Independent cost-benefit analysis of broadband and review of regulation

Volume I – National Broadband Network Market and Regulatory Report

August 2014

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The Hon Malcolm Turnbull MP
Minister for Communications
Parliament House
CANBERRA ACT 2600

14 August 2014

Dear Minister

Independent Cost-Benefit Analysis of Broadband and Review of Regulation Report

Together with my panel colleagues Ms Alison Deans, Professor Henry Ergas, and Mr Tony Shaw, I am pleased to submit to you the *Independent Cost-Benefit Analysis of Broadband and Review of Regulation Report*.

The report is comprised of two volumes. Volume I – the *Market and Regulatory Report* – examines and makes recommendations on the most appropriate overall structure and regulatory framework for Australia's future broadband market, including the role of infrastructure-based competition and, particularly, NBN Co's role in that market. It addresses the panel's terms of reference clauses 1(b), 2 (excluding 2(a)), 3 and 4.

As in the other parts of the panel's work, we consulted broadly and sought submissions from across the telecommunications sector. We again record our appreciation for the time given by individuals and organisations and the quality and content of the submissions received.

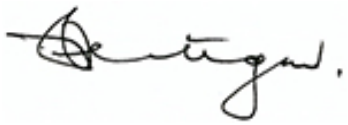
Volume II – the *Cost-Benefit Analysis Report* – compares the costs and benefits of alternative options for delivering high-speed broadband to Australian households and businesses. It addresses the panel's first term of reference.

In preparing its CBA Report, the panel has been ably and professionally assisted in devising and then constructing this analysis by The Centre for International Economics, as well as a number of other individuals and organisations. The panel also wishes to thank Professors Nicolas Curien (Conservatoire National des Arts et Metiers, Paris), Kenneth Flamm (Lyndon B Johnson School of Public Affairs, University of Texas, Austin), Jonathan Pincus (University of Adelaide) and Cliff Winston (Brookings Institution, Washington) who provided valuable input in reviewing the cost-benefit analysis.

The panel has reported to you separately on other aspects of its terms of reference through the *Statutory Review*.

The panel has been assisted in developing its thinking and completing its report by a secretariat and other staff within the Department of Communications, as well as a number of other individuals and organisations. We record our appreciation for their professional efforts.

Yours sincerely



Dr Michael Vertigan AC
Chair
Cost-Benefit Analysis and Review of Regulation

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1. Executive summary and recommendations

1.1 Executive summary

On 12 December 2013, the Minister for Communications announced a panel to conduct an independent cost-benefit analysis of broadband policy and review the regulatory arrangements for the National Broadband Network (NBN).

The panel's terms of reference are provided at Appendix 1.

This report examines and makes recommendations on the most appropriate overall structure and regulatory framework for Australia's future broadband market, including the potential for infrastructure-based competition and the role and structure of NBN Co Limited (NBN Co). This report (*Market and Regulatory Report)*, and the recommendations it contains, should be read in conjunction with Volume II of this report, the report on the costs and benefits of alternative approaches to the deployment of high-speed broadband (*CBA Report*), as well as the panel's report on the statutory review of Part XIC of the *Competition and Consumer Act 2010 (Statutory Review)*[1].

Background and context

Australia's telecommunications policy has been characterised by dramatic shifts in direction and persistent disagreement on crucial issues. While the rise of the internet opened up vast opportunities, it also gave rise to a lengthy, at times ill-informed and often unproductive debate about how those opportunities could best be exploited. After many twists and turns, that debate has resulted in the current market structure, centred on a government-owned NBN Co with primary responsibility for deploying and operating a high-speed broadband network on a wholesale-only basis.

Compared with countries that have income levels and population geographies similar to Australia's, that structure is highly unusual in creating a *de facto,* structurally separated, network monopoly and in reverting to government ownership and taxpayer funding of telecommunications infrastructure.

It is not the purpose of this report to assess whether that decision was or was not correct. Moreover, the panel recognised from the outset that is it was neither possible nor desirable to assess future telecommunications regulation starting with a clean slate. Rather, NBN Co has been established and, although it has experienced considerable difficulties, it now has a fibre

1 This report was tabled in both Houses of Parliament on 16 July 2014.

rollout underway, has myriad contractual arrangements in place and is proceeding to implement a new strategy. Other market participants have fashioned their own strategies and business arrangements on understandings about how the wholesale broadband market is expected to develop. Telstra has committed to a structural separation process which can only be implemented if its customers can be migrated to a national broadband network.

While taking those developments as given, the panel was mindful of the need to learn from experience in telecommunications reform in Australia and elsewhere and to appraise the outcomes of that experience so as to best inform the decisions that lie ahead. Recognising the commitments that are now in place, it has sought to provide a factual, rigorous and transparent basis for policies that can help Australia secure the immense possibilities that developments in telecommunications offer. Securing the benefits from those developments should be a high priority for a vast, technologically sophisticated country remote from its trading partners but deeply enmeshed in the global economy.

This summary provides an overview of the panel's findings and of the analysis on which they are based.

Principal conclusions

The panel has reached seven principal conclusions.

1(a). Upgrading Australia's broadband network can deliver substantial economic benefits. A fully commercial rollout, to areas where demand covers costs, would yield net economic benefits of $24 billion (in net present value terms, expressed in today's dollars) and would reach up to 93 per cent of premises.

1(b). The most efficient way to deploy high-speed services in those areas is through a 'multi-technology' approach, which uses a mix of copper and fibre-based technologies, along with hybrid fibre-coaxial (HFC). Relying on such an approach yields net economic benefits $16 billion greater than would be realised by relying solely on deploying fibre-to-the-premises (FTTP). Again in present value terms, that implies that 72 per cent of the investment in an 'FTTP only' fixed network would be wasted, in the sense of involving costs that are not matched by corresponding benefits.

1(c). While the future growth in demand for high-speed services is inevitably uncertain, the Multi-Technology Mix (MTM) approach can be upgraded should demand growth prove much greater than expected. In contrast, the costs of FTTP, once deployed, are irreversibly sunk. The MTM approach is therefore robust to variation in the growth in demand, whereas an 'FTTP only' approach commits to a higher level of spending that cannot currently be justified. Hence an MTM approach better manages the uncertainty of future demand – or is economically 'future proof' – in a way that an FTTP approach cannot be. Even ignoring the scope to upgrade from MTM to an FTTP-only approach,

simulations undertaken for the review find the MTM approach yields materially greater net benefits than an FTTP-only approach in 98 per cent of the circumstances modelled.

1(d). Extending high-speed broadband to regional and remote areas is inherently complex and expensive. Fundamentally, those areas are uneconomic to serve: deploying and operating NBN Co's fixed wireless network and satellite service costs some $5 billion in present value terms, while the present value of the benefits from the service is in the order of $1 billion.

2. Given the scale of the investment Australian taxpayers are making in high-speed broadband, ensuring services are provided efficiently is crucial. However, relying on NBN Co as an integrated entity to be the principal means of delivering those services is deeply problematic. The current model, in which NBN Co controls the full spectrum of technologies, inhibits the development of competition, is difficult to effectively regulate and results in unacceptable risks to, and costs on, taxpayers and consumers.

3. While it is always a case in public policy that "one would not start from here", the current situation creates important opportunities for a transition to effective competition. In particular, disaggregating NBN Co into competing business units, initially structured according to its existing and planned network technologies, would create roughly equally matched networks. For the first time since Australia's reform process began in the 1980s, this would provide a market structure in Australia where similarly sized networks would compete, much as happens in North America and significant parts of Europe. This would provide the most effective platform from which competition could develop, encouraging innovation, forcing down costs and reducing the need for intrusive and ultimately inefficient regulation.

4. Consistent with the Competition Principles Agreement, creating an environment that supports competition and promotes the long-term interests of end-users should take precedence over any impacts microeconomic reform might have on NBN Co's financial position.

5. Regardless of whether and when a move to disaggregating NBN Co occurs, the regulatory structure should be adjusted to better support competition. Statutory obstacles to market entry and other barriers to competition should be eliminated or at least reduced, while still ensuring regulation can deal promptly and effectively with any anti-competitive behaviour. Introducing greater flexibility into the regulatory arrangements, including through the removal of blanket prohibitions that affect infrastructure competitors, would enable greater timeliness, innovation and responsiveness in supply and encourage more efficient practices to be adopted.

6. Consumers, industry participants and taxpayers should be given clarity and certainty over the objectives of, and obligations on, high-speed broadband service provision.

Formally establishing a national broadband objective, structuring efficient subsidy arrangements and legislating an 'infrastructure provider of last resort' obligation, are all important in providing clarity and certainty.

7. Regulatory arrangements and processes should be better focussed, streamlined and made more accountable, including by providing for merits review of all regulatory decisions with lasting impacts. Responsibility for economic regulation should be transferred from the Australian Competition and Consumer Commission (ACCC) to a 'networks regulator' with responsibility for regulating all major infrastructure, and the panel recommends this approach to the Competition Policy Review.

The panel's recommendations follow from these principal conclusions.

The cost-benefit analysis

In responding to its Terms of Reference, the panel has undertaken a cost-benefit analysis (CBA) that both informs its findings on future deployment options for high-speed broadband and has helped shape its views on regulatory reform.

The panel's analysis compares the costs of alternative approaches to deploying high-speed broadband with the benefits that deployment yields. The benefits comprise business and residential consumers' willingness to pay for the services high-speed broadband provides, along with any wider social gains (such as reduced costs for delivering education and health services) it permits. Costs include those involved in constructing and eventually replacing the network, as well as those required to operate it.

Consistent with the NBN Co Strategic Reviews of the fixed and wireless networks undertaken by NBN Co in 2013 and 2014, from which the data on costs are derived, the evaluation covers the period to 2040 but imputes a residual value to any publicly funded assets in place at the period's end. All estimates are reported in present value terms, calculated using a discount rate of 8.3 per cent, and are expressed in 2014 prices. For this reason, the costs in the *CBA Report* cannot simply be compared with previous public cost estimates for the construction and operation of the NBN.

Estimating willingness to pay for high-speed broadband raises complex issues. The take-up to date of NBN Co's highest speed plans implies consumers place a relatively low valuation on those speeds. Indeed, using that take-up data as the basis for assessment implies the benefits of deploying very high speeds through FTTP technology fall significantly short of the costs in metropolitan areas. However, the panel commissioned two other studies which pointed to greater gains. A technologically focussed study examined the speeds needed to access the main current and prospective uses of broadband networks. Additionally, a carefully structured survey was undertaken involving a large scale stratified sample of consumers.

The survey was designed to provide econometric estimates of consumers' willingness to pay for high-speed services. Those econometric estimates were used as the primary measure of willingness of pay, along with a range of possible future growth rates.

The first important question the analysis addressed was whether the deployment of high-speed broadband would yield net economic benefits. The analysis finds that, compared with the current situation, moving to high-speed broadband would make Australians $24 billion better off in net present value terms. To that extent, ensuring widespread availability of broadband is in the national interest.

That assessment assumes service is deployed on a commercial basis, that is, to the areas where the private and social benefits from deployment exceed the costs. Those areas, which reach up to 93 per cent of premises, would be served using the fixed line network.

However, deployment of high-speed services using satellite and fixed wireless to the bulk of the remaining 7 per cent of premises not covered by a commercially determined rollout involves a net cost in excess of $4 billion (comprising $4.8 billion in costs and $0.6 billion of benefits).

In terms of the relative merits of alternative technologies, the panel compared a multi-technology option (including FTTP, various forms of fibre-to-the-node (FTTN) and HFC) with an all-FTTP approach in the fixed network areas.

In doing so, the study takes as given commitments that have already been made, most notably through the Definitive Agreements reached between NBN Co on the one hand and Telstra and Optus on the other. The costs associated with those commitments, which are around one-fifth of the total project costs, are imputed to both of the major technological options examined. However, had an MTM strategy been adopted from the outset, a share of the costs might have been avoided. If this were the case, the lower value of the commitments required to support an MTM approach would have increased the gap in net benefits between the MTM and all-FTTP options.

However, even taking those commitments as they now stand, the analysis shows that deploying an all-FTTP fixed network would make Australians some $16 billion worse off, in net present value terms, compared with the alternative of an MTM scenario. That implies that 72 per cent of the costs of deploying an all-FTTP fixed network would be wasted, in the sense of being withdrawn from other uses that Australians valued more highly.

The panel emphasises the many uncertainties involved in any analysis of this kind. However, it does not believe those uncertainties undermine its results – on the contrary, properly understood, they strengthen them. The panel has performed extensive sensitivity analysis and finds that its results are remarkably robust.

A systematic testing of the CBA results using a wide variety of assumptions shows that, in 98 per cent of cases, the MTM approach outperforms (that is, has greater net benefits than) an all-FTTP option.

The MTM approach has significant net benefits relative to an FTTP approach even if the per premises costs of FTTP could be reduced by over one-third relative to the NBN Co Strategic Review (*Strategic Review*) evaluation of NBN Co's experience to date. Indeed, in some scenarios, deploying an all-FTTP fixed line network would make society worse off than simply freezing broadband availability and speeds at current levels.

Examining two specific areas of uncertainty highlights and helps explain the robustness of the results. These are the rate of growth in willingness to pay and the rate of technological progress.

The growth rate of willingness to pay for higher speeds is a major source of uncertainty, as the nature of and willingness to pay for future applications are not readily predictable. However, should the growth rate of demand ultimately prove very much higher than the panel uses as a central projection, it is always possible under the MTM approach to accelerate the transition to FTTP. In contrast, should an FTTP approach proceed, and the growth rate of willingness to pay for higher speeds fall below initial expectations, the costs of providing FTTP cannot be reversed.

There is, in other words, an asymmetry between the scenarios: in the *MTM scenario*, the option of changing the timing of an upgrade to FTTP constrains the maximum harm any error in forecasting demand can cause; in the *FTTP scenario*, on the other hand, once the error is made, the losses are irretrievably incurred. As such the MTM approach better manages the substantial risk that broadband deployment places on Australian taxpayers and consumers and is therefore more economically 'future proof' than FTTP.

There are also significant uncertainties in terms of the rate of technological progress in both wireless and fixed line technologies. For example, technology providers who met with the panel explained that since the FTTP model had been selected by the previous Government, FTTN technologies had advanced more rapidly than expected, altering their view on the relative attractiveness of these options. The panel was also told of important developments in prospect for HFC and, even more so, for wireless networks.

These uncertainties highlight the risk of locking in a single technology as the technology of choice for Australia's telecommunications future. Doing so could expose taxpayers and consumers to unnecessarily high costs or preclude the adoption of new technologies as they emerge, thus diminishing the net benefits that the NBN is intended to deliver.

The key policy lessons and issues

Overall, it is the panel's conclusion that two lessons can be drawn from the experience to date.

The first is that where major policy decisions – such as those setting national minima for broadband service availability – need to be taken, they must be based on careful cost-benefit appraisal, and periodically reviewed. This is not solely or even mainly because that appraisal can yield a ranking of options (such as that embodied in benefit/cost ratios) but because it can expose the sensitivities and hence risks associated with each of the competing options. It therefore assists in informing taxpayers of the risks which are being placed upon them and can contribute to better management of uncertainty. Moreover, periodic *ex post* review of decisions, and of the appraisals on which those decisions were based, can strengthen the 'self-correction' mechanisms in public decision-making, including by improving the information base for, and hence the quality of, appraisals over time.

The second, no less important, finding is that there are substantial gains to maintaining an environment in which a range of technologies can contend, as that builds in the diversity and flexibility needed to manage uncertainty and ensure Australians derive the greatest benefits from the unpredictable course of technological advancement.

These lessons have shaped the panel's approach to the regulatory issues covered in its Terms of Reference. Those issues include:

- how best to ensure end-users, including those in rural and remote areas, have ready access to reliable and affordable fast broadband and voice services that are provided cost-effectively;
- how to ensure competition and contestability work effectively and efficiently where they can, while also ensuring regulation acts as a backstop or alternative where market forces, left to their own devices, will not adequately meet consumer needs; and
- how to encourage innovation and diversity in products and services, particularly in areas or markets that are less competitive.

To guide it in addressing these issues, the panel adopted the following objective:

> *To identify the market structure and regulatory arrangements that will deliver affordable and reliable communications services to all Australians, including fast broadband services, in the most economically efficient way.*

Future market structure

Competitive markets can play an important role in achieving the objective the panel has set out. Although competition invariably falls short of the textbook ideal, it would bring efficiencies, investment, innovation and more consumer choice at both the retail and infrastructure level. As well as the direct benefits competition offers in constraining the exercise of market power, thereby protecting consumers and promoting innovation, competitive markets reduce the burden on regulation and make it easier for regulatory agencies to properly undertake their tasks.

Conversely, long experience in Australia and overseas shows that there are substantial risks in entrenching monopoly power at the network layer. It also shows that once monopolies are allowed to develop, dismantling them is invariably costly, complex and contentious. For this reason, policy makers throughout the Organisation for Economic Co-operation and Development (OECD) area remain strongly committed to the goal of promoting infrastructure competition in telecommunications.

The panel therefore concludes that competition in both infrastructure and retail service markets should be promoted.

However, it is clear that practical constraints, including the characteristics of particular geographical markets, can prevent market-based arrangements achieving fully desirable outcomes. So too can past decisions by governments and regulators, as those decisions leave a legacy which cannot be simply erased nor even necessarily overcome at reasonable cost. Any move to sustainable and efficient arrangements must recognise those constraints. It must also recognise that competition is not a goal in itself, but an instrument for protecting consumers and promoting efficiency.

The result is that in some instances a gradual, but credible, transition may be required. Nevertheless, it remains important to identify, as clearly as possible, the options for maximising the benefits competition can bring to providing fast, reliable and efficient broadband.

Overall, the panel considers that an approach of delivering the NBN through a single entity (where NBN Co has comprehensive responsibility for planning, constructing, operating and commercialising high-speed broadband services across all platforms) will inevitably foreclose opportunities for diversity, innovation, competition and choice in the long term. Entrenching an infrastructure monopoly imposes too great a risk on consumers, government and taxpayers and is unlikely to meet the objective of timely and cost-effective deployment.

The panel believes these risks need to be mitigated through structural and regulatory changes that encourage competitive entry in the construction and ongoing delivery of broadband infrastructure.

Removing unnecessary constraints on competition would be a desirable first step. The panel therefore recommends that the *Telecommunications Act 1997* (Telecommunications Act) be amended to provide additional freedom for potential entrants into the high-speed broadband market.

Specifically, the panel does not believe there is a policy justification for retaining the current Part 7 of the Telecommunication Act, which, with some exceptions, prohibits a local access line being used to supply a superfast carriage service to residential and small business customers unless a Layer 2 bitstream service is available. Having reviewed a range of possible alternatives, the panel has concluded that the provisions of Part 8, which, once again with some exceptions and exemptions, prevent non-NBN Co operators of superfast networks entering retail markets, should be retained but in substantially amended form. Specifically, the provisions as amended would define some 'default' conditions entrants would have to meet, including structural separation. However, those default conditions would be capable of being over-ridden by exemptions granted by the regulator, with the legislation directing the regulator to approve exemption applications unless the costs of doing so outweighed the benefits. The panel envisages that the undertakings given in seeking such exemptions would specify the terms and conditions of third party access.

Reforming Parts 7 and 8 may bring some competitive pressure to bear on NBN Co. However, given the advantages NBN Co enjoys, the panel believes that the most realistic chance for any significant long-term competition to develop is to allow existing and future infrastructure to compete and to serve as a platform for cost-effective expansion. In contrast, under the current policy approach, NBN Co would be a geographically ubiquitous supplier of network services that controlled all the major access networks capable of being used for high-speed broadband, whose costs by then will be sunk.

The panel considered options around continuing with the current NBN Co structure or moving to a disaggregated approach. This choice involves a judgement about the potential economies of scale and scope available to a single integrated entity compared with the efficiencies, innovation and choice a disaggregated approach offers. It also requires a judgment about the extent of the risks to taxpayers and consumers inherent in the various options.

The panel recommends that the Government move to disaggregate NBN Co along the lines of its underlying networks where each of the satellite, fixed wireless, HFC and FTTx networks would serve as the basis for a competing entity.

Disaggregation would improve the prospects for infrastructure competition now and in the future, encourage private investment and bring specialist skills to bear in managing each of these networks. Rather than duplicate fixed costs, the approach the panel recommends would secure the maximum leverage from existing assets whose costs are sunk, using those assets as the basis for actual and potential competition. It would prevent assets consumers have paid

for (including the copper in HFC areas) from being prematurely scrapped, instead harnessing those assets for the benefit of end-users. Over time, this approach should reduce financial risks to taxpayers, facilitate a transition to private funding and improve the chance of efficient and timely network deployment.

Disaggregating the technology platforms could lead to some duplication of operating and network upgrade costs. However, the panel's modelling shows that if competition sped up delivery by one year and accelerated the annual growth rate of productivity by 2.5 per cent, its benefits would more than outweigh those costs of duplication. Experience shows competitive markets can easily produce gains of this order. Over and above these gains, a competitive structure would deliver the benefits of greater customer responsiveness, a lowered risk of monopoly pricing and a reduced burden on taxpayers.

The panel recognises that implementation of a disaggregated model will require planning and take time, and could raise implementation issues made all the more acute by the fact that the speed of the rollout is currently being increased. Moreover, NBN Co is adjusting to a new mandate, leadership and operating model, and there are dangers in disrupting that adjustment. Recognising these risks, the panel sets out various options for disaggregation, including options for transitioning to a disaggregated structure over time. Were a transitional approach adopted, the panel recommends that in the period before disaggregation, NBN Co undertake steps to ensure that the different networks are developed and designed in such a way as to facilitate future divestment. Additionally, so as to ensure progress is made on disaggregation, the Productivity Commission should be commissioned to undertake a further review of market structure in no more than five years' time.

Clarifying and funding service obligations

The Government has a commitment to ensuring that all Australians have access to high-speed broadband as soon as possible, at affordable prices and at least cost to taxpayers. NBN Co is the principal vehicle for the delivery of that commitment.

To date, however, that objective and the obligations associated with it have been specified mainly through the Statement of Expectations (SOE) which the Government, as the shareholder, issues to NBN Co from time to time.

The panel believes there are compelling reasons for specifying any universal service objective, and the associated obligations, in legislation, noting that the legislation should provide the flexibility to adjust the way in which the objectives and obligations are pursued in the light of evolving technologies and market structures. The reasons for specifying these in legislation include the sheer magnitude of the investment taxpayers are making in NBN Co and the importance of ensuring accountability for the outcomes of that investment; the need to provide NBN Co, its customers and competitors with a predictable framework for planning

their operations; and the desirability of setting a framework now that can accommodate any disaggregation and future privatisation of NBN Co.

Infrastructure provider of last resort

As a starting point, the panel recommends establishing in legislation an 'infrastructure provider of last resort' obligation that would attach to NBN Co but would be capable of being vested in other entities, should that be appropriate. The obligation should not be defined in a way that disrupts the planned deployment of the NBN; rather, the obligation would come into effect once deployment had been undertaken in a particular area. In so doing, it would provide end-users with the certainty that service, once commenced, would remain available.

A contentious aspect of NBN Co's obligations has been in the deployment of infrastructure in new real estate developments. Improving competition in the provision of telecommunications infrastructure in these developments can help hold down costs and improve the long-term affordability of communication services. The panel recommends requiring NBN Co to stand ready to provide connections to those developments under cost-reflective terms specified in an undertaking approved by the regulator. As part of this model, both the prime responsibility for the relevant decisions, and the burden of bearing the initial costs, would fall on developers (although ultimately, those costs would be capitalised into property prices). The panel recommends the Commonwealth work with the states and territories to ensure planning laws place on developers an obligation to makes the services available to a requisite standard in new estates.

Under the proposed model, developers would not be required to obtain connections from NBN Co, but they would have an assurance that connection services were available from NBN Co should they choose to use them. At the same time, the charges for those connections would signal to developers the costs involved, thus helping to guide efficient location decisions.

Uniform wholesale pricing

Imposing a legislated obligation to serve assures consumers of access to services but does not in itself ensure that those services are affordable. As a general matter, the best instrument for guaranteeing affordability is effective competition; but even with competition in place, important issues would remain with respect to costs and charges for service in regional and remote Australia.

To date, those issues, like the issues relating to obligations to serve, have been dealt with largely through the SOE which, under the previous Government, specified a form of uniform national wholesale pricing. In turn, NBN Co's Special Access Undertaking (SAU), as approved

by the ACCC, establishes price caps which provide some flexibility for NBN Co to vary the geographical structure of its charges, but only so long as the caps are met.

The panel believes a price capping approach should be retained but is mindful of the distortions uniform price requirements impose, including in terms of preventing the emergence of competition in regional areas (where prices are forced below costs) and encouraging potentially inefficient competition in metropolitan areas (where uniform prices might be above costs). Additionally, evidence from the panel's cost-benefit analysis suggests demand for extremely high-speed broadband is relatively highly price elastic, which means price distortions impose significant welfare losses (as they induce some consumers to demand services they value at less than their costs, while discouraging other consumers from demanding services they value at more than their costs). By disguising costs, uniform prices can also reduce the pressures on NBN Co to ensure their proper management. As well as those disadvantages, the panel notes that uniform wholesale pricing of NBN Co's services may not result in uniform retail charges, which is a further reason for concluding that it is a poor way of pursuing the goal of service affordability.

As a result, the panel recommends a gradual move to cost-reflective wholesale pricing, accompanied by subsidies provided directly to vulnerable consumers. By directly addressing the affordability objective, such a move would allow better targeting of subsidies. This would prevent, for example, the perverse redistributions uniform pricing can effect from low-income consumers in low cost areas to wealthier consumers in high cost areas.

However, the panel recognises that a transition to more cost-reflective pricing would have to be gradual. During that transition, changes in market structure and a move to greater competition could impact on NBN Co's capacity to cross-subsidise non-commercial networks. It would be a mistake, however, to suppress the development of competition to achieve other policy objectives, all the more so given the contribution competition can make to delivering service quality and affordability.

The panel's approach was therefore first to address the issue of competition and then examine how a wholesale-only national network subject to price caps could be accommodated within the proposed competition framework. This requires careful consideration of the scope for and design of any subsidies that might be required to preserve universal service.

Subsidies

The panel considers that any subsidies required to meet broadband access and pricing goals should be transparent, sourced in ways that minimise inefficient burdens on taxpayers, delivered as efficiently as possible and sustainable in a competitive environment.

NBN Co's current pricing structure fails to meet these criteria. Entrenching an opaque cross-subsidy, it offers no transparency on the extent of transfers and provides no benchmarks that would allow an assessment of whether future claimed transfers are reasonable compared with the actual costs of supply and revenues received. There is no potential for contestability of the subsidy and the funding source for the subsidy may be eroded over time by entrants attracted to the high profit margins in lower cost areas.

It is therefore worth considering an arrangement that made any subsidies explicit and transparently funded.

This could partly be achieved by writing down to their value-in-use any assets NBN Co acquires as they are brought into service. Were that done, the burden of any subsidies would be borne by taxpayers and accounted for in the Commonwealth's budget and associated financial statements. The panel believes this would be an appropriate approach to adopt, as it would signal transparently to taxpayers the capital loss entailed in providing service to uneconomic areas. Nonetheless, while it recommends proceeding with these asset revaluations, the panel recognises that they would not be sufficient to cover the operating and asset replacement costs involved in serving non-commercial areas, especially in the satellite and fixed wireless footprints.

By far the best option for funding any ongoing subsidy would be through consolidated revenue. Among other advantages, that would allow Parliament and the public to assess in an ongoing way the benefits of using taxpayer funds for this purpose rather than others. However, should that option not be adopted, the panel recommends that, if an ongoing subsidy is required and its minimum amount can be reliably determined, a single, annual, broad-based industry levy, covering both voice and broadband services, be imposed to fund that subsidy. This would be similar to the current arrangements for the Universal Service Obligation (USO), which are outlined in Appendix 3.

However, any new levy must not place unreasonable burdens on consumers. When the quantum of subsidy required is not capable of being market-tested, there is a risk that the levy itself will become a means by which powerful suppliers extract benefits at the public's expense. The panel believes that an important benefit of its disaggregation proposals is that the process of divesting the satellite and fixed wireless networks would offer an opportunity for market-testing the amount of any future subsidy these networks might need. But were NBN Co to instead remain an integrated entity, it would be difficult to determine the subsidy required and on that basis to set an appropriate levy. The cost and revenue uncertainties associated with NBN Co's still very initial stage of network deployment compound those difficulties.

Under those circumstances, imposing a levy could cause greater distortions than it is intended to remedy. As a result, it is the panel's conclusion that if NBN Co remains structured as it

currently is, the Government should wait to see whether any intervention is required to deal with concerns that competition may threaten NBN Co's ability to cross-subsidise service provision in loss-making areas. The panel therefore recommends that absent disaggregation, no specific mechanism for funding any subsidies within NBN Co be put in place, subject to review in five years' time.

The panel nonetheless believes any cross-subsidies within NBN Co should be quantified to the extent possible and made transparent to consumers and taxpayers. To that end, the panel recommends that NBN Co be required to report annually on the quantum of its subsidies to uneconomic areas, according to a methodology to be established by the Productivity Commission. While inherently imperfect, such estimates would provide a useful fact base for future reconsideration of the appropriate subsidy arrangements.

NBN Co's capital investment, products and pricing

The panel's terms of reference require it to report on the review and regulation of NBN Co's capital investment, products and pricing. The terms upon which NBN Co's products and services are offered will become increasingly important to end-users over the coming years as its network footprint grows. Efficient corporate practices within the company will be necessary to keep construction and operating expenditures to a minimum. At the same time, efficient regulatory arrangements are necessary to ensure, among other things, that the benefits from efficient operation flow through to the prices paid by access seekers and, ultimately, end-users.

A range of important changes to the regulatory arrangements have been recommended in the panel's *Statutory Review*. Subject to those recommendations being implemented, the panel sees merit in the current regulatory framework which allows for scrutiny by the regulator of both general principles enabling NBN Co to seek a regulated maximum return and the specific terms of access. The panel therefore recommends the broad approach to regulating the terms and conditions under which NBN Co provides services be retained, but with some enhancements in relation to issues such as developing products, upgrading its network and operational issues relating to terms of access.

The rules for NBN Co's ownership and governance are established in legislation. These rules allow considerable flexibility in the management of NBN Co's assets and give the Government significant powers to determine the structure of the company. These powers can facilitate the structural reforms to increase competition and improve long term industry outcomes that the panel recommends.

The minimum standard of broadband service set as a national goal will need to be reconsidered in the future. As is clear from the CBA, great care must be taken in determining whether the benefits to Australians from upgrading the telecommunications network to particular standards outweigh the costs. The panel therefore recommends legislating a

process whereby any proposed changes to the minimum standards set down in the most recent SOE would have to be assessed and reported on by the Productivity Commission.

Full privatisation of NBN Co is not an issue that requires immediate consideration. However, the objective of eventual privatisation should inform, and be consistent with, implementation of the panel's recommendations. Additionally, disaggregation offers scope for a timely move to mobilise private funding for at least aspects of NBN Co's operations, reducing the financial burden and risks being placed on taxpayers.

Efficient and accountable regulation

Even were a more pro-competitive market structure put in place, the sector's future performance will also depend on the efficiency of its regulatory arrangements. That in turn depends not solely on the regulator's powers but also on the mechanisms that can hold the regulator to account for the manner in which those powers are used.

The dynamic nature of telecommunications markets informed the choice of a regulatory framework that, as of 1997, vested substantial discretion in the regulator. Whatever its merits, that discretion was accompanied by relatively few checks and balances, and those which were put in place were progressively weakened. Here too, Australia is anomalous by international standards, both in placing the responsibility for infrastructure regulation in a competition and consumer authority and in removing almost all forms of review of regulatory decisions on their merits.

While strengthening the role of regulation, the panel has consequently sought – both in this *Market and Regulatory Report* and in its *Statutory Review* – to strike a balance between vesting in the regulator the powers it requires and ensuring the structure of regulatory institutions makes for regulation that is well-informed, transparent, predictable and accountable.

That is all the more important in an industry which will become increasingly complex. Structural separation has itself transformed issues such as the selection of new products and the extent, timing and funding of capacity expansion from being primarily commercial decisions taken within a vertically integrated entity into decisions that involve negotiations between NBN Co and access seekers. Those decisions will inevitably put greater demands on the regulator in the years ahead.

It is the panel's view that those decisions, and where possible others, should be taken on a basis consistent with the approach adopted in other regulated network industries, minimising the risk of regulatory distortions to the allocation of scarce capital. Placing responsibility for regulation in a 'networks regulator', whose sole task would be economic regulation of infrastructure networks, including telecommunications, would facilitate this, and would also better focus the regulator's tasks and hence accountabilities. As a result, the panel

recommends that such a specialist regulator be established and that the current review of competition policy examine the scope for transferring responsibility for economic regulation of infrastructure more broadly to a single networks regulator.

It is also important that the telecommunications policy capability within government be strengthened. More sharply defining the dividing line between policy and regulation – and making it clear the regulator's role is to implement the rules, not devise them – should be a component of implementing this report's recommendations.

A complete list of the panel's recommendations is provided in the following section. The full context and details of those recommendations can be found in the relevant chapters of this report.

1.2 Summary of recommendations

The full context for, and details of, the panel's recommendations for changes outlined below can be found in the relevant sections of the report.

Future market structure

Recommendation 1: Infrastructure competition be the guiding policy for the delivery of wholesale broadband services. This policy be implemented expeditiously to the maximum extent practicable.

Recommendation 2: The basis for a competitive wholesale broadband market structure be created through the disaggregation of NBN Co. This be done through:

a) the disaggregation and divestment of NBN Co's transit, satellite and fixed wireless business units, along with associated obligations, including with ongoing subsidies if they prove to be necessary;

b) putting in place arrangements with the aim to having the HFC network owned and managed by a non-NBN Co operator. If NBN Co is successful in acquiring the network and the Government considers that full divestment is not achievable, it disaggregate NBN Co's HFC network from its FTTx network to the greatest extent possible;

c) were full disaggregation not to proceed immediately, the Government direct NBN Co to move to the transitional internal arrangements identified as a preparatory stage, with a further independent review of market structure being conducted in no more than five years' time; and

d) the copper network remaining active in the supply of ADSL services within the HFC network area pending upgrade to FTTN or FTTP.

Parts 7 and 8

Recommendation 3: Part 7 of the *Telecommunications Act 1997* and associated provisions of the *Competition and Consumer Act 2010* be repealed.

Recommendation 4: Part 8 of the *Telecommunications Act 1997* be amended to:

a) remove the 1 kilometre exemption and the Ministerial exemption process, but protect existing providers' rights in relation to infrastructure already installed under the exemption either by an ongoing statutory exemption or by deeming such networks to be subject to an undertaking under the process set out below;

b) provide for an undertaking process under which superfast network undertakings, if accepted by the ACCC, replace the Part 8 provisions that require supply of superfast broadband carriage services on a wholesale-only structurally separated basis;

c) require the ACCC to accept such superfast network undertakings unless to do so would be contrary to the long-term interest of end-users in the area the applicant intends to service, having regard, amongst other things, to whether the provider has a significant degree of market power, the incentive and ability for the provider to distort competition in dependent markets, the conditions in the undertaking to overcome these risks and the proposed duration of the undertaking;

d) require the ACCC to publish and implement guidelines on how it will apply the long-term interest of end-users test to undertakings – these guidelines should have regard to the tests already applied to special access undertakings; they should also include model superfast network undertakings for particular classes of markets and situations, for example, small local carriers serving new developments, which carriers wishing to service those markets could adopt;

e) require the ACCC to consult publicly on the acceptability of superfast network undertakings received, and approve or advise of concerns with an undertaking within three months of its receipt; where it has advised of concerns it must make its final decision within a further three months of that advice, with the undertaking being deemed to be accepted if the ACCC makes no decision;

f) subject an ACCC decision to accept or reject such an undertaking to merits review or, in the event merits review is not provided, ensure the process for the assessment of such an undertaking is subject to clear and specific decision-making criteria specified in legislation; and

g) enable a provider to combine a special access undertaking and an undertaking under Part 8.

Broadband service provision

Recommendation 5: NBN Co's ongoing service delivery obligations be enshrined in legislation. New legislative provisions provide that:

a) all Australian premises be in a position to access high-speed broadband, so where it is not being so provided by another entity, or is not likely to be so provided by another entity, NBN Co (or an alternative designated provider) has an obligation to supply that access (as the infrastructure provider of last resort - IPOLR). That obligation become effective when NBN Co has commenced service provision in an area;

b) where premises are currently served (or in future served) by a third party, and that third party exits the market, NBN Co (or the designated provider) has an obligation to provide continuity of supply using the most practical means, subject to arrangements being made for recovery of costs necessarily incurred; and

c) the price and non-price terms and conditions of NBN Co (or the designated provider) provision of a broadband connection service to premises be established through a requirement that NBN Co (or the designated provider) have a Broadband Connection Service Undertaking approved by the ACCC setting out the terms and conditions on which it will fulfil its IPOLR obligations.

Recommendation 6: Nothing should prevent a developer from requesting any provider (whether it be NBN Co or some other provider) to supply infrastructure in, and to service, their estate. The Government should create a fair and effective market for this work by implementing the following arrangements:

a) the costs of provision of broadband telecommunications infrastructure in new developments should be borne by developers and customers through connection charges, thereby facilitating competition in the supply of these services;

b) providers servicing new developments should have freedom in setting their charges for developers and connection charges for customers; NBN Co's charges should be competitively neutral and established through its ACCC-approved broadband connection service undertaking; and

c) to ensure developers meet the cost of providing telecommunications infrastructure, the Commonwealth should use Council of Australian Government processes to secure changes to State and Territory planning laws to require the provision of such infrastructure as a condition of development approval and occupancy; the Government should also further explore its ability to legislate to achieve the same outcome.

Recommendation 7: Transitional measures be used to assist with implementation of the recommended new development arrangements so it is least disruptive to service provision objectives. As part of these measures, the Government should:

a) set a date for the introduction of developer charging that minimises the impact on the cost of developments already in planning or underway, but does so in a way that avoids a rush of developments being lodged with NBN Co and Telstra with a view to securing free installation of infrastructure;

b) investigate whether NBN Co's existing contracts could be reallocated to alternative providers in a fair and efficient way with a view to maximising operational efficiency;

c) publish a clear roadmap and timetable for the introduction of the new arrangements and the transitional rules that are to apply, including for developments already under contract; and

d) put in place a communications program to explain the rationale for developers being required to meet the cost of telecommunications infrastructure in their estates.

Recommendation 8: A policy of price capping for NBN-type services be adopted, under which prices continue to be affordable but not necessarily uniform nationally. This should be accompanied by a gradual move towards cost-based wholesale pricing, with directly targeted subsidies used to address any concerns regarding user affordability that may result from this change.

Recommendation 9: If the Government accepts the panel's recommendations to divest NBN Co of its fixed wireless and satellite operations, the setting of caps on the prices that can be charged for services supplied by those networks should be part of the divestment program.

Recommendation 10: Division 16 of Part XIB of the *Competition and Consumer Act 2010*, which provides authorisations for NBN Co to conduct activities reasonably necessary to achieve uniform national wholesale pricing that may otherwise be found to be anti-competitive, be repealed. The repeal date should be delayed to provide NBN Co with an opportunity to apply for any authorisations it may require under Part IV of the *Competition and Consumer Act 2010*.

Recommendation 11: The implications of different future structural scenarios for NBN Co and changed market-entry conditions for the funding of non-commercial services be addressed in the following way:

a) explicit mechanisms for funding non-commercial services be put in place if the satellite and fixed wireless networks are divested, and the quantum of the subsidies required for those networks is market-tested;

b) an industry levy be used to fund service provision in uneconomic areas within the satellite and fixed wireless footprints, with that levy combining the amounts required for telephony and high-speed broadband services; over time, the subsidy should become contestable, and be provided to consumers rather than to a particular supplier; and

c) were the disaggregation options not accepted, no specific mechanism for funding any subsidies within NBN Co be put in place, with this arrangement subject to review in five years' time; if this market structure is maintained, NBN Co be required to report annually on any cross-subsidies using a methodology designed by the Productivity Commission.

Regulation of NBN Co's products, pricing and expenditure

Recommendation 12: The ACCC issue guidelines setting out its general approach in dealing with issues relating to new product development by NBN Co.

Recommendation 13: To ensure national standards for broadband infrastructure and services are appropriate, an independent body, such as the Productivity Commission, review them at least once every six to 10 years, with the results used by the Government to confirm or adjust the national broadband standard. This review requirement be set out in legislation. Such a process should be a prerequisite to any imposition by Government of a new national broadband standard.

Recommendation 14: If, following an independent review, the Government decides to raise the national broadband service standard, it should initiate a process with NBN Co and other relevant operators to establish the most cost-effective way of implementing that new standard. In doing so, the primary emphasis be on upgrading networks commercially, including through increased user charges. The Government should only consider funding assistance when a desirable upgrade would not otherwise be undertaken on a commercial basis.

Recommendation 15: NBN Co should generally continue to be permitted to supply only declared services within the meaning of Part XIC of the *Competition and Consumer Act 2010*. However, to provide flexibility to deal with situations such as pilots and trials, the integration of new networks, the provision of services in contestable markets, and greater competition following full disaggregation, Part XIC should be amended to allow the ACCC to determine that specified NBN Co services are not to be treated as declared services in circumstances where the ACCC is satisfied this is in the long-term interests of end-users.

Recommendation 16: Were the Government to decide to retain NBN Co as an integrated entity, competitive neutrality requirements in respect of decisions about entry and expansion be established in legislation. Should NBN Co be disaggregated, the Government give NBN Co clearer instructions through the Shareholder Ministers' Statement of Expectations about how it is to behave in situations where market failure is not usually an issue. This includes:

a) instructing NBN Co to act in a manner consistent with competitive neutrality principles other than where it is clearly fulfilling explicit social and economic policy objectives or has ACCC authorisation;

b) instructing NBN Co as to its priorities and its commercial objectives, including ensuring that where it overbuilds an existing network it acts as a prudent investor, takes full account of the opportunity cost of capital and is mindful of the fact that overbuilding premises that have adequate alternatives reduces its ability to service those that do not; and

c) ensuring that concerns about anti-competitive behaviour by NBN Co in relation to overbuilding are appropriately dealt with through Part XIB and Part IV of the *Competition and Consumer Act 2010*.

Recommendation 17: Retail price controls not be applied to Telstra services on the NBN unless there is clear evidence of consumer detriment due to Telstra facing inadequate actual and potential competition in a particular market segment. The Minister's power to make price control determinations be retained in a form that allows it to be applied to services provided over the NBN, for use only as a reserve power and subject to that power being confined to areas of clear market failure.

Privatisation and governance of NBN Co

Recommendation 18: Arrangements relating to the privatisation of NBN Co as a company are not an issue that requires immediate consideration; they be revisited once the NBN is further established.

Administration of economic regulation of the telecommunications industry

Recommendation 19: The current telecommunications-specific functions of the ACCC, with the exception of those related to Part XIB of the *Competition and Consumer Act 2010*, should be transferred to a 'networks regulator'. The current Competition Policy Review, which is to report by December 2014, should examine the establishment of such a regulator which would have responsibility for access regulation for all infrastructure industries.

2. Panel's approach

The panel was required to examine and make recommendations on the most appropriate regulatory framework for Australia's future broadband market and, particularly, on NBN Co's role in that market. The panel's terms of reference are provided at Appendix 1.

In approaching its task, the panel was conscious that issues of market structure are not simply questions of regulatory approach but are fundamentally affected by the economics underpinning the market and by the decisions of market participants. That said, the role of NBN Co in the market is itself a key determinant of the future market structure, as is the role of established participants and new entrants. So while the future form of regulation will influence market structure, market structure will also influence regulation.

This interplay required the panel to consider and make recommendations on industry structure as well as more purely regulatory matters. These structural matters include the role NBN Co, as a government business enterprise, plays in the market relative to other firms, which is an issue separate from (though not entirely unrelated to) its regulatory treatment.

The areas for consideration identified in the panel's terms of reference are:

- the overall structure of the Australian wholesale broadband market, including infrastructure-based competition;
- the role of NBN Co in that framework; and
- the more detailed regulatory settings to apply in that industry structure.

The panel saw the key underlying policy issues to address as being:

- how best to ensure end-users have ready access to affordable and high-speed broadband and affordable and reliable voice services – this includes the issue of servicing rural and remote areas in a cost-effective manner;
- how to ensure competition and contestability work effectively and efficiently where they can, while also ensuring regulation acts as a back-stop or alternative where market forces, left to their own devices, will not adequately meet consumer needs; and
- how to encourage innovation and diversity in products and services, particularly in areas or markets that are less competitive.

Competition at both the retail and infrastructure level brings efficiencies, innovation and more consumer choice. Nevertheless there are areas in Australia that are unlikely to support

broadband infrastructure and/or retail competition; these areas may need ongoing subsidy to encourage supply and maintain ongoing financial viability.

The NBN is focused on fixed access service provision to the broad consumer and small business market. This has also been the panel's focus; the delivery of broadband services over mobile telecommunications infrastructure and over infrastructure servicing large corporate customers are market segments that would need to be considered in examining the market in its totality.

The questions around market structure and regulation must be considered in the context of existing markets and regulation – there is no clean slate, nor is it realistic (or necessarily desirable) to envisage merely turning back the clock.

In relation to the regulation of NBN Co, the terms of reference make particular note of:

- the long-term ownership and regulatory arrangements for NBN Co;
- operational constraints on NBN Co given its mandate to efficiently build, operate and maintain a wholesale-only access network; and
- how NBN Co's capital investment, products and pricing should be reviewed and regulated.

These structural questions are fundamentally important to the long-term operation of the telecommunications industry, to end-users and, more broadly, to Australia's future prosperity. As such, the panel considered broadly the questions of the appropriate industry structure and regulation.

2.1 Guidance for readers

This report examines the broader regulatory framework for broadband and the administration of telecommunications generally, and then turns to broadband service provision and economic regulation of the telecommunications industry.

In general, the report explains the relevant provisions for review, identifies possible issues, reports on submissions to the review, explains the principles which have guided the panel's approach and presents the panel's conclusions and recommendations.

The report and its recommendations relate to both the industry arrangements in the transitional period prior to the full rollout of the NBN and the period once the NBN rollout is completed.

The panel has prepared different reports to address its terms of reference:

- this report – which is Volume I of the independent cost-benefit analysis of broadband and review of regulation – is referred to as the *Market and Regulatory Report*;
- a report on the panel's cost-benefit analysis of high-speed broadband – which is Volume II of this report – is referred to as the *CBA Report*; and
- a report fulfilling the requirements of the review required under s.152EOA of the *Competition and Consumer Act 2010* (CCA) – is referred to as the *Statutory Review*.

2.2 Consultation and submissions

On 13 February 2014 the panel released a Regulatory Issues Framing Paper that focussed on structural issues and sought views from industry and the public on the structure and regulatory environment for Australia's future broadband market. The panel received 43 public submissions[2]. To encourage submissions the panel also held an industry forum on 24 February 2014, inviting a number of key stakeholders to attend and express views.

On 24 March 2014, the panel released a discussion paper on Telecommunications Regulatory Arrangements[3], which provided an overview of the Part XIC access regime and sought feedback on its principles and operation. The paper also provided an overview of provisions in the *National Broadband Network Companies Act 2011* (NBN Companies Act) that are required to be reviewed and sought feedback. Submissions on this paper were primarily used in the development of the *Statutory Review*. The panel received 15 public submissions[4].

While these two papers identified a range of specific issues for comment, the panel also invited stakeholders to raise other issues as they considered relevant.

In addition, the panel also had individual meetings with various interested public and private sector stakeholders[5], and enlisted the services of consultants and specialists to aid in its work.

2 Submissions are available on the Department of Communications' website at www.communications.gov.au/broadband/national_broadband_network/costbenefit_analysis_and_review_of_regulation/telecommunication_regulatory_arrangements_submissions_received_by_the_panel

3 Telecommunications Regulatory Arrangements consultation paper for the purposes of s.152EOA of the *Competition and Consumer Act 2010*.

4 Submissions are available on the Department of Communications' website at www.communications.gov.au/broadband/national_broadband_network/costbenefit_analysis_and_review_of_regulation/telecommunication_regulatory_arrangements_submissions_received_by_the_panel

5 The full list of stakeholders that the panel met with, either at the industry forum or individually, is: Australian Communications Consumer Action Network, the ACCC , Akamai Technologies, Alcatel–Lucent, Amazon Web Services, Cartesian, Cisco Systems, Competitive Carriers Coalition, Communications Alliance, Corning Optical

3. Historical context

This review is the latest stage in a debate that has taken place over many years in Australia: a debate fostered by the rise of the internet, the online economy, and the demand for reliable, ever faster networks to access it. Similar debates have occurred in other countries[6] and in relation to other infrastructure utility industries.

3.1 Evolution of broadband in Australia

A central issue in the evolution of broadband in Australia has been the performance of the access network that connects individual customers, whether at their premises or individually, to the wider internet. Historically, the upgrading of this network has largely focussed on adding new transmission equipment that can increase the performance of the transmission medium, whether copper or spectrum, with attention also being given to replacing that transmission medium with a higher capacity medium, for example, HFC, and more recently fibre. Where this connection is a bottleneck, policy makers have also focussed on the potential for infrastructure competition to develop. Overlapping and intersecting with the issue of infrastructure competition has been the question of whether, and how, to facilitate retail service-level competition using that infrastructure to improve consumer outcomes.

These efforts have been driven by the growing demand for broadband availability and capability in order to access new services. Since the commercialisation of the internet and World Wide Web began in earnest in the 1990s, internet access, applications and usage have all experienced phenomenal growth. From simple dial-up connections to access email, simple bulletin boards and chat rooms, the online world has evolved into sophisticated, multifunctional, multi-access ecosystems. This is well demonstrated by the growth in internet subscriptions and traffic over the past two decades.

As the services available on the internet have evolved, so have demands for better access to it. First generation asymmetric digital subscriber line (ADSL) technology offered faster access (up to 512 kilobits per second (kbps)) than that available over narrowband, dial-up platforms, as did later generation ADSL2 (up to 8 megabits per second (Mbps)) and ADSL2+ (up to 24 Mbps). The opening of incumbent network operators' exchanges and access networks to competing digital subscriber line access multiplexer (DSLAM) operators, for example, by ACCC declaration of unconditioned local loop services (ULLS) and line sharing services (LSS), fostered

Communications, Ericsson, Fetch TV, Institute for Broadband Enabled Society (University of Melbourne), IPSTAR Australia, KaComm Communications, Macquarie Telecommunications, Microsoft, NBN Co, Nextgen, Nokia Solutions and Networks, Opticomm, Telstra, TPG Telecom, The Treasury and Vodafone Hutchison Australia.

6 Refer to the International Broadband Strategies discussion at Appendix G of the *CBA Report*.

competition between providers, further spurring innovation. At the same time, the pricing of that access by the ACCC deterred infrastructure-based competition and reduced the incentives for Telstra to upgrade the copper network to higher speeds. There was, as a result, a complex, largely unresolved, tension between promoting competition using existing assets and maintaining the incentives for those assets to be extended and enhanced.

In contrast, HFC networks, where there has not been third party access, have been upgraded from data over cable service interface specification 1 (DOCSIS 1) to DOCSIS 3 to support faster internet speeds, although the pace of that upgrading has been affected by the fact that these networks' owners operated other networks or used digital subscriber line (DSL) technology on those networks. Mobile networks, where infrastructure competition has been the norm, have experienced even more significant improvements.

From providing basic voice functionality, those networks have grown to encompass faster mobile access to the internet.

By the early 2000s, the ability to further enhance broadband speeds by upgrading exchange based ADSL, involving long copper cable runs, was coming into question. It was increasingly clear that fibre and DSLAMs would need to be pushed closer to customers, for example, by the deployment of FTTN, to increase performance. However, a policy and regulatory impasse developed which led to that deployment not proceeding.

3.2 Policy framework for broadband availability

The definition of broadband has been dynamic. While high-speed services, particularly for corporate customers, predated the rise of the internet, it has been the increasing range and depth of services available on the internet that has given rise to the 'need for speed'. The definition of broadband has largely evolved with the technological capabilities of the equipment available. For example, when ADSL was first introduced, broadband was largely seen as a service operating at greater than 128 kbps. ADSL has evolved, with ADSL2+ now capable of providing up to 24 Mbps in optimal conditions. This is seen by many as providing a new benchmark, even though the speed commonly available in the community is well below this level.

The technical limitations of exchange-based ADSL2+, the need for further network investment to advance broadband performance and the Government's goal of ensuring that investment occurs are merely the background to the policy task.

For the purposes of this review, the issue is not so much defining what broadband is, or should be, but looking at how best to increase consumer access to higher speed broadband

and pave the way for even higher speeds. The current policy focus is on how to provide wider access to broadband speeds of 25 Mbps or more. For convenience, this is called 'high-speed' broadband in this report[7].

The emphasis has largely been around how to increase access network availability and capacity, and the provisions for retail service providers to access the network. Far less attention has been paid to creating market conditions that provide incentives most conducive to achieving the desired outcome. This neglect has had important implications that this review seeks to address.

Development of NBN proposals

Telstra floated FTTN proposals with governments from around 2005. These helped promote wider community support for faster internet access. However, they also raised concerns that the rollout of FTTN would restrict the scope for DSLAM-based competition, which had already led to a highly competitive service provider sector and significant benefits for consumers.

This led to a number of competing FTTN proposals being put forward by Telstra and by access seekers under the G9 and FANOC banners.

In June 2007, the Howard Government announced it would establish a panel of experts to conduct a competitive process to facilitate the construction of an FTTN network. While it did not allocate funding to assist with construction costs, the then Government indicated it would consider legislative changes needed to facilitate the project. The Howard Government also initiated a competitive process with funding for a regional high-speed wireless network. This ultimately gave rise to the OPEL project, led by Optus and Elders.

With the election of the Rudd Government in November 2007, the existing request for proposals for the construction of an FTTN network was terminated. In April 2008, the Rudd Government announced the OPEL project would not proceed. A competitive process for an FTTN or FTTP network, one which also included funding of up to $4.7 billion, commenced in April that year.

In April 2009, the Rudd Government announced that the request for tender process had failed to find a proposal that would deliver value for money and was terminated. The Government established a company, NBN Co, to build a new fibre-based NBN. The Government then proceeded with this project, with project capital expenditure initially expected to be up to

7 Note that Parts 7 and 8 of the *Telecommunications Act 1997* define networks delivering in excess of 25 Mbps download as 'superfast' networks.

$43 billion over an expected eight year build period. No appraisal was made of whether the benefits from the project were likely to exceed its costs.

After the September 2013 election, the Abbott Government indicated ongoing support for the policy objective of providing faster broadband and the operation of NBN Co, but also indicated it would undertake a fundamental reassessment of key aspects of the previous Government's NBN approach. In particular, the Abbott Government indicated its interest in ensuring the new network would be rolled out in the most efficient manner possible, including the possibility of greater use of pre-existing communications assets, for example, as part of an FTTN network. In looking for a more efficient and more timely framework for the provision of faster broadband, the Government also decided to seek confirmation of the costs and benefits of its investment in better broadband and to examine the best structural and regulatory framework for an industry in which NBN Co plays a central role.

Australian Governments have therefore shown a long-term commitment to progressively improving the availability of high-speed broadband. Table 3.1 summarises the evolution of this commitment over time.

Table 3.1: Government commitments to availability of high-speed broadband

Approximate Commencement	Name of Program or Policy	Technology	Speeds (Download/Upload)
June 2003	Higher Bandwidth Incentive Scheme	Satellite Wireless, ADSL	256/64 kbps
January 2006	Broadband Connect Program	Satellite Wireless, ADSL	256/64 kbps
March 2007	Australian Labor Party (ALP) Election Policy	FTTN	12 Mbps
April 2007	Australian Broadband Guarantee	Satellite, Wireless, ADSL	512/128 kbps
June 2007	Australia Connected: Coalition's Expert Taskforce competitive process	Fixed line	12-50 Mbps
June 2007	Australia Connected: Coalition's Optus and Elders joint venture (OPEL)	Wireless ADSL2	6 Mbps (12 Mbps by 2009) 20 Mbps
April 2009	ALP's National Broadband Network	FTTH Wireless Satellite	100 Mbps 12 Mbps 12 Mbps
July 2011	NBN Co's Interim Satellite Service	Satellite	6/1 Mbps
August 2012	NBN Co's Corporate Plan 2012-15	FTTH Wireless Satellite	100/40 Mbps 12/1 Mbps 12/1 Mbps
April 2013	Coalition's Plan for Fast Broadband and an Affordable NBN	FTTN, HFC Wireless Satellite	50 Mbps by 2019 25 Mbps 25 Mbps
December 2013	NBN Co's Strategic Review	FTTH FTTN HFC Wireless Satellite	100/40 Mbps 50/20 Mbps 50/15 Mbps 25/5 Mbps 25/5 Mbps

Over the past decade Australian Governments have provided support through subsidies and incentives to assist with the provision of improved broadband services by the private sector. It has only been in the last few years (since 2007) that various Governments have made election commitments to be directly responsible for the provision of broadband, most recently through NBN Co. The decision to make NBN Co the primary instrument for deploying a new taxpayer funded broadband network, including by acquiring from Telstra physical assets and its customer base, amounts to effectively bringing telecommunications infrastructure back under government ownership.

This background frames the approach the panel has taken. Given the delays to date in making substantive progress on next generation broadband (close to a decade), there is heightened importance in maintaining the momentum of the rollout of broadband infrastructure. However, previous decisions relating to this rollout involved complex and inter-related issues that require the panel's consideration. For example, the previous Government largely envisaged NBN Co would have a monopoly in the supply of mass-market customer access and would utilise significant cross-subsidies from high-margin markets to loss-making regional markets to maintain some degree of uniform national wholesale pricing. It also put in place legislative mechanisms to discourage competing investment that could erode NBN Co's business case. These arrangements all require examination.

At the same time, NBN Co has entered into complex contracts with Telstra, Optus and other parties to support the rollout and viability of its own network. For example, NBN Co entered into agreements to acquire duct access and managed services from Telstra and to migrate customers from both the Telstra and Optus existing networks. As a result of these agreements, NBN Co has significant contractual obligations, to Telstra in particular, many of which need to be met regardless of whether the NBN proceeds. Conversely, in entering into these agreements with NBN Co, Telstra has specific contractual arrangements as to the long-term value it should derive from the rollout of the NBN. NBN Co in turn has significant contractual commitments to Ericsson related to the rollout of the fixed wireless component of its network and to Space Systems/Loral for the construction of the satellite component.

The panel understands that even if the NBN were not to proceed, NBN Co (and thus the Commonwealth) would still face termination costs/expenditure of around $6-7 billion. Telstra will also receive significant funding under the separate 20 year Telecommunications Universal Service Management Agency (TUSMA) Agreement. These financial considerations place real and significant constraints on the options available to the current Government.

3.3 Context for the industry structure and regulatory review

In addition to the historical context noted above, in making structural and regulatory recommendations the panel took account of a currently anticipated industry structure and regulatory framework. This involves two basic elements: the industry as it operates now and

the industry as it is envisaged to operate following migration to the NBN. The panel also had regard to international broadband strategies, funding approaches and outcomes; information about international high-speed broadband deployment is provided in the *CBA Report*.

In the industry as it operates today, there are multiple carriers operating a variety of access technologies, including fixed line, terrestrial wireless and satellite. In the fixed line area, the principal access technologies and the number of subscribers are summarised in Table 3.2.

Table 3.2: Principal access technologies and subscriber numbers

Technology	ADSL	HFC	FTTP
Subscribers (approx.)	4.9 million	944,000	167,000

Source: Australian Bureau of Statistics 8153.0 - Internet Activity, Australia, December 2013.

Central to the current operation of the industry, Telstra operates a copper access network that services the vast majority of premises. It offers voice and broadband services over that network itself and is required to provide access to that network to competing operators via a range of declared services. Access seekers (such as Optus, iiNet, TPG and M2/Primus) use these services in conjunction with their own infrastructure, including DSLAMs and backhaul networks, to provide competing voice, broadband and other services to end-users. Telstra provides access to these declared services according to price and non-price terms and conditions set by the ACCC in access determinations or as otherwise commercially negotiated. In providing access, Telstra is subject to equivalence and transparency requirements under its Structural Separation Undertaking (SSU), accepted by the ACCC in February 2012[8].

Telstra has deployed HFC networks in Sydney, Melbourne, Brisbane, the Gold Coast, Adelaide and Perth; these are capable of serving approximately 2.5 million premises. Optus' HFC networks are in Sydney, Melbourne and Brisbane, and are capable of serving approximately 1.4 million premises. There is a significant overlap in the coverage of the Telstra and Optus HFC networks. Neighbourhood Cable rolled out HFC networks in Geelong, Mildura and Ballarat in Victoria, which have since been acquired by TransACT (now owned by iiNet). Coverage data for these networks is not publicly available, but would not exceed 100,000 premises.

The HFC networks were initially rolled out to deliver Pay-TV services, with Telstra and Optus competing on content. Telstra and News Limited formed a joint venture, Foxtel, while Optus formed a joint venture with Continental Cablevision (now known as MediaOne, a subsidiary of USA company Comcast). This competition ended in 2002 when Foxtel and Optus agreed to a

8 https://www.accc.gov.au/regulated-infrastructure/communications/industry-reform/telstras-structural-separation-undertaking

content-sharing arrangement and in 2006 and 2007, as part of the content-sharing arrangements, Foxtel gave an SAU to the ACCC as well as undertakings under s.87B of the CCA. The s.87 undertakings set out that access seekers can gain access to Foxtel's set top unit and related services and the special access undertaking sets out the terms and conditions upon which Foxtel undertakes to supply its digital set top unit service.

With the introduction of the internet and growing interest in broadband, Telstra upgraded its HFC network to provide internet services in September 1996 and to DOCSIS 3 in December 2009; Optus upgraded its network to provide DOCSIS 1 in January 2000 and DOCSIS 3 in August 2010. Market share is summarised in Table 3.3.

Table 3.3: Retail market shares in fixed line services

Provider	Telstra	Optus	iiNet	TPG	Others
Market share	42%	15%	14%	12%	17%

Source: ACCC report: Telecommunications competitive safeguards for 2012–13, p.26.

There are three mobile carriers – Telstra, Optus and Vodafone Hutchison Australia – operating national networks. While they were initially deployed for voice services accessed through mobile handsets, they now offer 3G and 4G broadband services, accessed through smart phones, tablets, laptops and PCs.

There are niche operators of wireless broadband networks targeting areas of poor fixed line broadband coverage, both in cities and regional centres. Some regional operations were fostered by Government funding under the Australian Broadband Guarantee (ABG) funding program, including HaleNet, Shoalhaven Internet, Aussie Broadband and Ocean Broadband.

Another niche market developed in the mid-2000s, with operators providing more advanced networks in new real estate developments, which developers used to differentiate their estates. Telstra offered its FTTP Velocity product as a premium product. Other smaller operators like Opticomm, OpenNetworks, Service Elements, Comverge, and Pivit entered the market. Together these providers are estimated to service around 88,000 premises.[9]

Satellite broadband services are available in all areas of Australia. However, due to their high prices and performance constraints compared with fixed line and wireless services, they are principally used where these services are not available. While Optus was built around the nucleus of the AUSSAT satellite system, it soon faced competition from transborder satellite

9 Data on greenfield operators' active connections is not available. The figure of around 88,000 was derived from subtracting NBN Co's active fibre connections as at 31 December 2013 (78,850) from the total number of fibre connections reported by the ABS as at 31 December 2013 (167,000).

providers able to cover regional markets. This includes providers like Intelsat and Inmarsat, themselves originally old inter-governmental organisations, and new companies like IPSTAR.

Several providers benefitted from competitively neutral subsidies under the Higher Bandwidth Incentive Scheme and the ABG. As at December 2013, there were approximately 91,000 satellite broadband subscribers in Australia. Most of these subscribers were subsidised either by Government funding programs or the NBN. Services are generally not available commercially at affordable prices without a subsidy. Some providers will offer commercial services where end-user equipment is already in place.

There has been significant investment in transmission capacity services, commonly known as backhaul, with investment by Telstra, Optus, Nextgen Networks, TPG (through merging with Soul Pattinson Telemedia and its acquisition of AAPT and PIPE networks), Amcom and smaller providers who operate specific links (for example, Basslink). This has led to competition on the large inter-regional routes (east and south coasts from roughly Cairns to Perth), with strong competition in inter-city transmission services, particularly for corporate and Government customers.

In terms of future market structure, the model put in place by the previous Government envisaged that, following the migration to the NBN, NBN Co would displace Telstra as the main provider of the fixed broadband access network, offering faster wholesale services in doing so and operating its network on an open access, wholesale-only basis. Given its national coverage and open access arrangements, it was envisaged that most retail providers would use NBN Co's network to service the mass market.

Once the NBN Co network was in place, Telstra would operate as a retail service provider (RSP) on the NBN in the same way as other RSPs. As part of that transition, Telstra would progressively implement structural separation of the fixed line customer access network servicing its voice and broadband offerings in the mass market.

As part of the Definitive Agreements to support the rollout of the NBN, in June 2011, NBN Co has obtained access to Telstra infrastructure over a minimum 35-year period, Telstra agreed to preference NBN Co wholesale fixed line services, Telstra agreed to migrate its legacy fixed line customers (other than HFC Pay-TV customers) and interim arrangements were put in place for NBN Co's immediate access to Telstra infrastructure to accelerate network deployment. NBN Co also negotiated with Optus to migrate the services on its HFC network to the NBN. While the ACCC considered the matter was finely balanced, it authorised the Agreement in 2012.

- Telstra estimated the post-tax net present value (NPV) of its arrangements under the Definitive Agreements and associated Government policy commitments at approximately $11 billion[10]; and

- Optus estimated the total value of its agreement as approximately $800 million on a post-tax NPV[11].

Following the election of the new government in September 2013, NBN Co undertook a *Strategic Review*. This review concluded NBN Co could build the NBN more quickly and at a lower cost using a multi-technology model. As well as an FTTN and FTTP approach for fixed line services, this would include extensive use of the Telstra and Optus HFC networks. NBN Co is currently negotiating with these parties for the use of those networks and use of Telstra's copper network for FTTN.

NBN Co plans to launch two Ka Band satellites in 2015 to support its Long Term Satellite Service (LTSS) which will offer download speeds up to 25 Mbps. It is currently leasing capacity from Optus and IPSTAR to offer speeds up to 6 Mbps. Both in the interim period and once the LTSS is available, NBN Co intends to subsidise the price it charges for its satellite services through an internal cross-subsidy.

Other firms can invest in telecommunications infrastructure of their own. However, Parts 7 and 8 of the Telecommunications Act require 'superfast'[12] fixed line networks built or upgraded after 1 January 2011 servicing residential and small business customers to operate on a wholesale-only basis and to offer access seekers a Layer 2 bitstream service on a non-discriminatory basis at a price regulated by the ACCC. In some instances, where networks built before 1 January 2012 provide NBN-consistent outcomes, they have been recognised as 'adequately serving' those areas, meaning NBN Co need not build in those areas.

Special arrangements with structural and regulatory implications also apply in new real estate developments. These arrangements are set out in the Fibre in New Developments Policy Update of June 2011[13]. In simple terms, developers fund pit and pipe infrastructure of an adequate standard as a condition of their developments being serviced. Developers can choose any provider they wish to provide other telecommunications infrastructure, such as cabling and electronics. If a developer does not choose another provider, NBN Co or Telstra (in

10 Telstra media release of 23 June 2011.

11 Optus media release of 23 June 2011.

12 'Superfast' networks are defined in this report as networks delivering in excess of 25 Mbps download, in line with Parts 7 and 8 of the *Telecommunications Act 1997*. This is consistent with the term 'high-speed' networks in this report.

13 http://www.communications.gov.au/policy_and_legislation/fibre_in_new_developments

the case of developments of fewer than 100 lots but with some exceptions) are IPOLR carriers and service the estate according to their respective responsibilities.

In the backhaul market, NBN Co would provide carriage from premises to its 121 points of interconnection (POIs). Beyond these 121 POIs, competition in the supply of transmission capacity has been encouraged.

The model also appears to have assumed that the mobile market would be largely untouched by the NBN reforms, although there has been growing interest in the scope to leverage the NBN investment to improve mobile service provision, for example, through the sharing of towers and backhaul. Recent activities and announcements suggest NBN Co investment in fixed broadband infrastructure may have provided mobile carriers with extra incentive and freed up resources to accelerate their own rollout of high-speed technologies like 4G LTE. Additional information on the current broadband market structure and regulation is in Appendix 2.

4. Objectives and principles for assessing broadband market structure and regulatory options

This chapter sets out the objective the panel used to guide its assessment of the relative economic and social costs and benefits of different future broadband market structures and regulatory arrangements. It also sets out the criteria and principles the panel relied on to identify the best long-term market structure from the feasible options and the concomitant regulatory requirements.

4.1 Objective

The objective the panel adopted for this part of its work was:

> *To identify the market structure and regulatory arrangements that will deliver affordable and reliable communications services to all Australians, including fast broadband services, in the most economically efficient way.*

The panel has been guided by four desirable features, namely that its recommended arrangements:

- meet the changing communications demands of end-users, including for faster, affordable broadband services in a way that enables progressive service enhancement over time;
- offer the best prospects for the development of an industry that is economically efficient, including by promoting economically efficient use of and investment in broadband infrastructure;
- are feasible and provide for the timely delivery of the Government's initial broadband service requirements and long-term service needs; and
- involve regulation and other market interventions that are no more intrusive or burdensome than needed and are transparent, predictable and accountable in their operation.

4.2 Policy principles used in assessing structural and regulatory approaches

Ownership and regulatory arrangements for the broadband market consistent with these features are most likely to advance the long-term interests of end-users (LTIE).

The LTIE is the main object of the Telecommunications Act. The concept, which encompasses the need for allocative, technical and dynamic efficiency, is long-standing and fundamental in

its nature. It is also used in Part XIC of the CCA to determine whether a service should be declared by the ACCC and is applied to the acceptance of access undertakings. The criteria for the LTIE test are that declaration of a service would:

- promote competition in relevant markets;
- promote the achievement of any-to-any connectivity (where relevant); and
- encourage the economically efficient use of, and investment in, infrastructure.

The panel's recommendations are designed to promote the LTIE in the specific context of high-speed broadband services. This includes by creating an environment where service deployment occurs consistent with economic efficiency.

In turn, economic efficiency will be promoted by using competition where possible, regulating where it is not, and setting clear rules for distinguishing between the two. This involves doing a range of things – to market structure and the design of the associated regulation – to ensure that both competition and regulation are effective in meeting their objectives.

The panel's basic premise is that competitive markets generally offer the best chance of advancing the LTIE and therefore the best chance of being consistent with the panel's desired features and securing its objective. Competition constrains market power, protecting consumers and promoting innovation. Competitive markets reduce the burden on regulation and make it easier for regulatory agencies to undertake their tasks.

Conversely, there are substantial risks inherent in entrenching monopoly power at the fixed network layer. For this reason, policy makers throughout the OECD area remain strongly committed to the goal of promoting infrastructure competition in telecommunications.

However, it is also clear that practical constraints, the characteristics of a particular market and past decisions – particularly by governments and regulators – can prevent market-based arrangements achieving fully desirable outcomes. As a result this may mean that a gradual, but credible, transition is required.

Transparency, predictability and responsiveness of the policy and regulatory arrangements are objectives worth pursuing - even separately from their impact on economic efficiency – because they are indispensable features of good public policy.

While policy arrangements need to promote efficient investment, it is not a sensible goal in itself to seek to ensure any particular investment recoups its costs: indeed, to elevate that goal above others would detract from efficiency. As a result, the panel did not see ensuring NBN Co achieves a particular rate of return as a desirable goal, any more than it would be desirable to set that goal for some other entity; nor does the panel consider policy or regulation should be driven by that goal, now or in the future.

Specifically while it is appropriate and desirable for NBN Co to seek to fully recoup its costs, including a reasonable return on its capital, it would not be in the public interest to determine the future regulatory arrangements so as to artificially favour NBN Co's ability to do so. That would effectively amount to granting NBN Co taxing powers. NBN Co's ability to recoup its cost should depend first and foremost on the efficiency with which it carries out its activities, including its capacity to control deployment and operating costs and its ongoing responsiveness to customer demands.

It was within this framework that the panel considered how best to achieve the broadband goals and objectives being sought by the Government; that broadband services providing defined minimum upload and download data rates should be generally available to all end-users, along with such other broadband products as market participants choose to provide. The Government has expressed a policy objective of ensuring universal access to minimum download data rates of 25 Mbps. In considering how to achieve this objective, the *Strategic Review* has proposed an approach that would provide 50 Mbps to around 90 per cent of the fixed line footprint by the end of 2019.

The panel has also had regard to a related goal: that regardless of where they reside or carry on a business, end-users should have access to designated services at an affordable price.

In considering how these goals and objectives might best be achieved, the following policy principles were adopted:

- any restrictions imposed by policy, statute or regulation on commercial investment in and supply of telecommunications services should be no more intrusive or burdensome than needed to promote the long-term interests of end-users;
- there should be no restrictions on retail level competition, other than those needed to provide for end-to-end connectivity and to protect consumers (where such protection is reasonably necessary);
- in so far as a network owner has a substantial degree of market power, there should be effective safeguards against the abuse of that power;
- any subsidies inherent in meeting broadband access and pricing goals should be transparent, sourced in ways that minimise inefficient burdens on taxpayers and be as efficiently delivered as reasonably possible;
- there should be competitive neutrality between public and private service provision; and

- in giving effect to the principles, regulation should be no more intrusive or burdensome than needed, should be proportionate, transparent, predictable and accountable in its operation, and should be subject to periodic transparent and independent review to ensure its benefits exceed its costs.

The panel accepted at the outset that some arrangements relating to the provision of broadband services already in place as a result of Government policy decisions would continue:

- NBN Co will operate on a commercial basis and provide a basis for ensuring that the Government's broadband policy objectives are met;
- NBN Co will primarily operate at Layer 2 in the service stack to provide scope for downstream innovation and product differentiation; and
- rollout of the NBN will achieve the structural separation of Telstra in respect of retail fixed network services supplied in the mass market.

Given these arrangements, potential options need to be assessed taking into account NBN Co's existing contractual obligations, its definitive agreement with Telstra and its agreement with Optus relating to Optus' HFC network.

In addition, the current industry settings for residential and small business fixed line broadband limit the scope for fundamental, rapid, structural change. The decision to create and invest in NBN Co has been made, substantial taxpayer funds have already been spent or are committed and work to ensure NBN Co can fulfil its charter is underway. Furthermore, the regulation enacted to support that decision has already significantly affected the general behaviour and forward planning of market participants. Any previous willingness of private investors to commit resources to the establishment of new fixed line access facilities on a large scale is likely to have been seriously weakened.

It is taken as given that regulation supporting outcomes such as any-to-any connectivity, appropriate technical standards and consumer safeguards where they are reasonably justified, will be a requirement of all the market structure options considered. The focus of the panel's work in this area was on the particular regulation needed to support the preferred long term market structure – including any necessary transition path to that structure – and how that regulation might best be framed so as to meet the goals, objectives and policy principles set out in this chapter.

5. Cost-benefit analysis and policy development

The panel's Terms of Reference required it to conduct a cost-benefit analysis of the NBN. A technical presentation of the analysis that has been undertaken is set out in the panel's *CBA Report*. This chapter places that analysis in context, summarises key results and discusses their broader implications.

It is important to note at the outset that unless otherwise indicated, all the estimates presented in this chapter are present values expressed in 2014 prices. Those present values are calculated over the period to 2040, discounting to the present at a rate of 8.3 per cent (real). This way of expressing values, which is the conventional approach in project evaluation, differs from that adopted in the original cost estimates for the NBN, as well as in some subsequent analyses both from the Government and NBN Co, which simply sum streams of outlays or revenues over periods of time, often without removing the effect of inflation. By instead using a discount rate to convert those streams into values in the present, the panel's analysis recognises that a benefit received many years from now is worth less than one received today, just as a cost to be borne in the distant future imposes less of a sacrifice today than one that must be incurred immediately.

The main points made in the chapter are:

- properly conducted, CBA is an indispensable tool for policy evaluation, increasing the information base for decisions, improving transparency and enhancing the legitimacy and accountability of public decisions;
- although there is a bipartisan commitment to deploying high-speed broadband, the large sums of public funds at stake, the complex and contentious nature of many of the decisions that must be taken, and the desirability of periodically reviewing progress mean taxpayers are entitled to a careful analysis of the costs and benefits that deployment involves;
- the panel finds that deploying high-speed broadband on an unsubsidised basis (to areas where demand covers costs) to the 93 per cent of premises served by the fixed line network (described in the analysis as the *unsubsidised rollout scenario*) would make Australians $24 billion better off, which corresponds to a gain of some $2,430 per household;
- although it still generates an economic gain of around $1,810 per household compared with simply freezing broadband availability and speeds at current levels, an *MTM scenario* delivers net benefits that are $6.1 billion lower than those of the *unsubsidised rollout scenario*. This reduction in net benefits mostly occurs because the MTM

extends service outside the fixed line areas, using fixed wireless and satellite, incurring costs that greatly exceed the benefits;

- an all-FTTP approach sees the net benefit of high-speed broadband reduced by a further $16.1 billion in NPV terms compared with the *MTM scenario*. This means that the *FTTP scenario* performed $22.2 billion more poorly than the *unsubsidised rollout scenario*, wiping out over 90 per cent of the gain Australia could make from access to high-speed broadband;

- the poor performance of an all-FTTP approach arises because consumers do not value the gain in speed it enables more than the accompanying increase in costs. At the same time, the *FTTP scenario* involves slower deployment and so improves broadband access significantly later than does MTM or an unsubsidised rollout; and

- sensitivity tests show these results are highly robust. In particular, even if willingness to pay for very high-speed service increases far more rapidly than expected, the MTM approach still out-performs an all-FTTP scenario as it meets immediate needs more quickly while offering the capacity to upgrade as demand for extremely high speeds eventuates.

The chapter begins by explaining the nature and purpose of cost-benefit analysis. It then sets out the main results of the CBA before explaining the major factors that underpin those results. Finally, it turns to the policy consequences of the CBA for the panel's work.

5.1 The nature and purpose of cost-benefit analysis

CBA is a technique for evaluating public decisions that hinges on comparing the costs of a proposal to its benefits, where costs and benefits are valued in monetary terms. In essence, the analysis asks whether the value placed on a project by the individuals it affects exceeds the project's costs. As well as the willingness of those individuals to pay for benefits that they obtain directly, the assessment takes into account any 'externalities' – that is, costs and benefits that accrue more broadly and which may be positive (as when a project increases the community's gains from public goods) or negative (as when use of a newly built road adds to pollution). Generally, a project enhances the community's welfare – in the sense of increasing the aggregate value it derives from scarce resources – if it passes a properly specified cost-benefit test.

CBA can be viewed in several complementary perspectives.

First, in analytical terms, CBA is related to the basic requirements for efficiency in the allocation of resources. It is a condition of economic efficiency that the marginal dollar of public expenditure has a benefit equal to that of the marginal dollar of private expenditure and that the benefit of a marginal dollar of public expenditure is equalised across programs,

projects and project elements: this is for the obvious reason that if the marginal benefits differed, the community would gain by reallocating spending from projects where the net benefits from the last dollar spent were relatively low to projects where those net benefits were relatively high. Because it allows net benefits to be estimated, CBA provides the information needed to test whether this condition is being met.

Second, set against the backdrop of a given portfolio of projects, CBA can be used to evaluate whether one or more public projects should be added to or removed from that portfolio. In other words, CBA is a tool that can help assess whether welfare would be increased by the decision to proceed with a particular project, compared with alternative scenarios, which may involve doing nothing, deferring or otherwise varying the project, or proceeding with an alternative project.

Third and perhaps most important, CBA is an instrument that taxpayers can use to monitor the decisions taken by governments, and to enhance the quality of those decisions. Thus, for a CBA to be properly conducted, the study has to go through the key elements of rigorous policy analysis, namely, careful specification of the objectives being sought, identification of the alternative options for achieving those objectives, an analysis of the likely consequences of each such option, and consideration of the risks that attach both to each option and to the assessment as a whole. Moreover, it is possible to compare a CBA made at the time of project approval to outcomes at project completion. As a result, the requirement to carefully assess, and report, the costs and benefits of decisions can improve decision-making, promote transparency and increase accountability.

Advantages of cost-benefit analysis

As well as adding rigour to public decision-making, CBA has several strengths that shape the methodology on which CBA relies and underpin its long recognised contribution to good public policy.

The first is evaluative standpoint. There is a presumption in CBA that the value policy makers place on a policy ought to be derived from the valuations of the individuals who will bear that policy's effects. Underlying this presumption is the belief that where a project is being evaluated on behalf of a group of individuals, that project should be adopted if those individuals' preferences are advanced by that decision, such that were those individuals taking the decision themselves, they would adopt the project at issue.

That creates a natural link between the use of CBA and the legitimacy of public action. It also informs a broad range of methodological choices. In particular, where a policy affects traded goods and services, the valuations used will be those captured in market prices, as market prices reflect individuals' willingness to pay for benefits and willingness to accept for costs. Equally, it is this presumption that guides the methods used to correct market prices where

they are distorted by taxes, subsidies or price controls, and to impute valuations where the policy's effects involve externalities that market prices do not capture.

Second, decision-relevance. A project increases a community's welfare if its benefits exceed its costs, including the opportunity cost of instead pursuing alternative projects or of pursuing that project on a different scale or with different timing. A properly constructed CBA captures this criterion because it uses weights designed to allow the meaningful aggregation of benefits and costs, treats as costs the net valuations forgone in pursuing that project relative to others, and takes account of the option of varying project scale. Moreover, as both current and future valuations are expressed in monetary terms, discounting future consequences into present values makes it possible to evaluate alternative time profiles for a given project. Together, all of these features mean that CBA allows different options (including the option of doing nothing and different scale and timing options within any given project) to be evaluated and compared.

Third, comparability between projects. An advantage of the systematic use of CBA is that it allows consistent values to be used across projects for assessing particular project inputs or outcomes, regardless of the sector in which those projects arise. For example, using a common approach to setting the discount rate in evaluating public investments is clearly necessary if meaningful rankings of alternative investments are to be derived. Equally, where benefits take the form of improvements in health, they can be evaluated consistently, whether they arise from investments in telecommunications or in health care itself. In carrying out its CBA, the panel has sought to ensure it adopts the approach conventionally used in Australia for each component of its analysis, thus encouraging that comparability.

Fourth, verifiability. The assumptions used in a CBA are capable of being tested in terms of their consistency with market valuations, the way in which market valuations have been altered, and the methods used to measure and weight non-marketed inputs and outputs. Moreover, so long as the study's assumptions are transparent, sensitivities can be analysed, and the risks associated with any uncertainties that bear on the project made clear.

Fifth and last, accountability. By providing an ex ante statement of key expected values for costs and benefits, CBA facilitates ex post identification of variances from those expected values. This both promotes accountability and enhances the 'self-correction' mechanisms in public sector decision-making, including by informing ongoing changes to the project's design.

The relevance of CBA to the NBN

While there is a bipartisan commitment to the construction of a national, wholesale-only, NBN, a careful CBA of the NBN remains highly relevant.

Taxpayers and consumers are entitled to know what has been decided in their name, and how its likely costs compare to the benefits. That tens of billions of dollars are at stake, with

consequences that are likely to affect every Australian household and business, only underscores the importance of making this information available.

At the same time, while deployment of high-speed broadband is underway, many decisions remain controversial, as is only to be expected with a project of the NBN's scale and significance. Those decisions range from the choice of the technological options to be pursued through to the manner in which the costs of the NBN, especially in regional areas, should be recovered. Proper CBA can help resolve some of those decisions, including by clarifying the assumptions that need to be made for one approach to be preferred to another.

Finally, it is apparent that the issues addressed in the panel's CBA will arise again in future. For example, the minimum level of broadband access that should be available to all Australian households and businesses may need to be reconsidered as technologies advance and new applications and services develop. The panel's CBA can assist in informing that reconsideration by providing a base-line evaluation of the costs and benefits of the standard that is now being put into place.

5.2 The panel's CBA

Underlying principles

Given the nature of the contribution CBA can make to good public policy, and the specific issues the panel's CBA sought to address, the panel adopted three principles in undertaking its analysis.

First, the panel's CBA is forward-looking. It is not concerned with the decisions that should have been taken when the NBN was announced, although it helps inform an assessment of their consequences; instead, its focus is on the decisions that need to be made as of now. A crucial result of this focus is that the panel treats as given the contractual commitments entered into up to this point, including the Definitive Agreements between NBN Co on the one hand and Telstra and Optus on the other. Those commitments were predicated on the initial FTTP deployment in the fixed network; they might have been less onerous had another strategy been pursued. By nonetheless taking the substantial outlays they entail as arising under all deployment scenarios (that is, as a joint and common cost to all variants of the NBN), the panel has probably diminished the difference between the options it assesses, compared with the results that might have been obtained in an analysis undertaken before those commitments were entered into.

Second, the panel has sought to be conservative in its approach, while nonetheless ensuring consistency with accepted best practice in project evaluation.

For example, in assessing willingness to pay for broadband access (and so the potential benefits of the NBN), the panel primarily relied on the results of a large statistical survey it commissioned from the University of South Australia's Institute for Choice, as that survey was carefully designed to support econometric evaluation of consumer demand. The 'stated preference' method used by the panel in deriving those econometric estimates is generally regarded as best practice in project appraisal for valuing benefits when the information required to do so is not available directly from market prices.

Equally, on the cost side, the panel drew on modelling carried out by NBN Co and its consultants, most recently as part of its *Strategic Review*. However, in ranking alternatives, the panel's CBA only takes account of resource costs – that is, the costs incurred in actually using scarce resources – and excludes transfers (which merely shift income from one person to another), except to the extent to which financing those transfers gives rise to the costs of taxation. As transfers associated with the agreements with Telstra and Optus have been publicly reported as having net present values of $11 billion and $800 million respectively (which means that they would account for around one-fifth of the total financial costs of the project in present value terms over the period to 2040), the exclusion of transfers has a significant effect on the reported cost data.

Third and last, the panel recognises the substantial uncertainties inherent in evaluating a project of this kind. Indeed, as noted above, one of the great strengths of CBA is that it makes variables explicit and so allows the consequences of varying them to be rigorously tested. In some cases, those uncertainties reflect the inherent unknown quantity of the future: for instance, about how rapidly demand for high-speed access will grow, or how quickly the costs and capabilities of alternative access technologies will evolve. In other cases, they arise from possible differences of view about how certain parameters are best set – such as the discount rate used in converting future streams of costs and benefits into present values. Given that scope for possible variation, the panel has relied on comprehensive sensitivity testing, both for individual parameters and for combinations of parameters, to ensure its results are robust.

The scenarios examined and principal results

The CBA was conducted around four main scenarios for the period 2015 to 2040. The scenarios differ in the upload and download speeds made available, in the timing of delivery and in their coverage of households. Those scenarios are as follows:

1. *No further rollout scenario*. This scenario assumes there is no further investment in infrastructure beyond the investments already made and hence no change in speeds from those available today. This scenario is clearly unrealistic; its only purpose is to act as a base case for estimating the social gains from increased access to high-speed broadband.

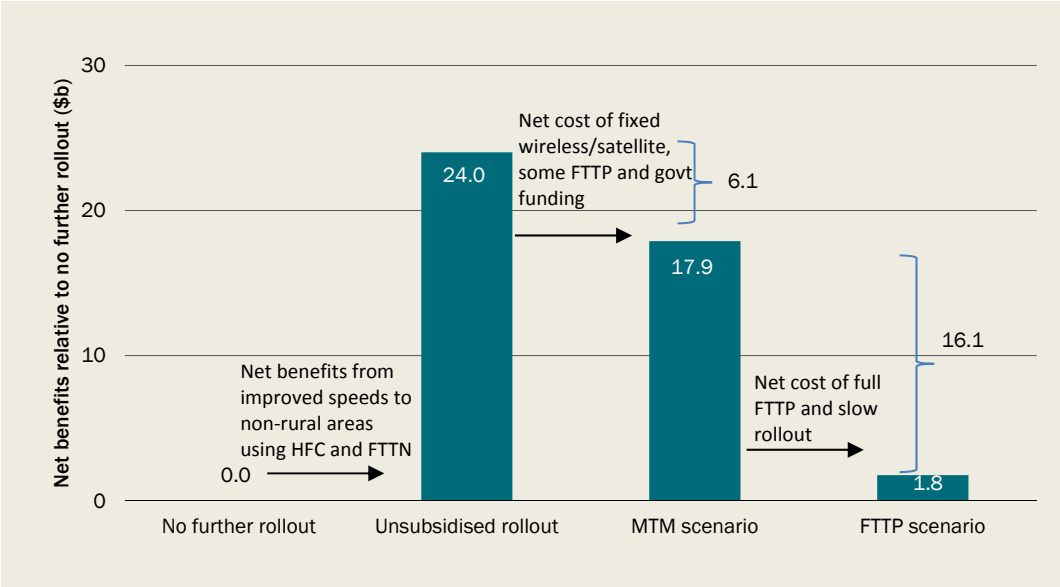
2. *Unsubsidised rollout scenario*. This scenario models the rollout of high-speed broadband to areas where it can be undertaken without the need for any government subsidy, using HFC and FTTN technologies. In implementing this scenario, it was assumed deployment was privately funded and that the investors providing that funding had the same degree of regulatory certainty about cost recovery as NBN Co.

3. *Multi-Technology Mix (MTM) scenario*. A combination of FTTP, FTTN, HFC and fixed wireless and satellite networks is used in this scenario to provide high-speed access on a ubiquitous basis, as set out in the NBN Co *Strategic Review*. Both in this scenario and the *FTTP scenario*, it is assumed that taxpayers fund the initial deployment of the network and bear any losses that network incurs.

4. *FTTP scenario*. While also relying on fixed wireless and satellite networks to supply service in regional areas, this scenario assumes only FTTP is used in the areas where fixed line service is provided.

Three major results, which are summarised in Chart 5.1, emerge from comparisons between these scenarios.

Chart 5.1: The net benefits of each scenario (present value)



Data source: The CIE.

The first is that there are substantial benefits from increased access to high-speed broadband. Compared with holding network speeds at current levels, an unsubsidised deployment, based on private sector funding and rolling out high-speeds to up to 93 per cent of premises, would make Australians $24 billion better off.

Second, this $24 billion rise in welfare, which corresponds to a gain of some $2,430 per household, was used as the baseline against which to evaluate the performance of the *MTM scenario* and the *FTTP scenario* over the next 25 years.

The *MTM scenario* delivered net benefits that are $6.1 billion lower than those of the unsubsidised rollout scenario. Although it still generates an economic gain of around $1,810 per household compared with simply freezing broadband availability at current levels, that gain is $620 per household less than would arise under a purely commercial approach.

This reduction in net benefits occurs because the costs involved in constructing and operating the fixed wireless and satellite networks greatly exceed the benefits, translating both into an overall social loss and into a substantial financial loss. The financial loss then increases the burden that must be placed on taxpayers and, as all taxes distort economic activity (generating what economists refer to as deadweight losses), there is an additional reduction in efficiency.

The *FTTP scenario* sees the net benefit of high-speed broadband reduced by a further $16.1 billion in NPV terms compared with the *MTM scenario*. This means that the *FTTP scenario* performed $22.2 billion more poorly than the unsubsidised rollout scenario, wiping out over 90 per cent of the gain Australia could make from access to high-speed broadband.

The main reasons for this outcome are the slower rollout of FTTP (which delays the flow of benefits), the high cost per premise of an FTTP rollout, and the deadweight losses generated by the taxation needed to sustain those costs under the NBN Co approach. This reduction in net benefit makes the *FTTP scenario* only $1.8 billion better in NPV terms than the no further rollout scenario, generating a gain of a mere $210 per household compared with simply continuing with today's inadequate network speeds.

Third and last, sensitivity analysis finds that these rankings are highly robust. Running though the full range of assumptions, the *MTM scenario* performs better than the *FTTP scenario* in 98 per cent of cases. Only in extreme circumstances could FTTP economically outperform the MTM approach – a result all the more striking because the modelling tended to favour FTTP, including by setting FTTN costs above international benchmarks and this assumes no upgrade of MTM technologies in the future.

Understanding the results

The substantial advantage of the MTM approach over the *FTTP scenario* reflects several factors that push in the same direction.

The first relates to the nature of demand for high-speed access. The panel adopted three approaches to evaluating end-users' valuations of broadband: estimation of demand curves from the take-up to date of NBN Co's various speed offerings; a detailed technological study of the speeds needed to access current and prospective applications, and of the costs imposed on users when access speeds fell below those levels; and a large-scale survey, administered to a stratified random sample, designed to support econometric estimation of

willingness to pay for differing access speeds. All three approaches found that the gain from higher speeds diminishes as speed increases.

In other words, users see significantly more value in moving from 5 Mbps to 10 Mbps than from 50 Mbps to 55 Mbps: in technical terms, the willingness to pay curve is concave. This means that the economic benefits of making even higher peak speeds available – 100 Mbps for example – are limited, reducing the additional benefits of FTTP over other technologies.[14] It also means that the greatest gains in users' valuations of the service come from improving speeds when and where they are low.

This is an important reason why the *FTTP scenario* performed poorly relative to the *MTM scenario*. Benefits are not much higher in the *FTTP scenario* than in the *MTM scenario* as the higher speeds that FTTP provides are not valued much more than the speeds provided by FTTN and HFC. In addition, because deploying FTTP is inherently slower (and accelerating its deployment would sharply increase costs), the additional benefits of FTTP are delayed, reducing their present value.

Conversely, the *MTM scenario*, as it makes greater use of existing assets (notably the HFC networks and the copper connection to customers' premises in the case of FTTN) can be deployed more quickly, and so addresses areas of especially poor access significantly sooner than does FTTP.

In short, because Australians value the move from low to high-speeds more than the move from high to yet higher speeds, and benefit more the sooner that move occurs, the *MTM scenario* is more cost-effective. The fact that the costs of deployment are much higher in the *FTTP scenario*, as it does not take advantage of the existing copper and HFC assets, then makes the *MTM scenario's* advantage all the greater.

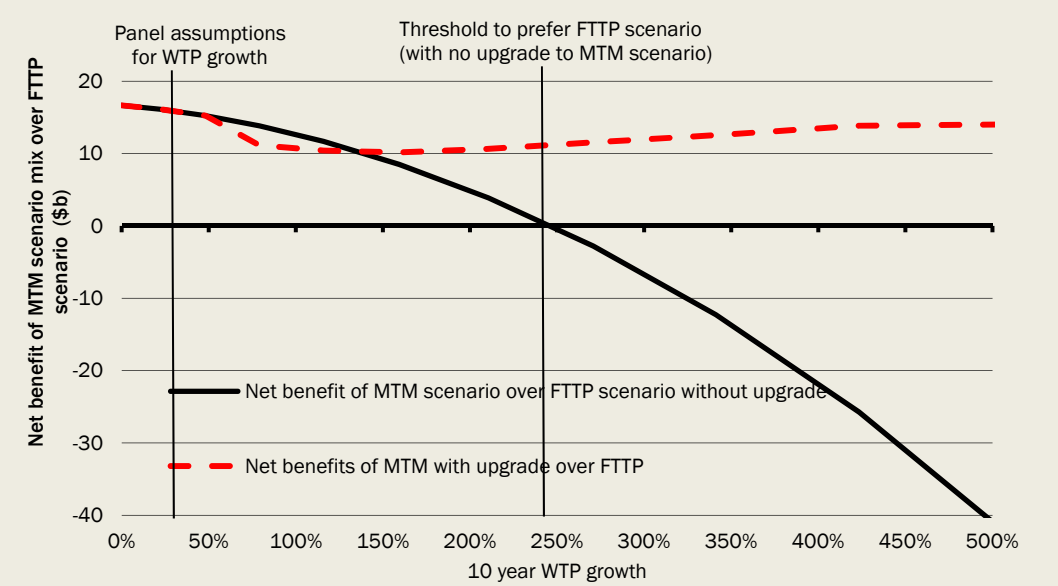
At the same time, compared with FTTP, the *MTM scenario* manages uncertainty – and particularly the uncertainty associated with the future growth rate of demand − substantially more efficiently. This is because the *MTM scenario* can both be deployed more rapidly and retains the option of upgrading to FTTP at a later date.

The effects of this has can be seen by modelling the relative attractiveness of an MTM and FTTP scenario for a range of growth rates for willingness to pay. The results are set out in

14 It is important to recognise that these findings are not inconsistent with the strong growth in data usage currently observed in Australia. Demand for peak speed and demand for broadband usage is not the same thing, and usage growth is only loosely related to bandwidth requirements over time. Peak bandwidth requirements of an online household are driven by three things. First, the number of people using the internet in that household (essentially flat); second, the length of time that each user spends using the internet, and the degree to which they multitask (still growing but ultimately limited); and third the bandwidth of the applications used while online (still growing, but offset by technologies such as video compression).

Chart 5.2. Obviously, should willingness to pay only grow slowly, the MTM approach will be superior as it avoids the very high costs of FTTP: costs that once incurred, are irreversibly sunk. However, were willingness to pay to grow much more rapidly than currently expected, the *MTM scenario* allows the initial demand for high-speeds to be met more quickly, with the upgrading of the network then addressing the demand for extremely high-speeds once it eventuates. Indeed, even on conservative assumptions about the extent to which MTM assets can be reutilised for FTTP, the relative advantage of the *MTM scenario* is actually greater when demand growth is extremely high, thanks to the combination of rapid initial deployment and upgradeability. From an economic perspective, this means that the *MTM scenario* is 'future proof' in a way the *FTTP scenario* is not.

Chart 5.2 Net benefits of MTM scenario over FTTP scenario under different growth rates in willingness to pay



Data source: The CIE.

It is important to note that these estimates understate the value of the flexibility the *MTM scenario* offers. That is because these estimates assume an upgrade from an MTM to FTTP would affect the entire fixed line network, with all the costs that imposes. In practice, however, any upgrades from (say) an FTTN to FTTP would be targeted to, and given priority in, those geographical areas where the demand for extremely high-speed eventuated most rapidly. Conversely, areas where demand lagged could remain on other access technologies. As a result, the benefits of accelerated growth would be captured without all of the costs the panel's modelling imputes.

The cost of ubiquity outside the fixed network

The analysis confirms that the high-speed services that are being provided outside the 93 per cent footprint impose costs that are high both in absolute terms and relative to users' willingness to pay for those services.

Specifically, data from NBN Co implies its supply of high-speed broadband using satellite and fixed wireless outside the fixed line footprint will cost $4.8 billion in NPV terms, excluding the $1.1 billion deadweight loss associated with the taxes financing those services involves. Options which deliver high speed broadband service in regional areas at costs substantially lower than NBN Co's are now being implemented internationally using fourth and fifth generation mobile technologies.

The approach adopted by NBN Co unquestionably provides an extremely high grade of service: among the highest, if not the highest, in the world. What is questionable, however, is whether that grade of service can be justified. The panel estimates the benefits to users from deployment of satellite and fixed wireless outside the fixed line areas as being $0.6 billion. Hence, even were the estimate of user benefits off by a factor of five, it would still fall materially short of the costs.

The question is whether the end-users served by NBN Co's fixed wireless and satellite service would have been better off receiving a grade of service more commensurate with their demand for high-speed broadband, along with a cash transfer of the resulting $5,000 to $10,000 saving per household served: or with those savings being redeployed to other, more highly valued, uses.

Be that as it may, the capital costs associated with these services are now almost entirely locked in. So too, as a result, are the deadweight losses of the taxes that will be required to cover them. The panel estimates that those deadweight losses of taxation amount to $1.1 billion, which alone cancels out all of the benefits from the service being provided. Were the financial losses funded through a narrow industry-specific levy rather than from consolidated revenue (which relies on a mix of broad-based taxes), the losses would be even higher.

The Government has already decided to bear this cost of ubiquity as part of the MTM rollout strategy. However, the magnitude of the costs highlights the importance of strong management discipline, both in efficiently providing the service and minimising the risk of yet further cost blow outs. This is a compelling argument for the separation and divestment of the fixed wireless and satellite networks, which would provide greater transparency of costs and revenues, increased focus on management of risks, and greater incentives for the assets to be put to the fullest possible use, including in improving mobile service in regional areas.

Concluding observations

In concluding, the analysis suggests private investment could have secured virtually all of the benefits of delivering high-speed broadband in the NBN fixed footprint, comprising 93 per cent of premises. Experience in New Zealand and the UK, among many others, also suggests that a commercially driven deployment would have been substantially better managed,

providing service on schedule and to cost, avoiding the high costs of delay that have been imposed on Australian consumers. Moreover, comparisons of NBN Co's costs with world best practice imply aggregate costs could have been up to 20 to 30 per cent lower and technologies would have been more finely targeted to user demand. Finally, any subsidies could have been directed specifically to areas of market failure, lowering the burden on taxpayers.

This means that the NBN intervention has resulted in significant additional economic costs. In particular, taxation to support the project generates deadweight losses that are estimated at 24 per cent in this analysis. In other words, for every hundred dollars of taxes that must be collected to fund deployment of the NBN, $24 worth of economic value is immediately destroyed. These costs cannot be avoided by borrowing rather than taxing because debts must be repaid with interest, and those repayments generate their own deadweight losses. Even in the *MTM scenario*, closest to NBN Co's current MTM strategy, the deadweight losses amount to $2.4 billion in NPV terms.

In addition, taxpayers fund part of the financial transfers from NBN Co to other businesses, and bear all of the risk associated with the project. There is no reason to believe this is an efficient allocation of risk.

Far from reducing the burden on end-users, the result is that prices will ultimately need to be higher than they would otherwise have had to be. That underscores the importance of creating an environment in which the incentives to manage costs efficiently are as effective as they can be. In the panel's view, increasing competitive pressures has a crucial role to play in this respect.

6. Future market structure arrangements for NBN development

Provision of infrastructure to deliver high-speed broadband services throughout Australia is a significant project (or series of projects) with consequences over a long period of time. The project is already underway and significant expenditure has been incurred or is committed. Undertakings have been given and significant contractual arrangements entered into. Expectations, both within the industry and with end-users, have been created.

The current stage of NBN Co development represents a tipping point in the high-speed broadband industry structure – a point at which, once a direction is set, it will be difficult to change. The panel faced a dilemma in framing its recommendations on future market structure arrangements for NBN development. Any decision to deviate from the current development path for NBN Co will inevitably involve cost and delays, potentially exacerbating community dissatisfaction with the current progress of the rollout. At the same time, focusing on these short term impacts could preclude or severely limit the enduring benefits that an alternative market structure could deliver.

In addressing this dilemma, the panel took the view that it should first identify the market structure that over the longer term would best support the objective of timely and efficient deployment of high-speed broadband. To the extent implementing the market structure involved costs or required dealing with constraints, the panel considered transitional options, which preserved the capacity to move to the preferred arrangement while allowing that move to be implemented in a phased way. Finally, recognising that the weaker the competitive pressures, the stronger must be the regulatory safeguards, the panel examined a scenario in which the proposed approach was not adopted and spells out the changes in the regulatory settings that would require.

6.1 Context and relevant principles

Even compared with other high income countries with challenging population geographies Australia is unique in adopting a market structure based on a *de facto* monopoly provider of telecommunications infrastructure. In the countries with which Australia commonly compares itself (including the USA, Canada, the European Union, Japan, South Korea and New Zealand) there remains a strong emphasis on infrastructure competition and on financing the deployment of new networks through private sector investment. This is not to say there is always strong and ubiquitous infrastructure-based competition; but it is generally encouraged. Many governments have directly or indirectly subsidised broadband deployment but nowhere is that funding on the scale of the NBN, and no advanced economy has effectively brought its telecommunications infrastructure back under government ownership, as Australia has.

Overall, in examining telecommunications policies in a wide range of countries, the panel did not identify any government intervention comparable to the NBN, with the possible, somewhat limited, exceptions of Singapore and New Zealand. Even there, however, governments have not taken steps to prevent or eliminate infrastructure competition across fibre, copper and HFC networks and have remained primarily reliant on the private sector. As a result, Australia's approach is at odds with that being pursued internationally.

Australia's telecommunications industry structure, which is still being put in place, could be seen as reflecting frustration with the purported failure of previous attempts at promoting infrastructure competition; however, such a view does not appear to be based on any rigorous analysis of whether those attempts indeed failed and if so, why.

Whatever the answers may be to those questions, it is the panel's view that the market structure which emerged from the privatisation of Telstra failed to exploit the scope for infrastructure competition between the different fixed line platforms – the copper-based network on the one hand, and HFC on the other. There had, in the initial deregulation of the fixed line network, been competitive entry through Optus' deployment of a HFC network. However, the efficacy of that entry was hindered by the asymmetry between Optus as the challenger and Telstra as the incumbent. Telstra's network was ubiquitous and its costs were substantially sunk, while the Optus footprint was limited and could only be extended through costly new investment. Regulatory intervention, which made retail competition using Telstra's network far more attractive than infrastructure-based entry, blunted the incentives for competing infrastructure to be deployed.

As a result, while Australian consumers benefited significantly from infrastructure competition in mobile networks (and between those networks and the fixed network), comparable benefits were never secured in a fixed network context.

However, the current restructuring of NBN Co's mandate and range of operations opens new opportunities in that respect, just as it does for the fixed wireless and satellite services to be operated separately from the fixed line networks. As a result, the panel has re-examined the scope for platform competition, in the light of three overriding principles that are consistent with the approach adopted by successive Australian governments since the reforms of the 1980s and 1990s, and with the Competition Principles Agreement.

First, competition should be promoted unless there are compelling reasons to believe it will be inefficient. In making that assessment, the presumption must be in favour of competitive markets and the onus for making out a contrary case must rest on those who would impose *de jure* or *de facto* restrictions on competition. This principle derives from experience, which shows that competition protects consumers, encourages innovation and reduces the burden on regulation, thus ensuring efficient use of the country's scarce resources; moreover, even where continuing regulation is needed, competition increases its efficacy by facilitating

benchmarking and providing regulators with the cost and demand information good regulation requires.

Second, where government business enterprises are involved, there is an obligation on governments to structure or restructure these enterprises in ways which promote competitive markets; and the mere fact that such a restructuring may crystallise financial losses or force prices down cannot justify refusing to do so.

Third, while devising the efficient market structure invariably involves trade-offs – for example, between the gains from specialisation on the one hand and those from economies of scale and scope on the other – these trade-offs are best undertaken by the competitive process itself, rather than on an abstract, *a priori* and hence inherently error-prone basis. Although that may result in the ultimate market structure differing from that which policy makers initially envisaged (as has occurred, for example, in electricity with the re-integration of retailing and generation), those outcomes will reflect the efficiencies discovered by competitive processes, rather than being imposed by government *fiat*.

Having regard to these principles, this chapter identifies several concerns with the current NBN Co structure and considers four alternative structures:

- disaggregation of the transit, satellite, wireless and HFC networks;
- disaggregation of the transit, satellite and wireless networks;
- a phased transition to disaggregation; and
- the status quo NBN Co model with enhanced regulatory settings.

6.2 Concerns with the current NBN structure

NBN Co is the main policy instrument for the deployment and ongoing supply of high-speed broadband under the policies of both the current Government and its predecessor. Under the current policy approach, NBN Co is intended to span the various technologies used for high-speed broadband and to act as a geographically ubiquitous supplier of network services.

The panel has concluded that this structure has seven significant shortcomings.

1. It creates a universal *de facto* monopoly provider (NBN Co) to manage satellite, fixed wireless, copper (likely FTTN), HFC and FTTP networks. While potentially achieving some economies of scale and scope, this eliminates any real prospect for competition in fixed broadband infrastructure for the foreseeable future (except, perhaps, in Central Business Districts (CBDs), through geographically limited extensions of pre-existing networks, and new developments). Given NBN Co's sunk costs and access to taxpayer funds, it will be hard – if not impossible – for rivals, who lack significant assets to

leverage, to enter the market and act as effective sources of competitive discipline on NBN Co.

2. Monolithic entities with a very high degree of market power, as NBN Co would have under the current model, have poor histories of working efficiently and – given their *de facto* control of cost and demand information – are difficult to regulate effectively. Although these claims are contested by NBN Co, some market participants have told the panel that a 'monopoly culture' is already evident in NBN Co's approach to its wholesale customers. There is no easy way to ensure the long term efficiency of NBN Co within its current structure, and its incentives to be innovative will inevitably weaken over time.

3. Experience to date suggests that a start-up entity like NBN Co will struggle to efficiently manage a business with such a wide scope, encompassing wireless, satellite and potentially HFC in addition to copper and fibre, especially in the context of an unprecedented network rollout. The tasks that NBN Co faces are inherently complex, as are the demands that are being placed on it, and they would stretch even a much larger, long-established organisation. Placing such great and diverse demands on a single start-up entity involves substantial risks, both to consumers and to taxpayers.

4. The expansion of NBN Co's mandate to FTTN creates additional challenges. Should Telstra's involvement in the design, construction, maintenance and operation of FTTN be extensive, there is a risk it will perpetuate, and will be widely viewed in the industry as perpetuating, many of the problems structural separation is designed to address (for example, preferential information access and scope to advantage its own retail customers). Conversely, should responsibility for all maintenance and operation of the copper assets used as part of the FTTN pass to NBN Co, this would magnify considerably the management task faced by NBN Co and therefore the risk involved in achieving the Government's goals.

5. It seems likely that, under the current arrangements, perfectly good (copper) infrastructure in the HFC footprint would be prematurely scrapped and hence wasted: infrastructure that is valuable in its own right and that could provide a basis for strong competition in the future. The premature scrapping of that infrastructure amounts to unnecessarily reducing the nation's capital stock, thereby shrinking the community's scope to benefit from costs it has largely covered (through the payments made for the copper network over the years) and that are now sunk.

6. The current structure imposes the entire burden of financing network deployment on taxpayers, forgoing opportunities to secure private investment in parts of the network. Even if NBN Co issued debt, that debt would be effectively guaranteed by taxpayers, so the effective call on taxpayers would not be reduced. As a result, the current model shifts on to taxpayers (who have no choice but to accept them) costs and risks that in all other advanced economies are being borne primarily by private investors.

7. The current structure, which closes off possibilities for future competition and entrenches opaque cross-subsidies, creates major challenges for the ultimate privatisation of NBN Co. The concerns this raises are all the more acute when viewed against the difficulties that have been encountered in moving away from market structures based on previous government-owned monopolies (Telecom, OTC, and Aussat). These are difficulties and costs that might well need to be borne again, were the current model allowed to persist.

Taking those shortcomings as given, the panel was also mindful of the potential costs of infrastructure competition. The most significant of these costs are those associated with duplicating existing network assets. Indeed, where an entrant would have to duplicate existing assets, the risks that entails are likely to deter competitive entry and expansion. Additionally, even if that entry occurs, the duplication can be inefficient, causing higher costs than society would need to bear.

However, using existing assets as the basis for competition is an entirely different matter from *ex novo* duplication of the current network. Far from causing duplication, that approach can help ensure those assets – and so the scarce capital they embody – are used as fully as possible. The resulting gain is even greater when the alternative would see some perfectly useable assets prematurely scrapped. As a result, the panel has concluded that the most realistic and efficient way of moving to a competitive market is to allow existing infrastructure to serve as a platform for that competition to develop.

6.3 Options for future NBN structures

The panel has therefore focused on the scope to disaggregate NBN Co along the lines of its underlying network components. There could, in other words, be separate entities operating each of the satellite network, the fixed wireless network and the HFC network, with NBN Co operating the FTTx network (including FTTP). These more focused entities would have smaller, more manageable mandates, thereby reducing financial risks to taxpayers and improving the chance of efficient and timely network rollout. Additionally, divesting these assets to specialist operators with established track records would shift risk from taxpayers onto the investors best placed to gauge, bear and manage those risks.

Similar considerations hold for NBN Co's extensive transit network, which is composed of a mixture of NBN Co links and leased Telstra capacity. Were that network, which reaches all NBN Co's 121 points of interconnection, disaggregated from NBN Co, it would be a powerful competitor in the transit and backhaul market, allowing NBN Co to focus on its mandate to operate the access network.

The disaggregation of NBN Co assets could be achieved in a number of ways that involve differing degrees of separation of entities and competition between them. The panel has

focussed on four main structural options. The first option divests the transit, fixed wireless and satellite networks, has the HFC network operating as a separate entity, and NBN Co retaining the responsibility for the FTTx network; the second divests the transit, fixed wireless and satellite networks with NBN Co having responsibility for fixed line networks; the third involves options for effecting a phased transition to disaggregation; finally, the fourth option would arise were the Government to reject disaggregation, creating a requirement for greater and more onerous regulation.

In each of the disaggregation scenarios, it would be necessary to define service areas for each access network and the service provision responsibilities of the operator within them. The responsibilities of the fixed line and wireless networks would be defined by their respective footprints and coverage maps. The satellite network would be responsible for all other areas. Service obligations and their funding would be addressed on the basis of the framework set out in chapter 8. While the operators of each platform would have designated service areas, they would be free to compete outside of those areas, and would not be limited in the range of services they could offer. They would be subject to the structural separation requirements of Part 8 of the Telecommunications Act (as amended according to the recommendations discussed in chapter 7) but could, under the provisions of that Part, seek exemptions from the Part's requirements. A summary of the structural models considered is at Table 4.

Option 1: Disaggregation of transit, fixed wireless, satellite and HFC networks

Under this option, the transit, satellite, fixed wireless and HFC networks would be divested, recognising divestiture of the HFC network would depend on the outcome of the current negotiations between NBN Co and Telstra. The remaining NBN Co would consequently become a structurally separated version of a copper-based incumbent (somewhat similar to Chorus in New Zealand), deploying and wholesaling services of the full range of FTTx options, including its FTTP infrastructure.

Each specialist network operator should be responsible for the interface with retailer operators and be encouraged to contribute capital to the future development of the platform. As well as reducing the call on taxpayer funds, this would ensure each operator had strong incentives to make the best use of the relevant assets.

The panel sees considerable benefits in this arrangement. As a start-up venture with an exceedingly challenging mandate, it is crucial that NBN Co have a narrowly focussed and well-defined objective, against which it can be held accountable. Financing the ramp-up of FTTx deployment is likely to represent the primary call on taxpayers' funds; concentrating NBN Co's efforts on this task can help give taxpayers a greater assurance that their funds will be well spent. At the same time, NBN Co does not have deep experience with HFC, and its managerial attention is likely to be heavily focussed on FTTx deployment. All of that means the efficiency gains from disaggregating the HFC and FTTx networks are likely to be substantial.

In the case of the transit network, it would be necessary to respect any commitments made as part of the renegotiations of the Definitive Agreements between NBN Co and Telstra. However, assuming that disaggregation is practicable, this network would provide valuable additional competition in the backhaul and transit markets. Participation in the transit network by existing industry players would allow them to extend their existing transit coverage, bringing wholesale competition to new areas and also improving the prospects for retail competition in those areas.

Finally, international experience provides many examples of satellite and fixed wireless networks being successfully operated on a stand-alone basis. One aspect of this success has been the capacity of the specialist operators to identify and secure a wide range of revenue sources. Conversely, while NBN Co can contract for these networks to be operated to its requirements, it does not itself have significant expertise in developing markets for the services these networks provide.

In short, this option would, for the first time in Australian experience, put in place a market structure that had the potential for effective infrastructure-based competition through leveraging existing assets. Additionally and importantly, the competing entities in the fixed network would be roughly symmetrically placed, each operating off a substantial service base and each with material options to expand. In all of these respects, this would be a completely different situation, and one which holds much more prospect for enduring competition, from that which prevailed at the time of the initial moves to deregulation.

Given these potential benefits, the panel has examined two issues this approach would raise: the viability of the wireless networks, given that they operate in very high cost areas; and the long run sustainability and effects of competition between the HFC and FTTx operators.

The viability of the wireless networks

The panel expects this option to generate significant pressures for expansion and revenue diversification in both the fixed wireless and satellite networks.

With respect to the fixed wireless service, there are opportunities for a specialist operator to aggressively complete deployment and upgrade/extend the network. This would lead to rapid, cost-effective improvements in the quality of service in a wide range of non-metropolitan areas. There may also be options for such an operator to increase asset utilisation by exploiting economies of scope into mobile services, increasing competition and choice in those services. Equally, a specialist satellite operator may be able to secure additional revenues in related markets, such as those available from RSPs that supply services to mining sites, multi-site corporations, government departments and public utilities.

However, despite the ability to develop new revenue sources, the panel accepts that both the satellite and fixed wireless networks could require subsidies to cover their operating costs. However, that would be the case even under the current model: the difference is that in the disaggregated model those subsidies would be transparent, and hence accountable, rather than disguised, and hence unaccountable. Moreover, the process of divesting these assets would allow the required quantum of these subsidies to be tested, providing confidence that the consumers or taxpayers bearing the costs of those subsidies were not being exploited. That is in contrast to the current situation where, in the absence of market testing, there can be no assurance the implied subsidies consumers and taxpayers are bearing reasonably reflect costs. How that market testing could be used to inform subsidies going forward, and the options for efficiently funding those subsidies, are issues addressed in Chapter 8 of this report.

The panel is therefore surprised that NBN Co's Fixed Wireless and Satellite Review considered a drawback of the divestment option that it would require transparent subsidies to these services[15]. On the contrary, in the panel's view, the fact of making subsidies transparent is a strength of this option. This issue and others are set out more fully at Appendix 4.

Competition between the HFC and FTTx operators

Under the arrangements put in place at the time of disaggregation, the HFC operator would be required to supply a Layer 2 service on a vertically separated, wholesale-only basis. This requirement reflects the potentially large customer base and significance of the HFC network in the broadband wholesale market. Additionally, it would be desirable for the operator to have equity at risk in the HFC network, which would sharpen its incentives and reduce the call on taxpayers' funds. Any Commonwealth contribution to underwriting any expansion or upgrading costs for the HFC would need to be determined as part of the disaggregation process.

As in the designated wireless areas, the HFC network operator would have service obligations in its network footprint, but would be free to expand outside that footprint and would face the threat of competition from FTTx, as well as from the fixed wireless network. The greatest risk confronting the operator is that of NBN Co leveraging the sunk costs of its copper assets to deploy FTTx in the HFC service area. However, in the event of a sale of the HFC assets, that risk would be priced into the contractual arrangement for sale, and should lead the operator to more aggressively deploy and promote its own service offering. That said, to the extent to which the Government believes it is desirable to focus NBN Co primarily on areas not served by the HFC, it could make that clear in its SOE.

15 NBN Co's Fixed Wireless and Satellite Review – May 2014.

The best domestic and international evidence is that cable modem service can be profitably supplied in competition with ADSL and FTTx. While this is apparent in North America, where cable service has a near ubiquitous role in providing Pay-TV, it is also the case in significant parts of Europe, where high-speed broadband is a more substantial and direct driver in the deployment of cable infrastructure. In Australia's case, the costs of HFC network assets are sunk and deployed in some of the highest income parts of Australia, which should provide a sound basis for a sustainable business. It is true that this HFC network would operate on a wholesale-only basis, unlike its counterparts overseas; but so would its main competitor. Moreover, if demand for high-speed broadband proves so low that it is insufficient to fund a network whose costs are largely sunk, that suggests the investment in deploying entirely new network assets (such as those required for FTTP and even FTTN) would be completely uneconomic.

There may be concerns that disaggregation of the HFC would undermine the economics of NBN Co. However, there is little near term risk of the HFC operator expanding into areas that are not closely contiguous to or within its service area. As a result, NBN Co's FTTx operations are not likely to be undermined by rivalry from the HFC *unless* it is tardy in network deployment, sets prices that are unduly high, or provides poor service quality – in which case the competition from the HFC (and even the threat of that competition) would be clearly beneficial.

Nor is the argument that any expansion of the HFC would be prompted by 'cream skimming' especially credible, all the more so as (under the panel's recommended approach) the wireless assets – which require the greatest subsidy – would no longer be NBN Co's financial responsibility. That should decrease the cross-subsidies embedded in NBN Co's prices, reducing the threat of 'cream skimming' entry.

Lastly, any equity contribution secured from the HFC specialist would reduce the call on taxpayers, while that specialist would also bear responsibility for its share of the payments required under the Definitive Agreements. This should temper any concern about the impact on NBN Co's finances from its inability to achieve early revenue growth through its access to HFC.

As a result, the panel believes the gains from this option exceed any financial burdens it might entail. Those gains would be even greater if the remaining copper in the HFC footprint continues to be operated on a wholesale-only basis by NBN Co, thus providing competition against the HFC operator. Obviously, the operating arrangements for copper would need to be agreed with Telstra; to ensure structural separation, it would be necessary for Telstra to transfer at least the operation of the copper to NBN Co.

A strength of this model is that it would ensure the legacy copper network and competitive DSLAM investments in the HFC areas were not inefficiently scrapped, as would happen in the

MTM model proposed in the fixed line network *Strategic Review*. Instead, that network would operate as a continuing competitive discipline on the HFC operator and could be used for FTTx deployment in that footprint – when that could be done without distracting NBN Co from its primary mission and where justified on commercial grounds. Such an arrangement could be beneficial for RSPs in that competition between network operators would put downward pressure on input costs, offer diversity of supply and encourage innovation.

The requirement that the HFC and copper networks in the HFC footprint be operated under the terms of Part 8 of the Telecommunications Act should address any concerns that existing owners of those assets might have regarding their future use. It would also help address concerns about Telstra's possible ongoing involvement in the deployment of FTTN in the copper network.

Option 2: Disaggregation of transit, fixed wireless and satellite networks

Under this option, only the transit, satellite and fixed wireless networks would be divested to specialist operators. As well as deploying and wholesaling the services of the full range of FTTx options, including its FTTP infrastructure, NBN Co would retain (and potentially expand) the HFC network.

As in the panel's full disaggregation model, social gains would come from the divestment of the transit, satellite and fixed wireless networks. As that divestment would create the scope for market-testing any subsidies, the treatment of loss-making services in the satellite and fixed wireless footprints would be exactly the same as that envisaged for full disaggregation.

However, this option forgoes the benefits of immediate competition in the fixed line footprint, which accounts for the vast bulk of customers and businesses. Additionally, there is a material risk that NBN Co would discontinue the copper infrastructure within the HFC footprint, eliminating any threat of future infrastructure competition. While there is no perfect way of dealing with this risk, some possibilities are considered below.

Option 3: Transition arrangements for disaggregation

It is the panel's view that the structural changes it has proposed should be implemented as soon as reasonably practical. However, the panel recognises that there are constraints in this respect, although it believes these apply mainly to the fixed line networks.

Thus, at the time of writing, the HFC and copper networks are still owned by Telstra and Optus and negotiations are ongoing to have them divest those assets to NBN Co. As such the Commonwealth is not in a position to unilaterally make decisions about the ultimate ownership of those assets and any proposed disaggregation would raise issues that could need consideration in the negotiations.

At the same time, NBN Co is adjusting to a new mandate, leadership and operating model, and there are dangers in disrupting that adjustment. Last but not least, the move to a disaggregated model will require planning and could take time, particularly in the phase where the tempo of the rollout is being increased. The Government may therefore consider a gradual process of disaggregation would be more suitable. To this end, the panel has therefore considered phased approaches to implementation of its disaggregation proposals.

A first such approach would involve NBN Co contracting out the operation and management of the various platforms. The costs and benefits of doing so would depend on the precise nature of the relevant contracts, and in particular on the extent to which each platform operated as an independent profit centre, with some degree of control over capital expenditure. However, even a more limited form of contracting out could at least preserve the platforms as separate entities, thereby facilitating eventual disaggregation. Moreover, again depending on how the contracts are devised and structured, contracting out could provide information about costs and demand that would be useful in the regulatory process.

Additionally or alternatively, the various platforms could be 'ring fenced' within NBN Co itself. Even were that approach adopted, the business units that are not currently absorbed within NBN Co, such as the HFC, could be kept as a stand-alone operating business during the transition stage. Any operating framework for the ring fencing, including for accounting separation, would need to be approved by the regulator.

The panel does not believe these approaches can come close to yielding the significant public benefits associated with full disaggregation. It would not be easy to reconcile the contracting out model with strong competitive tensions between the business units. As for ring fencing, it would not in itself involve or permit any such tensions, and regulators have rarely been convinced that ring fencing can be properly policed at reasonable cost. Moreover, there are risks in the ring fencing approach: for instance, were it clear to NBN Co that a particular ring-fenced unit was to be divested, and would then compete with it, NBN Co would have incentives to starve that unit of capital and skills.

There are no ready solutions to these problems. For example, seeking to prevent NBN Co from depriving soon to be divested units of capital would require intrusive, likely unworkable, controls over its corporate decision-making.

As a result, these options ought to only be considered as short term transitional steps to disaggregation, with their inherent weaknesses and risks recognised and fully understood. To that end, should a phased approach be adopted, the Government should commit itself to a further independent review of telecommunications market structure in no more than five years' time.

Option 4: Status quo NBN Co model with enhanced regulatory settings

Finally, the Government may decide to retain the current model for NBN Co, which would therefore continue as an integrated, nationwide, wholesale-only provider of high-speed broadband services. For the reasons set out above, the panel believes this would preclude substantial benefits the community could legitimately expect.

The social costs of this option would be reduced were the legacy copper network broadband services kept in service in FTTx deployment areas for so long as the copper was not being used in FTTx deployments, and in HFC areas. This would involve some continuing costs for maintaining the copper, and may not be possible under the disconnection provisions of the Definitive Agreements. Moreover, even were it possible, RSPs using these services would run the risk of the service being terminated, reducing their willingness to invest. This possibility is therefore far from being a complete solution.

Retaining the status quo would prevent competition developing. This would have implications for the regulatory settings, as the more limited is the extent of competition, the stronger and more intrusive must be the regulatory safeguards.

In particular, as set out in the panel's *Statutory Review* and in the other chapters of this report, under this option:

- The ACCC should be more vigilant in administering the panel's proposed revisions to the anti-discrimination rules;
- With only narrowly defined exceptions, all of the NBN Co's services should remain declared services;
- Competitive neutrality requirements in respect of NBN Co's decisions about entry and expansion should be given legislative form;
- Since any subsidies NBN Co might seek could not be market tested there could be no assurance that those subsidies were reasonable. As a consequence no levy-funded subsidy mechanism to support the cost of NBN Co's universal service obligations should be considered at this stage; and finally,
- The ACCC should take account of NBN Co's very substantial and enduring market power in considering applications from potential competitors for exemptions from the provisions of Part 8 of the Telecommunications Act.

6.4 Conclusions and recommendations

Overall, the panel sees great merit in the commitments successive governments have made to the underlying principles of the Competition Principles Agreement – principles the

Commonwealth quite rightly demands that the States and Territories respect. Despite the many complexities involved, there is a significant opportunity to place infrastructure competition on a viable and effective basis. Conversely, should the status quo be entrenched, there is a risk of locking in a structure that will prove as resistant to change as were its predecessors.

Recommendation 1: Infrastructure competition be the guiding policy for the delivery of wholesale broadband services. This policy be implemented expeditiously to the maximum extent practicable.

Recommendation 2: The basis for a competitive wholesale broadband market structure be created through the disaggregation of NBN Co. This be done through:

a) the disaggregation and divestment of NBN Co's transit, satellite and fixed wireless business units, along with associated obligations, including with ongoing subsidies if they prove to be necessary;

b) putting in place arrangements with the aim to having the HFC network owned and managed by a non-NBN Co operator. If NBN Co is successful in acquiring the network and the Government considers that full divestment is not achievable, it disaggregate NBN Co's HFC network from its FTTx network to the greatest extent possible;

c) were full disaggregation not to proceed immediately, the Government direct NBN Co to move to the transitional internal arrangements identified as a preparatory stage, with a further independent review of market structure being conducted in no more than five years' time; and

d) the copper network remaining active in the supply of ADSL services within the HFC network area pending upgrade to FTTN or FTTP.

7. Parts 7 and 8 of the Telecommunications Act and the treatment of new high-speed networks

7.1 Introduction

A key question in consideration of the structural and regulatory treatment of new high-speed networks is whether, and on what terms, competition between NBN Co and alternative providers should occur. This chapter focuses on brownfields rollout, by which is meant the deployment of high-speed networks to premises already connected to the telecommunications network. Network deployment in new developments is discussed in chapter 8.

The issue of competitive entry has been highlighted by TPG's proposed rollout of fibre-to-the-basement network infrastructure to up to 500,000 premises. However, the panel did not specifically focus on that network proposal, nor did it address the legal issues surrounding it. Rather, TPG's proposed network exemplifies the general issue the panel has considered.

The panel's approach was guided by the objectives and principles set out in chapter 4, particularly that infrastructure competition should be encouraged, and by the panel's view that private investment can bring effective disciplines to the use of scarce capital, reduce the risk being placed on taxpayers and free taxpayers' funds for other purposes.

On the basis that high-speed networks servicing business customers are not subject to special regulation under Parts 7 or 8, the panel has not concerned itself with these networks. Telecommunications service providers have generally been responsive to the needs of larger business customers and can have every incentive to remain so. Consistent with this observation, no special intervention in support of those customers should be considered.

It is important to note that the Part 7 and 8 rules do not apply to NBN Co. NBN Co is subject to similar rules through the NBN Companies Act and the CCA.

7.2 The current rules

For convenience, the rules under Parts 7 and 8 of the Telecommunications Act and associated provisions of the CCA are referred to as the 'superfast network rules'.

In summary, the rules apply to a local access line:

- used, or proposed to be used, to provide a fixed-line carriage service where the download transmission speed is normally more than 25 Mbps[16] to residential or small business users ; and
- was built, upgraded, altered or extended on or after 1 January 2011 so that it is capable of providing download transmission speed normally more than 25 Mbps.

Network upgrades, alteration and extensions are captured by deeming rules.

In summary, the rules require:

- the owner of the network to offer a Layer 2 bitstream service (as defined by the ACCC) on a non-discriminatory basis at or below a price set by the ACCC (Part 7, s.141, and certain provisions of the CCA); and
- the controller of the network or an associate not to supply services to anyone other than a carrier or carriage service provider (that is, they must not supply to retail customers) (Part 8, s.143).

There are a number of exemptions to the rules. The rules do not apply to networks being rolled out in real estate developments that existed on 1 January 2011, to network extensions of less than 1 kilometre or to any kind of wireless network. The rules only apply to networks wholly or principally servicing residential and small business customers, thus excluding networks that serve large business customers. The Minister can also grant exemptions (conditional or unconditional) from Part 7 and/or Part 8. Exemptions have already been granted to Telstra and TransACT.

Subject to those exceptions and exemptions, the rules prevent alternative (that is, non-NBN Co) operators of superfast networks from entering retail markets. Formally, that merely places them in the same position as NBN Co. In practice, however, the rules greatly diminish the commercial incentives to enter wholesale markets because none of the considerable efficiencies of vertically integrated operation are available, while at the same time entrants face almost certain competition from a taxpayer-funded provider.

16 A network capable of delivering 25 Mbps download speed is referred to in the legislation as a 'superfast' network. This is the same definition that this report uses for 'high-speed' networks, but 'superfast' is used in this chapter in specific reference to the legislation under discussion.

According to the Explanatory Memorandum for Parts 7 and 8, the rationale for these rules was to prevent alternative vertically integrated superfast network providers from advantaging themselves over independent RSPs and from undermining NBN Co's ability to cross-subsidise:

> *Amongst other things, the NBN Implementation Study identified that difficulties could arise for the delivery of the Government's NBN policy objectives as a result of NBN Co being subject to strict regulatory requirements while competing against other, less regulated, providers of superfast broadband. In particular, the Study noted the scope for competing providers to target high-income and low-cost, high-density areas, operate as vertically-integrated providers and advantage themselves over independent retail service providers (RSPs) on the NBN, and ignore technical specifications employed by NBN Co. This could mean that where other providers rolled out superfast networks in advance of the NBN, these would not deliver consumers in those areas the same benefits as the NBN. Moreover, by cherry-picking high-value markets such providers could undermine NBN Co's ability to deliver the Government's policy objectives for the NBN nationally.*

This statement crystallises the issue of NBN Co facing competition from superfast networks: how might they impact on NBN Co's ability to cross-subsidise services in regional, rural and remote areas, assuming it were required to do so; and if there is such an impact, how that impact should be dealt with. It also crystallises an assumption that competition or the threat of competition at the network level is of little value to residential and small business consumers - an assumption TPG's proposal, and international experience, question.

7.3 Submissions

NBN Co strongly supported the existing rules. It argued they were important to it operating on a level playing field and supported its ability to fund otherwise uneconomic services in regional, rural and remote areas.

As for other parties, most other submitters did not directly challenge Part 7 and 8 or the notion that new competing superfast networks should be regulated in this way.

Rather, those submissions – generally made by parties that will be seeking access to the NBN – seem to accept these provisions as part of the rollout of the NBN. The submissions by parties that own extensive distribution and transmission assets appear to be concerned by the prospect of competition. These submissions suggested that alternative networks that are operated on a vertically integrated basis create scope for the network owner to favour its own downstream operations (thereby potentially raising the same issues that were of concern with Telstra in the past). These concerns were echoed by Telstra, which has previously placed great emphasis on the benefits of vertical integration, including in promoting competitive entry into the provision of telecommunications infrastructure. The Communications Alliance expressed concerns that networks employing vectored very-high-bit-rate digital subscriber line (VDSL)

would require some form of monopoly to optimise technical performance and suggested that in these instances access rules were particularly important.

TPG argued that carriers should generally be free to invest within the limits established by the superfast network rules and that there is (TPG maintained) already substantial competition in these areas from HFC and 4G mobile networks, so that any issues about 'cherry picking' will arise in any event. It argued that if a network extension represented an access bottleneck then access requirements could be imposed under Part XIC and that this was the usual and better course of action. That said, TPG did argue that its proposed network operated under a statutory exemption and so did not strongly urge the repeal of the rules as a whole.

7.4 Options

The panel considered alternative options for the rules under Parts 7 and 8, including that they should be: unchanged; tightened to provide stricter controls on alternative superfast network providers who enter the market; or relaxed to allow alternative superfast providers to also operate in the retail market, but under conditions that still address the potential for anti-competitive conduct.

Arguably the rules under Part 7 are not as intrusive as those under Part 8. Carriers can already be required under Part XIC of the CCA to provide access to specified services. Part 8 is significantly more intrusive because it effectively limits a network operator to wholesale supply.

Thus preventing alternative superfast network providers from entering the retail market could seriously compromise the incentives for investment in competitive infrastructure. By discouraging that investment and strengthening a *de facto* NBN Co monopoly, the rules would then deprive end-users of services that might otherwise be provided or, if those services are provided, might cause them to be provided less promptly and efficiently than they could be.

Were that to occur, it would hardly be in the long-term interests of end-users. Rather, the resulting *de facto* monopoly arrangements would erode both the disciplines on wholesale prices and incentives for innovation, in the market generally and for NBN Co particularly. These are significant risks that cannot be fully offset by regulation; that fact underscores the presumption that competitors should not be unnecessarily constrained against a firm like NBN Co which enjoys very considerable advantages, including that of ready access to taxpayer funding.

As for claims that the restrictions are required to ensure NBN Co's ability to fund its service obligations, those claims are both unproven and, in any event, inconsistent with good public policy: if there is a need to subsidise prices in regional, rural and remote areas, this should be done through arrangements that are transparent and accountable, rather than by means of opaque restrictions on competition. As a result, protecting poorly targeted cross-subsidies

cannot justify retaining the rules that are currently in place. Alternative arrangements which would ensure universal access and affordability more effectively and efficiently are set-out in chapter 8.

Moreover, if the purpose of the current arrangements was to prevent entry that might undermine internal cross-subsidies, they have singularly failed to do so, while creating substantial uncertainty as to their precise reach and impact.

This uncertainty, which arises from the poor design of the legislative provisions, is apparent in the controversy around the legality of TPG's network and the scale of the network (around 500,000 premises) that TPG has been able to propose under the statutory exemption. Potentially, other network infrastructure owners could do the same, and to an even greater extent if they own existing networks that are larger than TPG's.

There are no credible low cost options for improving the network extension rules. Thus, were it desirable to redesign the statutory exemption to significantly restrict entry such as that proposed by TPG, the likely effect of possible rule changes would be to impose onerous restrictions on legitimate maintenance and development activities by existing network infrastructure operators. The 1 kilometre exemption has an artificial character, and any workable alternative will be similarly artificial, creating the risk of unexpected market entry as well as of unintended consequences in adversely affecting the ongoing functioning of existing networks.

Importantly, the risks inherent in locking in inappropriate market structures will rise over the coming years. While current knowledge may lead to sensible decisions about immediate infrastructure requirements from an engineering perspective, a long term industry arrangement based on a *de facto* monopoly supply of wholesale broadband services will increasingly erode dynamic efficiency as technology continues to evolve, opening new commercial opportunities in the process.

As a result, the "*no change*" option has little to recommend it. Nor does the panel favour the option of tightening the rules to further restrict what alternative wholesale providers that enter the market can do. On the contrary, tightening the rules would entrench a *de facto* monopoly and exacerbate the distortions it brings.

None of that detracts from the benefit to end-users from having access to effective competition and choice at the retail level, even if there is a single network provider in a given locality. However there is also benefit in firms being able to enter wholesale markets on a competitive basis – remembering that, even in situations such as apartment blocks, competition ***for*** the wholesale market (through regular or even one-off auctions) can be as effective as competition ***in*** the wholesale market in protecting the interests of consumers.

Both retail and wholesale competition can and should therefore be pursued. The former is guaranteed by Part XIC and the special access provisions relating to NBN Co. The latter can be promoted by removing disincentives to wholesale market entry while ensuring there is effective support for retail competition, potentially in the form of access, equivalence, and appropriate non-discrimination and/or separation regulation. Removing those disincentives is obviously all the more important if NBN Co remains as an integrated entity; in that event, the changes proposed by the panel should be treated as a matter of considerable urgency.

7.5 Vertical integration issues

In the panel's consideration of relaxing the rules, a key issue was the terms on which an alternative superfast network provider may participate in the retail market.

Submitters implicitly acknowledged the option of allowing alternative networks to engage in the retail market, but also highlighted issues around equivalence of access, non-discrimination and the separation of wholesale and retail activities[17]. The panel agrees that vertical integration is an issue that any new rules must address.

However, the need for and type of broadband-specific regulation to address vertical integration issues depends on the nature and characteristics of a network. For example, if a network covers a limited number of premises, and is exposed to the risk of displacement (not least by NBN Co), the costs of prohibiting vertical integration are very likely to exceed the benefits. This would particularly be the case where the superfast network rules do not apply to the bulk of the pre-existing network as a result of previous grandfathering arrangements (for example, as with the upgrade of the TransACT network in Canberra). In that case, a prohibition would require what amounts to ring fencing a potentially small segment of a network, eliminating any efficiencies of integration without yielding discernable gains in greater competition.

However, where an entirely new network is being considered the application of separation rules could be warranted, so long as the result was not to deter efficient investment. Even then, however, the precise arrangements should be no more onerous or intrusive than can be justified by the need to protect competition, and should not deny customers the benefits of rivalry, diversity and choice.

17 'Equivalence' refers to access seekers being treated in the same way, potentially in like circumstances, as the downstream operation of a network operator. 'Separation' refers to particular organisation rules (for example, structural, functional, operational, accounting) separating business units to reinforce equivalence and non-discrimination. 'Non-discrimination' refers to strict prohibitions on variation in the treatment of downstream operators and customers. 'Equivalence' and 'non-discrimination' overlap but are different. For example, if a carrier was allowed to have a downstream operation and discrimination was allowed, equivalence could still be required in like circumstances, or generally.

The case for such a light handed approach is made all the more compelling by the fact that alternative networks are, by definition, alternative to NBN Co. That is, they will face actual or potential competition from an extensive, well-funded, wholesale-only competitor, whose operations receive significant support from taxpayers. This will provide a discipline on any vertically integrated network provider in the wholesale market that has not existed in the past. Adding to that discipline, if entry conditions were more supportive of competition than the current provisions, there might even be a second alternative network provider across large parts of the national market.

Given these considerations, the panel rejects the unqualified imposition of any structural separation, wholesale access and/or equivalence, separation and/or non-discrimination rules. Attempts to impose arrangements of that kind are likely to worsen the artificiality of the current arrangements stifling competition while giving rise to perverse and unanticipated consequences. Moreover, it is difficult to see why those arrangements would be necessary, given the industry structure that could emerge under better policy settings.

That said, the panel recognises that situations may arise where imposing structural requirements would be in the LTIE. However, Part XIC provides only limited capacity to address vertical integration issues apart from the access declaration and determination process. The processes it establishes are likely to be too weak or slow to address any vertical integration issues promptly and effectively. The panel therefore does not favour the option of leaving those issues to Part XIC as currently drafted.

Instead, it would be preferable to adopt an intermediate position in which desirable levels of access can be ensured, and additional carrier-specific requirements relating to equivalence, non-discrimination and separation imposed as requirements of entry and/or ongoing service provision, where (and only where) they are clearly justified.

With such an intermediate position in mind, the main options considered by the panel to address vertical integration concerns were:

- retain requirements to offer Layer 2 wholesale services, as currently required under Part 7, but give the ACCC new powers to impose separation, equivalence, and/or non-discrimination rules when doing so would clearly be in the LTIE; and/or
- retain structural separation rules as currently required under Part 8, but provide for a new undertaking process. Once approved by the ACCC following an assessment based on the LTIE, the provisions in the undertaking concerning access, separation, equivalence, and/or non-discrimination would replace the statutory requirements in Part 8.

Under both options, and to the extent possible having regard to acquisition of property considerations, the 1 kilometre statutory exemption should be abolished to ensure that all alternative superfast networks were subject to the new arrangements.

The panel does not favour any Ministerial exemption power in these arrangements. As NBN Co shareholder representatives, Ministers have a potential conflict of interest in their exercise of exemptions relating to superfast broadband market entry conditions. Instead, any exemption power should be exercised by the regulator.

The first option, of an enhanced Part 7, has several weaknesses. The drafting of legislation to create specific new powers for the ACCC to intervene after a rollout has occurred would be complicated, such powers would be difficult to administer and the provision could lead to unintended consequences. Furthermore, there is a risk that an order to structurally separate wholesale and retail activities may constitute an acquisition of property; if so, the structural separation remedy may not be available under this option, or only available at unduly high cost.

The second option has the advantage that requirements for access, equivalence, non-discrimination or functional separation could be established as conditions of exemption. Further, the structural separation option can be implemented simply by refusing exemption, or could be made a requirement in the future were certain threshold conditions met. Under this arrangement, Part 7 would not be necessary. This second option is therefore the one that the panel recommends.

In terms of how this option would operate, the panel proposes a process under which current and prospective superfast wholesale operators could lodge a superfast network undertaking (SNU) setting out conditions that replace default conditions that would be defined by Part 8. The ACCC would be required to accept an undertaking unless the undertaking was not in the LTIE. The LTIE would be specified to be that of the end-users the applicant intends to service, thus making implementation of the test more practical and timely. Moreover, by restricting consideration to those end-users directly affected, the panel intends to exclude arguments about cross-subsidy, as those should be transparently addressed through the subsidy arrangements discussed in chapter 8, rather than in the context of individual entry decisions.

The amending legislation itself should provide the ACCC with guidance, for example that in accepting an undertaking it assesses the effect of the undertaking on the LTIE of the proposed end-users. Given the enduring impact of these decisions, their impacts on private property rights and their implications for end-users, the ACCC's exercise of that power should be subject to review on the merits.

Alternative superfast network providers could offer a range of conditions in SNUs:

- adopting standard access obligations (SAOs), or some other set of obligations that still provide effective support for retail competition but are more appropriate to the provider's intended operations;
- publishing a reference offer for Layer 2 wholesale access;
- supplying services on genuinely equivalent terms and conditions;
- supplying services at arm's length to its own and others' operations;
- providing services according to specified non-discriminatory rules;
- providing non-standard contracts to the ACCC for scrutiny; and/or
- implementing accounting, operational or functional (legal) separation of their business activities.

The provision of Layer 2 access would be a normal element of such an undertaking, but the ACCC should be able to approve an undertaking without such a condition if this is in the LTIE; it may also not be required if a Layer 2 access service has already been declared by the ACCC. Such an undertaking should not preclude the lodgement of a special access undertaking unless the undertakings are inconsistent.

Decisions about the acceptance of undertakings by the regulator should have regard to matters such as the proposed size of the network, the level and nature of competition in the locality of its footprint, the materiality of the expected impact of the network, the costs and benefits of the proposed regulation, and ultimately the LTIE of end-users in the area the applicant intends to service. The legislation should also require the ACCC to define minimum undertaking requirements for particular classes of markets and situations, e.g. small local carriers serving new developments, and for it to establish model SNUs for networks that fall into those categories, which carriers servicing those markets could adopt.

The undertaking process would give the ACCC significant power over investors. To ensure investment certainty:

- ACCC decisions about undertakings, including any associated conditions, should be subject to merits review;
- the new provisions should also require the ACCC to publish guidelines setting out how it will apply the LTIE test (these guidelines should have regard to the tests applied to the NBN Co SAU) and to act in a manner consistent with those guidelines;

- the ACCC should be required to consult publicly and to approve or advise of concerns with any such undertaking within three months of its receipt. Where it has advised of concerns, it must make its final decision within a further three months, with the undertaking being deemed to be accepted if the ACCC makes no decision;
- the burden should be on the ACCC to show that an undertaking is against the LTIE of end-users in the area the applicant intends to service. In other words, the ACCC would only be able to reject an undertaking if there are objective reasons to be satisfied that the harm caused by accepting the undertaking outweigh the benefits;
- undertakings should have effect for up to 30 years, in line with NBN Co's SAU; and
- the ACCC should not be able to recommend variations to such undertakings unless the variations are essential to the LTIE and (as the panel proposes more generally) should accept variations made in response to those recommendations unless they are insufficient to meet the concerns.

Were the panel's recommendations in respect of merits review of these decisions not accepted, the panel recommends that the ACCC be provided with clear and specific criteria it must implement in considering an undertaking. In particular, the ACCC should be required to accept an undertaking unless acceptance meant that:

- The proponent of the undertaking would have the incentive and means to distort competition in dependent markets; and
- The costs of those distortions would be enduring and material, compared with the benefits to the end-users it proposes to serve from its operations and to the costs of the proposed regulatory remedy.

7.6 Networks already exempted

Consideration also needs to be given to how the current or any new rules will impact on existing networks operating under Ministerial exemptions.

Those exempted superfast networks that are currently operated by Telstra were given this status on the expectation that they would be integrated into the NBN. If they are not integrated after the completion of the NBN rollout, then they must be operated in a manner consistent with Telstra's SSU and the new Part 8 regulatory arrangements.

The TransACT VDSL network (which is owned by iiNet) has exemptions for its recent VDSL2 upgrade. These networks are currently exempted until the 'designated date' for Telstra's structural separation (that is, currently 30 June 2018). This is on the assumption that, by the time Telstra is structurally separated, TransACT should be putting in place similar arrangements or should seek new exemptions. The TransACT exemptions are subject to a

number of conditions, including that it offer Layer 3 access to ISPs. A more flexible approach to that existing under Parts 7 and 8 would provide scope to deal with the future treatment of these TransACT networks in a way that appropriately balances the costs and benefits of particular regulatory requirements.

As already noted, the panel proposes that the 1 kilometre rule be repealed. However, rights relating to infrastructure installed under the current 1 kilometre exemption (before a certain date to be determined by the Government) should be grandfathered.

7.7 Recommendations

The panel does not believe there is a policy justification for retaining the current Part 7 of the Telecommunications Act. It should therefore be repealed.

Having reviewed a range of possible alternatives, the panel has concluded that the provisions of Part 8 should be retained in substantially amended form. Specifically, the provisions as amended would define some 'default' conditions entrants would have to meet, including structural separation. But those 'default' conditions would be capable of being over-ridden by undertakings accepted by the regulator, with the legislation directing the regulator to approve undertaking applications unless to do so would be contrary to the long-term interests of end-users in the area the applicant intends to service. The panel envisages that the undertakings given in seeking approval would specify terms and conditions of third party access.

The Ministerial exemption process and the 1 kilometre exemption in Part 8 should be repealed, with appropriate grandfathering provisions for infrastructure already subject to these exemptions. The legislation should be drafted to avoid any constitutional issues arising from the acquisition of property, especially in relation to infrastructure already installed under the existing 1 kilometre exemption.

Recommendation 3: Part 7 of the *Telecommunications Act 1997* and associated provisions of the *Competition and Consumer Act 2010* be repealed

Recommendation 4: Part 8 of the *Telecommunications Act 1997* be amended to:

a) remove the 1 kilometre exemption and the Ministerial exemption process, but protect existing providers' rights in relation to infrastructure already installed under the exemption either by an ongoing statutory exemption or by deeming such networks to be subject to an undertaking under the process set out below;

b) provide for an undertaking process under which superfast network undertakings, if accepted by the ACCC, replace the Part 8 provisions that require supply of superfast broadband carriage services on a wholesale-only structurally separated basis;

c) require the ACCC to accept such superfast network undertakings unless to do so would be contrary to the long-term interest of end-users in the area the applicant intends to service, having regard, amongst other things, to whether the provider has a significant degree of market power, the incentive and ability for the provider to distort competition in dependent markets, the conditions in the undertaking to overcome these risks and the proposed duration of the undertaking;

d) require the ACCC to publish and implement guidelines on how it will apply the long-term interest of end-users test to undertakings – these guidelines should have regard to the tests already applied to special access undertakings; they should also include model superfast network undertakings for particular classes of markets and situations, for example, small local carriers serving new developments, which carriers wishing to service those markets could adopt;

e) require the ACCC to consult publicly on the acceptability of superfast network undertakings received, and approve or advise of concerns with an undertaking within three months of its receipt; where it has advised of concerns it must make its final decision within a further three months of that advice, with the undertaking being deemed to be accepted if the ACCC makes no decision;

f) subject an ACCC decision to accept or reject such an undertaking to merits review or, in the event merits review is not provided, ensure the process for the assessment of such an undertaking is subject to clear and specific decision-making criteria specified in legislation; and

g) enable a provider to combine a special access undertaking and an undertaking under Part 8.

8. Broadband service provision

8.1 Introduction

The Government has made clear that it is committed to completing the NBN and ensuring all Australians have access to high-speed broadband as soon as possible, at affordable prices, and at least cost to taxpayers[18].

NBN Co is the main policy instrument being used to achieve this objective. Under current policy settings, it effectively has sole responsibility for completing the NBN and delivering wholesale broadband access to all Australians at affordable prices.

This remit creates a *de facto* obligation on NBN Co to provide service nationally at 'affordable prices', funded by taxpayers and users of broadband services. However, despite the commitments successive Governments have made on behalf of Australian households, there is no clarity as to the service obligations that apply to NBN Co and how service affordability is to be managed into the future. The NBN Co service obligations discussed in this chapter would also apply to any disaggregated NBN Co entity.

NBN Co has raised with the panel its concern that infrastructure-based competition in major urban areas would undermine its ability to fund affordable universal access to broadband infrastructure via an internal cross-subsidy. Whether this will be the case, and the extent of any such effects, cannot readily be determined until competitive supply emerges and in the absence of transparent policies providing guidance about:

- NBN Co's current and future supply obligations;
- how 'affordability' is to be determined and achieved over time;
- the minimum standard to which broadband access services are to be supplied now and in future; and
- how any required network upgrades are to be funded.

NBN Co's infrastructure supply obligations, including for new real estate developments and for supply of access services to new customers once its network has been rolled out in an area – and the prices it can charge for connections – will have a significant effect on the extent of any subsidy NBN Co may require. So too will the standard to which it is obliged to provide service and the wholesale prices it can charge for its minimum service offering, as well as for higher speed services. In the absence of clarity around these factors, it will be difficult in the

18 Refer to Shareholder Ministers' Statement of Expectations letter to NBN Co of 8 April 2014.

future to identify whether (and if so, to what extent) any poor financial results from NBN Co are or are not a direct outcome of its obligations to supply services in loss-making situations.

Policy clarity in these respects is important in providing NBN Co with a clear understanding of its mission and responsibilities; developers with legal certainty as to NBN Co's obligations to supply services for new developments; RSPs and consumers with certainty as to NBN Co's service provision obligations once its own access network has replaced Telstra's network; and NBN Co's actual and potential competitors with certainty about the legal framework in which they will operate. Equally, Australians deserve certainty as to what they will receive in return for the capital commitments made by the Government on their behalf; and what they will pay towards and receive from any ongoing support that is to be provided to NBN Co or other broadband service providers, be it via cross-subsidy or from other sources. Consistent with the National Competition Policy, consumers and taxpayers are due full transparency of any subsidies and accountability for the effective and efficient discharge of social obligations.

In examining the obligations that might be established, it is useful to set out some preliminary observations. Unless price controls are in place, an obligation to supply a high cost area need not, in itself, give rise to losses: it will only do so if the prices the market can bear do not cover the costs involved in making service available. As a result, the need for a subsidy has to be assessed considering both obligations to serve and any constraints on the prices that may be set. The discussion that follows therefore begins by examining the issue of service obligations, including in new developments; then it turns to affordable user pricing; and lastly, it considers how the ongoing supply of any mandated loss-making services can be funded in an efficient and sustainable way. The issue of the minimum standard to which broadband access services are to be supplied and how network upgrades are to be funded in the future is dealt with in chapter 9, which considers NBN Co's products, pricing and expenditure.

8.2 Infrastructure provider of last resort obligations

Despite the intention that the NBN will replace the existing Telstra fixed line network in large parts of Australia, there is no existing legal obligation for NBN Co to provide ongoing service after its network rollout has been completed or to operate as the IPOLR carrier in those service areas. Historically, Telstra's network has been used to fulfil its legal obligation to supply the standard telephone service, which has been broadly defined in terms of a requirement to make service available at any place within Australia at which people reside or carry on a business. Under current arrangements, Telstra has a 20 year contractual obligation to operate as the retailer of last resort; but the panel is not aware of any corresponding ongoing legal obligation on any carrier, other than in the 36 small adequately served areas, to provide the fixed line infrastructure to support this ongoing retail supply obligation.

This situation relies on the Government as shareholder deciding when, where and how NBN Co is to provide fixed line infrastructure, and what service provision and continuity arrangements will apply after the NBN rollout is completed.

In effect, NBN Co has to date been treated as if it were a monopoly supplier. Under this assumed status the obligations being imposed on it are not specified in legislation but rely on the Government providing clarity through its shareholder SOE, even though those obligations involve what can more properly be described as customer rights. The April 2014 SOE to NBN Co by its Shareholder Ministers expresses the Government's commitment to completing the NBN but is silent on NBN Co's ongoing supply obligations.

In the panel's view, NBN Co's ongoing service delivery obligations should be specified in legislation. Taxpayer equity funding of up to $29.5 billion, acceptance that ongoing service supply in loss-making areas will be subsidised, as well as funding to support the migration of customers from Telstra's copper network represent a major public commitment. This warrants a corresponding legal obligation relating to wholesale service provision by NBN Co and other carriers that form part of the NBN umbrella. In any event, such a requirement will need to be put in place prior to NBN Co being privatised otherwise its new owners could choose to withdraw from unprofitable geographic areas or decline to extend its infrastructure into areas or to premises where it expects to make a loss. The same requirement would arise under all the future industry structures considered by the panel.

The panel appreciates there would have been difficulties in placing supply obligations on NBN Co when it was a start-up company with no infrastructure and with an uncertain rollout-completion timetable. It would be undesirable for inconsistencies to arise, however inadvertently, between the deployment schedule for the NBN that made the best use of resources and NBN Co's mandated service obligations. But the situation is changing and will change further as deployment progresses. At the very least, property owners in areas where the NBN has been provided need to have certainty about supply continuing into the future, as do those in areas that would be affected by infill service provision.

The issue, in other words, is that of devising service provision obligations that are consistent with the fact that the network is still at an early stage of deployment. This could be achieved by IPOLR obligations only taking effect after the initial NBN rollout has been completed in each area. This would provide RSPs with certainty in relation to ongoing access network provision so they can confidently make complementary investments in backhaul and other service-supporting infrastructure in that area; and give consumers certainty that requests via their RSP for NBN Co to provide infrastructure will be met where it is reasonable to do so.

With respect to the precise scope of the IPOLR obligation, and assuming the Government remains committed to completing the NBN so as to ensure all Australians have access to high-speed broadband, the following approach should be adopted:

- all Australian premises should be in a position to access high-speed broadband: so where it is not being so provided by another entity, or is not likely to be so provided by another entity, NBN Co would have an obligation to supply that access, consistent with the efficient deployment of its network;

- where premises are currently served (or are in future served) by a third party, and that third party exits the market, NBN Co would have an obligation to provide continuity of supply using the most practical means, subject to arrangements being made for recovery of costs necessarily incurred;

- for new estates, developers should have the option of obtaining high-speed broadband from NBN Co subject to NBN Co competing fairly in that market, with NBN Co having an obligation to supply access as well as the right to charge for that access on terms and conditions that allow it to recover costs it would not incur in the normal course of business. (The issue of new estates is discussed in more detail at section 8.3.)

These recommended IPOLR obligations should apply to the broadband provider in each of the designated satellite, fixed wireless and fixed line service areas under each of the panel's alternative market structure options.

It would be efficient for the supply obligations in the fixed line broadband footprint to also include the provision of infrastructure that supports a standard telephone service; to do otherwise would probably impose unnecessary costs on consumers.

An IPOLR obligation obviously does not mean that NBN Co (or any another IPOLR carrier) should be required to provide broadband access free of charge. However, given the approach that has been adopted to the deployment of the NBN, it would be unreasonable to require customers who were being forced to migrate from the existing copper access network to the NBN (including the fixed wireless network) or to take up a fixed wireless service to be required to pay for this replacement access connection, other than by means of normal charges for service provision. But the connection of new premises to the network – be they in new estates or in brownfield areas – should be subject to the payment of a reasonable connection charge that reflects the cost incurred in making that connection.

The policy issue is to ensure there is a price signal that can help inform development decisions for new premises while recognising that customers in existing premises are being given no choice but to connect to the NBN. This situation makes it difficult to frame a charge for connections to new premises that is both equitable in its treatment of existing and new

premises on the one hand and helps guide efficient development decisions on the other. There is no perfect way of reconciling these competing considerations; the panel's approach is to establish a process that requires NBN Co to stand ready to make those connections on terms and conditions approved by the regulator.

Specifically, the panel recommends that the price and non-price terms and conditions of NBN Co provision of a broadband connection service to premises be established through a new legislative arrangement which requires NBN Co to have an undertaking approved by the ACCC setting out the terms on which it will fulfil its IPOLR obligations. The principle would be that NBN Co has no obligation to provide new services unless it is compensated for their provision in accordance with the arrangements set out in its approved 'Broadband Connection Service Undertaking' (BCSU). Designated IPOLR carriers in non-NBN Co service areas should similarly also be required to have an approved BCSU[19].

This undertaking should cover all new service provision situations: migration from an existing copper connection (where no connection fee would usually be charged because migration is being forced on those customers); new estate developments (where initial connection costs should be established using competitive neutrality principles and recovered); brownfield infill developments (where charges should reflect the connection costs reasonably incurred, as for new estates); and for connections to NBN Co's fixed wireless service and to its satellite service (where applicable). In each case, including for the satellite and wireless networks, the incremental costs to be recovered from connection charges should at least recover the costs NBN Co would avoid were it instead serving a premises that is already connected to the NBN. If the Government wished to retain power to influence the maximum connection charges allowed, because of a concern about ongoing connection affordability, it should provide for that in the legislative provisions (and ensure that there is transparent funding in place to deal with any consequential losses).

While IPOLR obligations could be implemented via carrier licence conditions, the better approach, given the enduring nature and social significance of these requirements, would be to establish them through new legislative provisions which provide for the regulator to formally agree to how the carrier will give effect to its obligations and create enforcement powers that ensure the obligations are met.

Legislating IPOLR obligations would make future service provision requirements transparent; complementary mechanisms should also be put in place at that time to allow for those obligations to be pursued in ways that do not involve NBN Co, should that be judged to be a more efficient approach.

19 This envisages a situation where a carrier other than an NBN Co successor is designated an IPOLR for an area; for example, where a carrier services a large number of premises in new developments.

Recommendation 5: NBN Co's ongoing service delivery obligations be enshrined in legislation. New legislative provisions provide that:

a) all Australian premises be in a position to access high-speed broadband, so where it is not being so provided by another entity, or is not likely to be so provided by another entity, NBN Co (or an alternative designated provider) has an obligation to supply that access (as the infrastructure provider of last resort - IPOLR). That obligation become effective when NBN Co has commenced service provision in an area;

b) where a premises is currently served (or in future served) by a third party, and that third party exits the market, NBN Co (or the designated provider) has an obligation to provide continuity of supply using the most practical means, subject to arrangements being made for recovery of costs necessarily incurred; and

c) the price and non-price terms and conditions of NBN Co (or the designated provider) provision of a broadband connection service to premises be established through a requirement that NBN Co (or the designated provider) have a Broadband Connection Service Undertaking approved by the ACCC setting out the terms and conditions on which it will fulfil its IPOLR obligations.

8.3 Infrastructure and service in new developments

Nothing should prevent a developer from requesting any provider (be it NBN Co or some other provider) to supply infrastructure in, and to service, their estate. However, the infrastructure supplied should be of an NBN-consistent standard. A non-NBN Co carrier providing high-speed carriage services over that network would need to be compliant with the provisions in Part 8 (as recommended be amended) of the Telecommunications Act or operate under a Part 8 exemption undertaking approved by the ACCC.

The panel's recommended IPOLR policy will provide developers legal certainty that they have the option of obtaining high-speed broadband infrastructure and wholesale services from NBN Co (or the designated IPOLR carrier for the geographic area in which the estate is located), subject to its reasonable costs being recovered, with the prices it charges and other terms and conditions of supply being determined through the BCSU approval process.

However, where the developer has not provided the required pit and pipe infrastructure, NBN Co (or the disaggregated business unit IPOLR) would not be obliged to supply service. It would also have no supply obligations where access is being provided by another entity but, equally, would not be prohibited from providing access. Its obligation to provide continuity of supply in the event of a network provider failing would need to be defined and structured in a practical manner and should in principle be subject to the underlying assets passing to it or its costs being otherwise recoverable.

The recommended approach to infrastructure provision in new developments is summarised below. Additional information about possible implementation and transitional arrangements is provided in Appendix 5.

Context

A number of competitive neutrality and consumer outcome issues have arisen in the provision of telecommunications infrastructure in new estates under the current NBN policy framework.

Addressing these issues is important because every year around 140,000 new residences are built in Australia. During the period of the NBN rollout, an estimated 2.1 million new premises will be built and will need access to modern telecommunications infrastructure[20]. The provision of infrastructure in new developments is a significant capital expense for NBN Co, involving planned expenditure of over $3 billion[21] in the period from 2010 to 2020; this is a substantial burden on taxpayers when there is, *prima facie*, scope for greater private sector involvement that might reduce that burden.

Current arrangements

The current arrangements are complex and have only a partial legislated underpinning: NBN Co (for developments over 100 lots) and Telstra (under 100 lots) share responsibility for the supply of infrastructure in the absence of an alternative supplier; and developers (that are constitutional corporations) are required to install pit and pipe infrastructure and to transfer its ownership to the respective companies as a commercial condition of providing service.

The arrangements have raised a variety of concerns. Those concerns include: NBN Co (and Telstra for the rollout of copper) not imposing upfront charges to service developments while smaller alternative providers generally seek to recover their costs from developers as part of their business models (creating an incentive for developers to use NBN Co or Telstra rather than alternative suppliers, regardless of relative efficiency); delays in new developments being serviced; developers failing to submit installation applications; failure of small carriers servicing new developments; and no cost discipline in deciding where developers undertake developments because they do not bear the cost of providing backhaul to a new estate.

20 NBN Co Strategic Review, p.46.

21 NBN Co, Strategic Review, p.61. The Strategic Review states capex on new developments to FY2021 was expected to be $3.4 billion under previous Corporate Plan (2012-15 Corporate Plan which was endorsed by the Government and publicly released) and capex for the Revised Outlook to FY2024 was expected to be $3.4 billion.

Submissions to the Regulatory Issues Framing Paper[22] fell into two broad camps. Those who generally supported the existing arrangements largely benefited from them – NBN Co, property developers, and access seekers. Those who opposed the arrangements were generally alternative providers, such as Opticomm and the members of the Greenfield Fibre Operators of Australia (GFOA).

Those who opposed the arrangements argued that developers have no experience or desire to design and build pit and pipe[23] and that there should be market driven infrastructure-based competition in new developments[24]. They also outlined alternative provisioning models: limiting NBN Co's role in new developments to the deployment of networks in remote, non-metro areas[25]; requiring NBN Co to charge for installations in new developments on a commercial basis[26]; allowing developers to contract and fund the provision of infrastructure, with subsidisation from NBN Co[27]; and requiring NBN Co to re-open tenders for build-operate-transfer networks[28].

The panel sees the creation of an efficient and effective market place, which delivers timely, high quality, sustainable infrastructure outcomes for consumers in new developments, as the key goal in this area. That market should also provide developers with price signals that can help guide the locational aspect of development decisions.

The proposed approach

Application of the principles outlined above for IPOLR provision of service means that NBN Co's provision of infrastructure and service in new estates, including backhaul where alternative supply is not available, would be subject to the payment of installation and connection charges by developers and end-users that reflect the costs reasonably incurred.

This approach reflects the fact neither NBN Co – nor anyone else – should be required to subsidise developers and alternative providers. Rather, developers should factor in the full costs of providing all the infrastructure required when making their investment decisions, rather than having those costs partly borne by taxpayers or by consumers through poorly specified cross-subsidy arrangements.

22 The Regulatory Issues Framing Paper was released by the panel on 13 February 2014.

23 Opticomm, p. 2.

24 Greenfield Fibre Operators of Australia, p. 2.

25 Greenfield Fibre Operators of Australia, pp. 4-5.

26 Greenfield Fibre Operators of Australia, p. 4.

27 Property Council of Australia, p. 5.

28 Communications Alliance, p. 10; Opticomm, p. 10.

Developers should bear these costs because they are directly related to the design and location of the development – both of which are within the developer's control. Ultimately, any costs developers are required to meet will be passed on to land owners and purchasers, affecting locational decisions. Rendering these costs explicit and ensuring they are factored into development decisions will therefore promote economic efficiency.

Nonetheless, the panel is mindful of NBN Co's market power, and the risks it poses to developers, end-users and competitors. Where the developer relies on NBN Co (or the relevant disaggregated NBN company) for infrastructure provision, it would consequently have to be done at prices no higher, and terms and conditions no less favourable, than those established through an approved BCSU, as would the connection of customers using that infrastructure. NBN Co's competitors in this market could then compete in the knowledge that those terms and condition had been assessed by the ACCC against competitive neutrality, equity and efficiency principles. This creates a fair and effective market for the supply of connection services to new estates.

Under the panel's recommended approach, developers would bear the cost of installing both telecommunications infrastructure (which they currently do not if NBN Co or Telstra is deploying the infrastructure) and pit and pipe infrastructure (which developers currently fund). This approach is generally consistent with the manner in which other utility infrastructure is provided in new developments.

As part of the scheme, developers should be required to install pit and pipe meeting appropriate fibre-ready construction standards. Competing carriers should also install other infrastructure to NBN-consistent standards. This could be achieved by the Commonwealth providing guidance that could be reflected in state and territory planning law and/or establishing appropriate rules in statute or licence conditions on carriers servicing new developments. Whether the carriers providing these services were wholesale-only or not would depend on whether they had exemptions from the ACCC under the arrangements proposed for Part 8 of the Telecommunications Act.

An industry-based accreditation scheme to identify capable and experienced carriers could assist developers in their choice of provider. Industry could also consider mechanisms to help co-ordinate strategic planning, assist the provision of infrastructure by competing providers across developments, bring network operators and RSPs together and inform consumers about who is servicing their estate.

A competing carrier servicing a development would generally be expected to service all premises within the development. In the event it failed to do so, NBN Co would continue to have the obligation to service the premises as IPOLR. The panel does not consider it realistic to have a mosaic of small IPOLRs across Australia, servicing a multiplicity of small estates. NBN Co could fulfil these obligations by overbuilding the development (thus providing an incentive for the incumbent carrier to service all premises) or by contracting with the

incumbent carrier. As the incumbent carrier would be subject to access charges that were determined under Part XIC (or Schedule 1 of the Telecommunications Act in the case of pit and pipe), this would prevent it demanding excess charges from NBN Co as the IPOLR. As a safety net, the Government could also indicate it reserved the right to impose an IPOLR obligation (specific or general) on any carrier serving a new development.

The main implementation issue arising from this recommended scheme is that Commonwealth legislation cannot impose requirements on developers that are not incorporated under the corporations power and many developers are non-incorporated. Unless the Commonwealth's telecommunications power could be used to this end, it would be necessary for state and territory governments to amend their planning laws to place this responsibility on all developers – a change that could be pursued through the Council of Australian Governments (COAG). A failure of the states and territories to amend planning laws would run the risk that developers might choose not to provide the requisite infrastructure nor organise a carrier to service their estates, leaving their residents without service. While developers leaving residents without service is unlikely, as doing so would reduce the value of the development, it cannot be entirely ruled out.

Although NBN Co (or the relevant disaggregated NBN company) would not, under the panel's recommended arrangements, take on IPOLR responsibilities in its planned network footprint until it has a network presence, transitional arrangements – through a licence condition or the shareholder SOE – should create IPOLR-like responsibilities for new developments within the proposed footprint before that time. It would also make sense for Telstra to continue to service smaller developments pending its structural separation or NBN Co's rollout in an area.

Transitional arrangements will be needed to move to the new arrangements in a way that is least disruptive to service provision objectives. The implementation of any changes is complicated by the fact that NBN Co already has over 5,000 contracts covering more than 200,000 new lots and premises, and has assigned its own contractors to build in some of these areas. Any comprehensive consideration of the issues must therefore also address these already-contracted areas. These contracts could be left to run their course or, where practical, reallocated competitively or offered to alternative operators on a 'franchise' basis.

Developers may object to having to meet the cost of providing telecommunications infrastructure, as they have in respect of other infrastructure charges imposed by state and territory governments. Moreover, development projects have long lead times and developers will argue that many projects are well advanced and that they have not factored in potentially significant telecommunications costs in their costing and business plans. Some of these concerns may be allayed by appropriate transitional arrangements and an acceptable implementation timeline. Additionally, as noted above, the panel's recommendations include a requirement for NBN Co's charges to be reviewed and approved by the regulator, thus allaying any concern about potentially unreasonable charges. To ensure developer and wider

concerns about meeting the cost of telecommunications are addressed, a soundly reasoned communications program will need to be put in place.

Recommendation 6: Nothing should prevent a developer from requesting any provider (whether it be NBN Co or some other provider) to supply infrastructure in, and to service, their estate. The Government should create a fair and effective market for this work by implementing the following arrangements:

a) the costs of provision of broadband telecommunications infrastructure in new developments should be borne by developers and customers through connection charges, thereby facilitating competition in the supply of these services;

b) providers servicing new developments should have freedom in setting their charges for developers and connection charges for customers; NBN Co's charges should be competitively neutral and established through its ACCC-approved broadband connection service undertaking; and

c) to ensure developers meet the cost of providing telecommunications infrastructure, the Commonwealth should use Council of Australian Government processes to secure changes to State and Territory planning laws to require the provision of such infrastructure as a condition of development approval and occupancy; the Government should also further explore its ability to legislate to achieve the same outcome.

Recommendation 7: Transitional measures be used to assist with implementation of the recommended new development arrangements so it is least disruptive to service provision objectives. As part of these measures, the Government should:

a) set a date for the introduction of developer charging that minimises the impact on the cost of developments already in planning or underway, but does so in a way that avoids a rush of developments being lodged with NBN Co and Telstra with a view to securing free installation of infrastructure;

b) investigate whether NBN Co's existing contracts could be reallocated to alternative providers in a fair and efficient way with a view to maximising operational efficiency;

c) publish a clear roadmap and timetable for the introduction of the new arrangements and the transitional rules that are to apply, including for developments already under contract; and

d) put in place a communications program to explain the rationale for developers being required to meet the cost of telecommunications infrastructure in their estates.

8.4 Affordability

As well as ubiquitous availability, it is also an integral element of Government policy that high-speed broadband service be affordable.

The previous Government's policy was for NBN Co to put in place an implicit cross-subsidy to achieve uniform national wholesale pricing for designated products. The 2010 SOE to NBN Co required products on the same technological platforms to be available nationally at the same prices. Further, the basic access product (that is, the 12/1 Mbps service) was required to be available on all platforms at the same price nationally, and similar outcomes were to be achieved for other products where practicable. Effectively, that meant the uniform pricing provision applied to the basic access product, but that other products might or might not be uniformly priced, depending on whether it was practicable for them to be so.

Subsequent to the change in government, a new SOE was issued. That Statement, released by the Government in April 2014, does not contain a requirement with respect to uniformity of wholesale prices: a matter which falls within the terms of reference of this panel.

NBN Co's implementation reflects the policy setting determined by the 2010 SOE. Three aspects of those settings are worth noting.

First, shortly after the 2010 statement was issued, NBN Co released wholesale products providing uniform national wholesale pricing on the fibre network and for the 12/1 Mbps service across platforms. In February 2013, the then Government announced NBN Co would offer 25/5 Mbps services on its fixed wireless and long term satellite platforms at the price on which they are offered on its fibre network.

Second, so as to ensure NBN Co, in giving effect to uniform national price caps would not be in breach of relevant competition law, the previous Government introduced Division 16 into Part XIB of the CCA. Division 16 authorises, for the purposes of the CCA, certain conduct by NBN Co that is reasonably necessary for it to achieve uniform national wholesale pricing. This conduct relates to refusal to interconnect other than at listed POIs, the bundling of services and cross-subsidising in charging for services.

Third, NBN Co's SAU, accepted by the ACCC in December 2013, broadly reflected these elements of policy as it then stood. However, it established maximum price caps, rather than actually specifying uniform prices.

Submissions

Having solicited submissions on these issues, the panel did not receive responses expressing strong views on uniform national wholesale pricing. However, NBN Co argued that there was a

tension between greater competition, its ability to offer uniform national wholesale pricing and its commercial viability, saying that:

> *…infrastructure based competition in major urban areas would undermine NBN Co's ability to fund affordable universal access to broadband infrastructure via an internal cross subsidy (i.e. via uniform national wholesale pricing). Any change to existing arrangements would require the panel to consider alternative models of funding, such as subsidy mechanisms and industry levies (p.4).*

Panel's views on affordability

Affordability is intended to ensure all Australians can access high-speed broadband services, should they choose to do so, without undue financial sacrifice. Traditionally, this goal has combined vertical equity (that is, the objective of ensuring that irrespective of income level, all households can afford the service) and the geographical dimension of horizontal equity (the objective of ensuring households can access a given service on similar terms, regardless of where they are located). With both objectives being pursued by a single instrument (the uniform national price), substantial distortions are likely to result.

Thus, the uniform price could benefit wealthy households in high cost regional areas (who would obtain service at less than cost), while imposing a large, but disguised, tax on low income households in low cost metropolitan areas (who pay charges well above costs). Rather than advancing social equity, this would undermine it. Indeed, the uniform national pricing of access to telephony in Australia had exactly this effect for most of the 20th century, providing a large transfer to owners of agricultural land at the expense of poorer consumers in the urban areas.

At the same time, since demand for telecommunications usage (though less so basic access) is relatively price elastic, the uniform price can lead to allocative inefficiency (that is, some consumers who value the service at less than the attributable cost of its provision consume it, while some who value it at more than attributable cost do not). The distortions are then magnified if the fact that prices do not properly signal costs blunts the incentives for efficiency, as neither consumers nor regulators are necessarily aware of underlying costs and hence may have difficulty in observing the potential to secure productivity gains.

Last but not least, price distortions both provide a policy rationale for impeding competition (so as to protect cross-subsidies) and by encouraging 'cherry picking' can distort whatever competition emerges. This readily translates into a form of taxation by regulation that lacks transparency, weakens accountability, and achieves its objectives at unnecessarily high cost.

Since the Hilmer reforms of the 1990s, governments mindful of these risks, have sought to better align prices with underlying costs, while addressing equity concerns directly. Reflecting this broadly held consensus, the panel does not support imposing a uniform national pricing

constraint on NBN Co. Indeed, in the panel's view, such a constraint would be especially socially costly, for reasons that include the following:

- the demand for high-speed broadband services, especially those in the top speed tiers, is relatively price and income elastic. This implies both that distorting prices will lead to substantial allocative inefficiencies and that cross-subsidies may have a regressive impact on income distribution;

- taxpayers rather than consumers will, for many years, bear the majority of the costs of the NBN. This makes it all the more important to avoid opaque (and possibly perverse) income redistribution effects, but these are almost inevitable when prices are not aligned with costs; and

- government ownership and its reliance on taxpayer funding make it crucial that NBN Co be exposed to competition, as it indeed would be even under the current legislation. However, price uniformity has the potential to distort that competition, artificially encouraging it in low cost areas while depriving end-users in high cost areas (where the social gains from reducing costs could be particularly great) of its benefits.

The panel recognises that geographical price differences could raise concerns. In considering those concerns, the panel notes that affordability primarily relates to retail prices; but any uniform pricing obligation on NBN Co would operate at the network layer. Even with uniform national wholesale prices, retail prices will depend on the costs associated with serving particular areas, the likely demand in those areas and the extent and nature of competition between RSPs. As these may differ significantly from area to area, the degree to which retail consumers ultimately experience uniform prices is inherently difficult to predict. Moreover, even uniform prices may be unduly high for the more vulnerable consumers. If the goal is to protect those consumers, uniform pricing is both a blunt and potentially ineffective way of doing so.

Additionally, experience shows that the primary factors protecting and advancing service affordability over time are productivity gains on the supply side (which allow prices to fall in real terms) and rising incomes on the demand side (which make those prices increasingly affordable). With telephony, for example, penetration increased in non-metropolitan areas as of the 1960s not because of pricing uniformity but because higher incomes and lower costs stimulated consumer demand. Equally, the panel expects that it will be the increased attractiveness of the service, underpinned by technological progress, rising productivity and growing incomes, that will be by far the most important determinant of long term take-up. This is consistent with NBN Co's SAU, which stipulates real annual price reductions of 1.5 per cent over the period to 2020, although the impact of those reductions is to some extent offset by the impact of rising revenues from usage.

That does not mean, however, that prices for the service should be unregulated. Rather, as NBN Co will enjoy a very substantial degree of market power, it is appropriate that its services be declared and its charges controlled, as is indeed the case under the current SAU.

The panel therefore recommends that affordable user charges be addressed in the short term through a uniform national price capping policy; this is a more realistic option than a uniform national pricing policy, while still ensuring consumers throughout Australia are properly protected from monopoly pricing. As well as matching long-standing arrangements for other declared services (where the regulated charges are a cap, rather than a fixed price), this approach merely recognises the flexibility already provided for in the SAU.

Over time, however, charges and caps in higher cost areas would gradually move to levels that take those higher costs into consideration – much as was done by the ACCC in establishing pricing bands for ULL; without such price adjustments, customers in those areas will forever face ongoing monopoly supply as below cost pricing will make any market entry financially unattractive. This differential pricing approach would reduce the level of cross-subsidy within NBN Co's prices and therefore diminish the potential impacts of competition on NBN Co's viability. To the extent that the resulting prices raised concerns about ongoing user affordability, those concerns would be better addressed through more directly targeted user subsidies (as discussed below).

Recommendation 8: A policy of price capping for NBN-type services be adopted, under which prices continue to be affordable but not necessarily uniform nationally. This should be accompanied by a gradual move towards cost-based wholesale pricing, with directly targeted subsidies used to address any concerns regarding user affordability that may result from this change.

Recommendation 9: If the Government accepts the panel's recommendations to divest NBN Co of its fixed wireless and satellite operations, the setting of caps on the prices that can be charged for services supplied by those networks should be part of the divestment program.

Authorisation for uniform national wholesale pricing

With respect to authorisations provided under Division 16 of Part XIB of conduct reasonably necessary to achieve uniform national pricing, these provisions were reviewed by a team from Deloitte Access Economics led by Dr Ric Simes in 2013. The review found that the statutory authorisations had not given rise to conduct that has attracted practical concerns about the operation of Division 16 of Part XIB of the CCA. Nonetheless, the team suggested the arrangements be kept under review.

The panel is not convinced there is a need for, or merit in, those provisions. The broad scope of the protections they provide could be used by NBN Co to prevent reasonable requests for

interconnection and unbundling. Moreover, removing those protections would not prevent NBN Co acting in ways reasonably required to meet any pricing obligations consequent on Government policy.

Thus it is difficult to see how conduct that merely gives effect to Government policy would amount to 'taking advantage' of market power or have the proscribed purposes set out in s.46 of the CCA. As regards conduct that might otherwise breach ss.45 and 47, authorisations could be sought from the ACCC for that conduct, if the public benefits it gives rise to outweigh the competitive detriments.

As a result, the panel recommends that these provisions be repealed. Recognising the ACCC will require time to consider any authorisations that might be sought along the lines discussed above, the repeal should be delayed by around 18 months. The delay would allow NBN Co to make any authorisation applications it believes are warranted.

Repealing the Division 16 provisions may help subject NBN Co to further competitive pressures. For example, while the current POI arrangements provide a reasonable basis for competitors to interconnect with NBN Co's network, technological innovations such as optical switching may make it technologically and economically feasible to interconnect at more points of the network. Potential infrastructure competition would place pressure on NBN Co to provide its services at prices below the level where it becomes attractive for competitors to demand more granular interconnection. Equally, removing NBN Co's ability to refuse unbundling under Division 16 could put pressure on NBN Co to deliver the services demanded by retail service providers, rather than relying on tactics such as bundling to compel its customers to purchase products that they may not require.

Recommendation 10: Division 16 of Part XIB of the *Competition and Consumer Act 2010*, which provides authorisations for NBN Co to conduct activities reasonably necessary to achieve uniform national wholesale pricing that may otherwise be found to be anti-competitive, be repealed. The repeal date should be delayed to provide NBN Co with an opportunity to apply for any authorisations it may require under Part IV of the *Competition and Consumer Act 2010*.

8.5 Subsidy

Policy principles relating to funding of loss-making service provision

Securing the affordability of high-speed broadband services in high-cost areas has been an important element in the NBN policy framework. Under the current arrangements, this objective is secured through NBN Co's commitment to uniform national wholesale pricing, supported by internal cross-subsidies from low-cost areas to high-cost areas, particularly to the fixed wireless and satellite networks in regional and remote Australia. This raises the

question of the precise objective being pursued and of the means by which it should be pursued in future.

In the panel's view, the objective is that of ensuring NBN Co (and/or any other entity fulfilling its current role) is in a position to recover the costs necessarily incurred in providing services to areas which it would not serve were it not required to do so. The arrangements used to pursue that objective should be:

- transparent, so that the costs at issue are clearly identified to consumers, taxpayers and regulators;
- accountable, which means that effective processes are in place for ensuring any payments are no greater than those reasonably required to achieve the policy objective;
- sustainable, in the sense that they are consistent with future developments in technology and in the market place. The arrangements should, in particular, be 'competition ready', recognising that competitive constraints may arise both from fixed and mobile wireless networks and from competing fixed line networks; and
- efficient, in imposing no greater a burden on consumers, taxpayers and the broader economy than is needed.

Current arrangements

As part of the agreements the previous Government reached with Telstra, new arrangements were put in place for funding Telstra's legacy universal service obligations. While they are reasonably transparent, they do not involve any clear mechanism for testing whether the payments being made are properly cost-reflective. Moreover, they do not provide for contestability of the subsidies being disbursed, and hence create few pressures for efficiency. The panel believes options should be explored for expediting the reform of these arrangements.

With respect to high-speed broadband, NBN Co's current business arrangements incorporate two main kinds of cross-subsidy.

First, the disconnection payment included in the Definitive Agreements, which is paid to Telstra upon migration of customers off its copper and cable networks, is geographically averaged. This amounts to an effective cross-subsidy because the net revenue to NBN Co from the customer connection may be either lower than the disconnection payment (say in rural areas) or higher than the disconnection payment (say in a high-population density area). The result would then be that in rural areas NBN Co would bear a loss, while in high-density area it would reap a gain. However, this is a one-off effect that is part of the transition to the NBN.

Second, and more importantly, NBN Co has been committed to uniform national wholesale pricing. As it currently stands, NBN Co's SAU sets caps on prices that may constrain charges to not be aligned with costs. Were prices in some areas below avoidable costs, while prices in other areas exceeded avoidable costs, there would be an implied cross-subsidy from low-cost (or high revenue) areas to high-cost (or low revenue) areas.

These arrangements do not meet the criteria set out above. Entrenching an opaque cross-subsidy, they provide no transparency as to the extent of the transfers and impose no benchmarks as to whether future claimed transfers are reasonable compared with the actual costs of supply and revenues received. There is no potential for contestability of any subsidy, which reduces the incentive to seek efficiencies in service delivery in high-cost areas. And even under the current provisions in Parts 7 and 8 of the Telecommunications Act, the subsidy sources are likely to be eroded over time by entrants attracted to lower cost urban areas under the 1 kilometre exemption. The panel's recommendations to remove restrictions on competition may exacerbate that erosion.

Design options for alternative arrangements

Although the current scheme is unlikely to be satisfactory in the long run, it does not automatically follow that assistance is required or that there is an immediate case for policy change. Rather, that depends on the gains from change relative to the costs, including the risks of error in determining the quantum of any assistance that might be provided and of inefficiency in its use. Moreover, should change be considered desirable, there is a range of approaches any new scheme could adopt. The relevant options differ in terms of the form any subsidy takes and the manner in which it is financed. Thus, a subsidy may be up-front or on-going; it may be funded from taxpayers generally or from consumers of telecommunications services, be it directly (as in a tax on telecommunications services) or indirectly (as in an industry levy); and it may be paid to suppliers or to consumers.

It is important to note that any change to arrangements for funding loss-making service provision does not represent an additional cost on broadband customers. These services are currently being funded through NBN Co customer charges. Moving to a different funding option will just change the method of raising that funding, not increase overall costs to customers.

Given this wide range of options, the panel believes there are good reasons for preferring an explicit subsidy provided directly to consumers. Making the subsidy explicit increases transparency and hence promotes accountability, while providing the subsidy to consumers directly addresses the goal of affordability, allows careful targeting and encourages competition. As a result, the panel recommends that any arrangement that is put in place either involve such direct, consumer-side, subsidies, or be designed to move on to that basis according to clearly defined transition points and timelines. The resulting gains would be even

greater were any such subsidy funded from consolidated revenue; that would ensure it was funded relying on a broad tax base while forcing on-going consideration of the opportunity cost of using taxpayers' moneys for this purpose rather than others.

That said, the panel recognises that there is a tension between relying on demand-side subsidies and a project that is heavily focussed on the supply-side, and in particular, that centres on using a chosen supplier as the primary instrument for achieving service availability goals. However, the fact that the project is still at a relatively early stage of deployment creates opportunities for structuring its initial arrangements in a way that minimises future subsidy requirements.

An option in this respect is to write-down NBN Co's assets to their value-in-use as they come into service, thus reducing the regulated asset base and as a consequence user charges determined using this base. At its core, this approach would accept that some services would never be provided commercially so that an immediate asset value write-down is required to reflect the actual opportunity cost of the assets used in providing them. In practice, this shifts the burden of funding the initial infrastructure on to taxpayers, as the full costs of that infrastructure would never be recovered. If each area at least covered its operating costs, the new capital base could allow uniform national wholesale pricing to continue (or attenuate the impact of moving to cost-reflective pricing) without the need for supplementary subsidy, at least for the life of the initial assets. Conversely, where net cash flows were negative, the only on-going subsidy required would be that needed to cover operating costs and possibly, future asset renewal.

In the panel's view, such write-downs have the merit of recognising immediately the future losses the project will impose on the community and are therefore consistent with sound public sector practice. Indeed, to the extent to which the NBN project as a whole is unlikely to recover its appropriately measured cost of capital, the panel believes it is incumbent on the Government to recognise that fact and its fiscal consequences promptly, and urges it to do so.

However, while the Government should be in a position to assess the likely loss on the project as a whole, it is not easy to estimate the quantum of the losses specifically associated with any cross-subsidy requirements. Only by testing the market – in other words, seeking to dispose of the assets subject to the purchaser meeting specified supply obligations – could the requisite amount be properly determined. As a result, the panel believes it is only in the context of such market tested valuations that the asset write-down approach should be used as a means of underwriting universal service costs.

In practice, taxpayer funding – be it direct, as under the proposed demand-side subsidy arrangements, or indirect, as in the case of asset write-downs – may either be judged unacceptable or prove insufficient. For example, even were initial asset write-downs carried out, there could be a need for ongoing subsidies to cover cash costs.

Under those circumstances, one option would be to allow NBN Co to impose an 'access deficit contribution': that is, to mark up its charges in such a way as to recover any losses it necessarily incurs in providing service in high cost (or low revenue) areas. However, because such charges are typically traffic-based or related in some way to interconnection, it is not clear what form they could take in NBN Co's case.

Conceptually, a similar scheme, based on a per-service tax, could be put in place to increase the costs of any potential entrants to the broadband wholesale market so that they could not undercut NBN Co's wholesale prices in low-cost areas unless their costs in supplying those areas were below NBN Co's. The charge imposed on facilities-based competitors would be set to reduce incentives for RSPs to inefficiently choose alternatives to NBN Co's network, thereby maintaining NBN Co's ability to fund any cross-subsidy. Revenues collected through the scheme would be returned to NBN Co as a payment to offset the net revenue it had forgone directly as a result of network competition.

The main advantage of such charges, which are conceptually similar to those derived from the Efficient Component Pricing Rule, is that they directly target the threat to NBN Co's revenue from competition, with the proceeds collected rising as infrastructure competition became more widespread. In theory, such a charge can be set at a level that discourages inefficient entry (that is, entry that involves higher costs than NBN Co's) while nonetheless accommodating efficient entry (that is, entry which involves lower costs or higher quality service than NBN Co's). The extent of such a tax depends on NBN Co's avoidable costs and its forgone revenues, with the revenue side being influenced by the precise nature of any pricing constraint on NBN Co.

In practice, it is not possible to determine the quantum of such a tax at this stage of network deployment. A premature decision would create a real risk of the tax being set incorrectly, distorting both NBN Co's network decisions and those of actual and potential entrants. The rationale behind the panel's recommended measures to increase competitive pressures in the industry is to provide a basis for competition to develop. Imposing an access deficit charge or a bypass tax on all potential competitors to NBN Co would work in the opposite direction and create risks of distortions as well. For these reasons, the panel does not support such charges being introduced.

An alternative would be to fund any required subsidy by introducing a new industry levy or increasing the existing Telecommunications Industry Levy (TIL) which supports the current voice USO scheme. This would raise concerns, especially from telecommunications providers, about new imposts on top of existing charges. The overall TIL/levy amount for the 2012-13 financial year was set at $255 million. While this is not a large amount compared with the industry's revenues, the distorting effect of a tax rises more than proportionately with its rate and even the widest telecommunications-specific levy would still fall on a relatively narrow base. However, it needs to be remembered that this levy would not be an additional impost

but replace an existing implicit tax of the same amount (that is, through NBN Co charges on customers to fund the internal cross-subsidy). Without knowing the specific base of a new levy, changes to NBN Co's charges and the amounts involved, it is impossible to assess the extent of any likely distortion and so be confident about such a scheme's merits.

Notwithstanding these concerns, it would be far better to have some form of levy scheme than to continue restrictions on the development of competition so as to protect any NBN Co cross-subsidy. As for the design of such a levy, were one to be required, the panel believes it should cover both voice and broadband services. As network deployment proceeds, there is no policy justification for treating voice and broadband differently, though the constraints imposed by the existing Telecommunications Universal Services Management Agency (TUSMA) contract may mean separate arrangements are required for a period of time. Combining these levies and pooling the resulting funds should be accompanied by moves over time to make the services being acquired contestable (that is, open to any provider willing to deliver the designated services), be it through competitive bidding to provide those services or by implementing a customer rebate or voucher scheme. Though in implementing such a process to change how loss-making service provision was funded, it would be important to ensure that broadband customers understand what is occurring and that costs overall were not increasing.

In short, the panel concludes that:

- Any subsidy scheme be designed to evolve into a scheme based on targeted subsidies to consumers, rather than directly funding providers. However, the panel recognises that there is a tension between relying on demand-side subsidies and the thrust of policy as it stands, and hence assumes that for some period of time, any subsidies would flow to the supply side;

- Where pricing constraints mean the value-in-use of the assets being deployed falls short of their acquisition cost, those assets should be written down to value-in-use as they come into service, subject to that value being market-tested;

- NBN Co not be allowed to impose any form of access deficit contribution or bypass charge on network competitors; and

- Were an ongoing subsidy required that could not be funded through consolidated revenue, a new levy be imposed, that combines the funding of broadband and legacy universal service obligations.

These conclusions, however, are subject to the future market structure arrangements, which are discussed below.

Implementation of subsidy arrangements in different structural scenarios

As discussed in chapter 6, the panel has considered four different future structural scenarios for NBN Co. These can be summarised as follows:

- Option 1: Disaggregation of transit, fixed wireless and satellite, and HFC networks;
- Option 2: Disaggregation of the transit, fixed wireless and satellite networks;
- Option 3: A phased transition stage to disaggregation – the move to option 1 or option 2 would be implemented through a transition stage where NBN Co's business units are initially structured to support disaggregation; and
- Option 4: Status quo NBN Co model with enhanced regulatory settings – NBN Co would remain integrated across all access technologies.

Whether a requirement for subsidy arises, and if so, how it should be met, needs to be considered separately for each scenario. The assessment is undertaken on the assumption that charges will be subject to caps that do not fully recover costs in high cost areas, resulting in losses in those areas. Additionally, it is assumed the subsidies will, at least initially, flow to the supply side, that is to NBN Co or any of its former units.

1. Disaggregation of transit, fixed wireless and satellite, and HFC networks

The panel does not believe disaggregating the HFC footprint would cause any additional subsidy requirement. It is unlikely that the HFC operator would materially threaten the profitability of the FTTx areas, unless the operator in those areas was charging such high prices as to induce large-scale competing entry. In that event, the competitive process would erode super-normal profits, rather than undermining the viability of cross-subsidies within the FTTx coverage area, and compensating the FTTx operator for losses consequential on the elimination of monopoly rents would be neither efficient nor equitable.

Of course, the HFC operator would be subject to any levy imposed so as to fund the provision of service in the high cost areas, as would be the provider of FTTx services. Consumers of HFC services would therefore contribute to the costs of loss-making areas in the same way as would those using services provided by means of FTTx.

There is already an established competitive transit market for backhaul notably between capital cities and the larger regional markets with Government financial assistance. The panel also notes the $250 million Government investment in the Regional Backbone Blackspots Program (RBBP) comprises some 6000 kilometres of fibre-optic backhaul connecting selected

locations[29] to established backhaul routes. The RBBP service does not require ongoing financial support. The panel does not consider disaggregation of the transit network would cause any additional subsidy requirement.

The main issue under option 1 and option 2 is how to enforce and fund performance guarantees given that the satellite and the fixed wireless networks will most likely each incur capital and operating losses.

The extent of any losses would clearly depend on the pricing arrangements. In the absence of demand-side subsidies, it is likely that as well as service availability and quality obligations, the fixed wireless operator would be required to price the designated services at no more than some standard of metropolitan parity, with that requirement imposed through a long term price cap. There would also likely be requirements to upgrade the network over time, in line with developments in technology, with the upgrade obligations being triggered by a predictable, transparent process in accordance with the panel's recommendations in this regard in chapter 9. Similarly, the satellite operator too would be required to meet price and performance requirements, at a level appropriate to satellite technology.

In the full knowledge of those obligations, potential operators would bid to acquire the assets. This bidding process would therefore have the advantage of capitalising expected future losses on the price capped services, substantially reducing the total quantum of required subsidies going forward. Nonetheless, as both the satellite and fixed wireless operators would likely incur losses on operating costs, the bids would be required to include the quantum of subsidy demanded, allowing the Commonwealth to evaluate the minimum subsidy it would need to pay for those services to be made available.

In contrast to the fully integrated model for NBN Co, the fact that those subsidies had been market-tested would both ensure transparency and provide consumers and taxpayers with a degree of assurance as to their quantum. This reduces the risk involved in setting any levy that would be required to fund the subsidy. Proceeding with such a levy would therefore be appropriate as part of putting this option in place.

The panel does not recommend that subsidy arrangements extend to the remaining fixed networks. No doubt, implementation of this option would increase the threat to NBN Co's FTTx network of competition from the wireless service operator(s). However, it is in the areas adjacent to the designated wireless footprint that that threat would be most acute; but these are areas where excess profits are not likely to be high. Competition would therefore not threaten the areas likely to materially contribute to financing any cross-subsidy within the fixed network. At the same time, the current burden on NBN Co of funding uneconomic

29 Broken Hill, Darwin, Emerald, Geraldton, Longreach, South West Gippsland and Victor Harbor.

satellite or fixed wireless services would be removed, which should more than offset any effects from increased competition due to the amended Part 8 provisions. There would therefore not be a need to provide assistance to the operator of that network.

2. Disaggregation of transit, fixed wireless and satellite

Option 2 differs from option 1 solely in that the HFC network remains with NBN Co. As discussed above the main issue is how to enforce and fund performance guarantees given that the satellite and the fixed wireless networks will most likely each incur capital and operating losses.

3. Transition stage to disaggregation and 4. Status quo with enhanced regulatory settings

Under these two options, NBN Co's ability to cross-subsidise service provision into the future will only be reduced to the extent that competition increases due to the proposed changes to Parts 7 and 8 of the Telecommunications Act. The question is whether any resulting changes are likely to prove so material, and to occur so rapidly, as to justify a policy response at this point.

In considering this issue, the panel notes that NBN Co has yet to commence operations in many areas where subsidy would be generated, that is, where the profit margin on wholesale supply might ultimately be high. Its actual costs and revenues in those areas, as in the areas where margins are likely to be lower, are consequently difficult to predict. Highlighting those difficulties is the wide error range that has characterised NBN Co's cost and revenue estimates to date.

Uncertain too are any losses competition might impose. While the magnitude of the financial impact on NBN Co of entry by TPG or other carriers is difficult to predict, the effect could be small and its impact significantly deferred as that entry allows NBN Co to avoid or postpone capital outlays it would otherwise have had to incur. Of course, NBN Co might choose to nonetheless accelerate deployment in areas where the threat of entry is greatest, but that decision is not clearly required for it to achieve its public policy mandate – which is to ensure availability of high-speed broadband services in areas not otherwise adequately served. As a result, any additional costs that accelerated deployment involves (and which might be imputed to competition) should not be viewed as requiring compensation.

In the longer term it may turn out that the net cost of provision of broadband access services in loss-making areas is less than forecast, either through demand (both for access and/or higher speeds) being greater or operating costs being lower than currently assumed. As a result, actual subsidy requirements may be below those NBN Co currently anticipates. Equally, excess profits might be greater than anticipated in high revenue/low cost areas. Either situation alone, or the combined financial effect of both outcomes, could obviate the need to

consider providing NBN Co with additional financial assistance as a result of increased competition.

Overall, while there is considerable uncertainty about actual magnitudes of the effects associated with increased competition, the panel believes the immediate impact is likely to be minor. However, as the NBN Co's rollout progresses, the case may improve for some form of financial support or explicit recognition in NBN Co's financial accounts of the consequences flowing from competition. Equally, should NBN Co be privatised, any accumulated losses that were unlikely to be recovered in future would be brought to account through the sale price. The costs of establishing and encouraging competition in the broadband access market would then be borne by taxpayers in general, as is appropriate, since it is end-users across Australia that will receive the main benefits from a more competitive market structure.

As a result, unless its disaggregation proposals proceed (allowing subsidies to be market-tested), the panel does not believe any specific mechanism for recovering the costs NBN Co incurs in providing service in potentially loss-making areas should be put in place at this time. Rather, those costs should be recovered through NBN Co's existing regulated charges, thus providing added incentives for it to seek efficiencies in its operations.

However, while NBN Co should remain responsible for covering the costs of potentially loss-making areas, it is in the public interest that the quantum of those costs, and the means by which they are funded, be transparent. In other words, the arrangements put in place in the early 1990s for assessing and disclosing the extent of cross-subsidies within the network of what was then Telecom Australia should be applied to NBN Co, adapting the methodology to the difference in operating context. Moreover, as well as estimates of the losses, estimates should be disclosed annually of the burden funding these losses impose on end-users directly and the community more broadly. Despite their obvious limitations, such estimates would help inform the process of ongoing policy review. The Productivity Commission should be tasked with determining the methodology to be applied in producing these estimates, and with reviewing the annual estimates.

Conclusions on cross-subsidy arrangements

The panel therefore recommends that explicit mechanisms for funding any cross-subsidies only be put in place if the satellite and fixed wireless networks are divested, and the quantum of the subsidies required for those networks is market-tested. In that event, assuming the Government is unwilling to rely on consolidated revenue, the panel recommends an industry levy be used to fund service provision in uneconomic areas, with that levy combining the amounts required for telephony and high-speed broadband services. Over time, the subsidy should become contestable, and be provided to consumers rather than to a particular supplier.

The panel does not believe the disaggregation of either the transit network or the HFC would give rise to any additional subsidy requirement, above and beyond that needed for the satellite and fixed wireless services. Both the transit network and the HFC should contribute to any industry levy, as would the FTTx operator, on a competitively neutral basis.

Were the disaggregation options not accepted, there would not, in the panel's view, be a case for providing a fully integrated NBN Co with any form of assistance towards the costs of non-commercial services. The risks of error involved in determining the quantum of any such assistance that could be justified would be too great, as would the danger of undermining the incentives for NBN Co to operate efficiently. As a result, the Government should, in that event, postpone consideration of any new levy until another independent review of the situation had been carried out.

However, were NBN Co to remain as a fully integrated entity, it should be required to report annually on any cross-subsidies using a methodology designed by the Productivity Commission. That methodology should cover both the quantum of any internal subsidies and their economic costs.

Recommendation 11: The implications of different future structural scenarios for NBN Co and changed market-entry conditions for the funding of non-commercial services be addressed in the following way:

a) explicit mechanisms for funding service provision in non-commercial services be put in place if the satellite and fixed wireless networks are divested, and the quantum of the subsidies required for those networks is market-tested;

b) an industry levy be used to fund service provision in uneconomic areas within the satellite and fixed wireless footprints, with that levy combining the amounts required for telephony and high-speed broadband services; over time, the subsidy should become contestable, and be provided to consumers rather than to a particular supplier; and

c) were the disaggregation options not accepted, no specific mechanism for funding any subsidies within NBN Co be put in place, with this arrangement subject to review in five years' time; if this market structure is maintained, NBN Co be required to report annually on any cross-subsidies using a methodology designed by the Productivity Commission.

9. Regulation of NBN Co's products, pricing and expenditure

9.1 Introduction

Item 4 of the panel's terms of reference require it to report on "how should NBN Co's capital investment, products and pricing be reviewed and regulated".

The panel has read the reference broadly to also cover NBN Co's non-price terms and conditions of supply and its operational expenditure.

The terms upon which NBN Co's products and services are offered will become increasingly important to end-users as its network footprint grows. Efficient corporate practices within the company will be necessary to keep construction and operating expenditures to a minimum. At the same time, efficient regulatory arrangements are necessary to ensure, among other things, that the benefits from efficient operation flow through to the prices paid by access seekers and, ultimately, end-users. This chapter examines the current requirements in these areas and assesses whether current mechanisms and processes are sufficient to achieve the goals the panel has identified. Where they are not, it makes recommendations on how they can be improved.

9.2 Current regulatory framework

The framework within which NBN Co builds its network and supplies services is derived from three broad sources:

- Oversight by the ACCC within the specific competition framework contained in Part XIC of the CCA, as well as the line of business restrictions contained in the *National Broadband Networks Companies Act 2011*;
- Corporate governance arrangements under the Corporations Law, *Public Governance, Performance and Accountability Act 2013* (PGPA Act)[30] and NBN Co's constitution; and
- Shareholder guidance, currently provided by the Shareholder Ministers.

30 The PGPA came into effect on 1 July 2014, creating a single framework for Commonwealth entities previously operating under the *Financial Management and Accountability Act 1997* and the *Commonwealth Authorities and Companies Act 1997*. Previously NBN Co operated under the Commonwealth Authorities and Companies Act.

ACCC oversight

Under Part XIC of the CCA, all NBN Co services must be declared, creating an obligation on NBN Co to supply services on request and bringing the terms and conditions of wholesale access within the oversight of the ACCC. These terms and conditions may be set out in one or more of the following regulatory instruments:

- a standard form of access agreement (SFAA) developed by NBN Co which, once agreed to by an access seeker, becomes an access agreement;
- an SAU developed by NBN Co and accepted by the ACCC; and
- regulatory determinations made by the ACCC (binding rules of conduct and access determinations).

To enable NBN Co to readily offer services, the SFAA, which NBN Co refers to as its Wholesale Broadband Agreement (WBA), is not subject to ACCC approval. However, the ACCC can make binding rules of conduct and access determinations in relation to services described in the WBA and these decisions can be used as a benchmark for negotiating future access agreements. NBN Co's SAU (approved by the ACCC in December 2013) and its WBA (the most recent of which came into effect in April 2014) are intended to complement each other. The panel's recommendations on the operation of these instruments are provided below in this chapter.

The NBN Companies Act deals with the operations of NBN Co, including restrictions on its lines of business. These restrictions are intended to ensure that it focuses on the wholesale telecommunications market.

Corporate governance arrangements

NBN Co has been established as a company under the Corporations Law and is expected to operate on a commercial basis at arm's length from government. As such, absent Government direction to the contrary, its conduct, including product development and pricing, is expected to be driven by commercial principles.

That said, the mere fact that NBN Co has been established by government to achieve certain policy outcomes creates a tension between the decisions it would take as a commercial entity and those that best advance the policy goals it was designed to pursue. The manner in which those tensions are resolved ought to be determined by the SOE, discussed in chapter 6 and below. In practice, however, the extent of the tensions has been such that NBN Co has been more heavily involved in the political process than would be desirable. One objective of the panel's recommendations in respect of clarifying and specifying in legislation NBN Co's social policy obligations is to reduce the need for and scope of that involvement.

The PGPA Act requires government business enterprises (GBEs) such as NBN Co to report on their operations to the relevant Minister and Parliament more generally. This Act requires GBEs to provide annual reports, submit business forecasts, provide audited financial statements, have its directors and officers comply with certain requirements and comply with general policies of the Government.

Shareholder guidance

Shareholder Ministers have communicated the Government's expectations to NBN Co via Statements of Expectations, in the form of letters to the Chair of its Board; the most recent SOE was issued in April 2014. These statements provide a vehicle to spell out the Government's requirements; they can be useful in providing guidance in situations where it would be inappropriate or unduly cumbersome to establish new legislative provisions or rely on other existing regulatory instruments.

9.3 NBN Co's capital expenditure products and pricing

The key aspects of how NBN Co's products, pricing and expenditure are dealt with are set out in the SAU and WBA. These arrangements themselves are largely established on a commercial basis and have been proposed by NBN Co itself, following consultation with its customers. However, they also bear the mark of Government direction (for example, on uniformity of pricing) and ACCC intervention (for example, though the SAU process). In relation to matters outside the SAU, NBN Co again generally has commercial discretion, subject to other regulatory or policy constraints. For example, NBN Co is currently subject to strict non-discrimination obligations, which the panel has recommended be liberalised in some respects.

9.4 General issues raised in submissions

While the panel did not expressly seek submissions on the matters under term of reference 4, submissions expressed some concerns with the regulation and review of NBN Co's expenditure, products, and price and non-price terms. Extensive comments on these issues were also made in submissions to the ACCC's consultation processes on NBN Co's SAU and the panel drew on this source.

The issues raised in submissions can be grouped into two broad categories: threshold issues concerning the broader structure of NBN Co's regulatory arrangements; and operational issues relating to specific terms of access. Given the panel's focus on broader structural and regulatory arrangements, it has concentrated on the first category of issues, while making some observations about the second, but largely leaving these as matters to be considered further, particularly by NBN Co and the ACCC, within any revised framework.

A key issue in submissions was the regulatory arrangements relating to ACCC oversight. Optus argued that the SAU should be revoked and replaced with direct regulation by way of access determinations and binding rules of conduct. Its concerns were that the SAU gives NBN Co too much discretion to set the framework for how it is regulated as well as the authority to remove the framework at its own discretion. While Optus is the only access seeker that argued the SAU should be scrapped, other providers nevertheless were concerned about how much control NBN Co has been given to set its own rules and the control it has given itself over its own processes. Telstra, for example, has expressed concern that NBN Co has undue sway over dispute resolution processes set out in the SAU. Optus raised similar concerns in relation to the SFAA development forum.

Related to this are residual concerns that NBN Co retains too much autonomy in the setting of the terms of its SFAAs (that is, its WBAs). Despite measures in the SAU setting out how it would engage industry stakeholders on the negotiation of replacement SFAAs and commitments to making SFAAs consistent with the SAU, access seekers remain concerned that the ACCC cannot directly regulate the WBA and that NBN Co is able to offer terms on a 'take it or leave it' basis. In submissions to the panel's Telecommunications Regulatory Arrangements Consultation Paper[31], some industry participants (for example, Optus, Vodafone Hutchison Australia and TPG) suggested that the SFAA should form part of the regulatory hierarchy, with a number (for example, Macquarie Telecom, the Competitive Carriers Coalition and Nextgen) suggesting that it should be the lowest instrument in the hierarchy. The essence of the issue here, however, is the extent of regulatory recourse to the ACCC that access seekers should have and the point in the regulatory process at which that recourse best occurs. That question is addressed in the panel's *Statutory Review*[32].

In a similar vein, issues were raised about the process of engaging with NBN Co in the Product Development Forum (PDF). Telstra expressed concerns in the consultation on the SAU that an RSP's commercial position could be weakened through the sharing of its intellectual property or commercially sensitive information in the PDF without rigorous confidentiality and intellectual property arrangements between NBN Co and other parties in place. Telstra believes that RSPs would be less willing to engage in the PDF processes as a result. iiNet expressed the view in its submissions that the PDF processes were too convoluted to encourage industry engagement. The difficulty for NBN Co, however, is that it is subject to strict statutory non-discrimination obligations, which appear to restrict its flexibility in product development.

31 The Telecommunications Regulatory Arrangements Consultation Paper for the purposes of s.152EOA of the *Competition and Consumer Act 2010* was released on 24 March 2014.

32 The statutory review under s.152EOA of the *Competition and Consumer Act 2010* was tabled in Parliament on 16 July 2014.

In relation to cost recovery, access seekers, such as Optus (p.22), and Dr John de Ridder (p.3), expressed concern that the prudency controls on NBN Co are not stringent enough to prevent excessive capital expenditure that would be rolled into the Regulated Asset Base and lead to higher access charges – and end-user prices – over a longer term. Most industry submitters on the SAU consultation, including Telstra, Optus, AAPT and Macquarie Telecom, raised the concern that NBN Co would seek to recover its costs through charging for usage (which is likely to increase significantly) by means of its Connectivity Virtual Circuit (CVC) charges while encouraging take-up through below-cost Access Virtual Circuit (AVC) charges. This concern is based on the expectation that as end-user data usage continues to increase, the CVC charge will, in the space of a few years, come to dominate the wholesale charges faced by access seekers. While the SAU now contains powers for the ACCC to review and, if necessary, rebalance NBN Co's prices, until those powers have been tested and proved effective, some industry participants, including Telstra, argued the powers may not go far enough and Optus, TPG and Dr de Ridder expressed concern that the CVC pricing issue has not been adequately addressed.

Against these concerns, however, the ACCC submitted that "the SAU will deliver a framework for the regulation of NBN Co services that allows for vigorous retail competition, while providing sufficient certainty to NBN Co that it will be able to recover the prudent costs of its investment, subject to demand for its services meeting expectations. The ACCC considers that the current SAU and Part XIC framework is sufficiently flexible to allow the ACCC, NBN Co and industry to respond to changing circumstances and/or policy" (submission to the framing paper, p.20). In this context, the panel notes that the issues identified above were also raised in the SAU consideration process and assessed by the ACCC as the independent regulator.

9.5 Regulatory framework

The issues covered by the panel in its *Statutory Review* address some of these matters. Particularly relevant here are the impact of NBN Co's non-discrimination obligations on product development and the development of more tailored access agreements; also discussed in the panel's *Statutory Review* is the operation of the legislative hierarchy. While the panel's recommendations in relation to Part XIC will help to address some particular issues relating to how NBN Co's capital investment, products and pricing are reviewed and regulated, they may not be sufficient.

Current framework

The panel has recommended substantial changes in its *Statutory Review*. Subject to those changes, the panel sees merit in the current regulatory framework and NBN Co's broad approach, which allows for both general principles enabling (but not guaranteeing) NBN Co to generate a maximum regulated rate of return and submitting the specific terms of access for scrutiny by the ACCC.

The panel's view is that as the network owner and operator, NBN Co is best placed to understand its costs and business dynamics and thus to define its products and, at least initially, propose terms and conditions of supply. In circumstances where a carrier undertakes these tasks in good faith and develops an SAU that is properly reviewed by the ACCC, end-users will be better off than under a process which transfers those roles directly to the regulator. Indeed, the panel would be concerned about the appropriateness and ability of the ACCC – or any regulator – to put itself in the shoes of an entity such as NBN Co and develop a complete set of product offerings, terms and conditions and cost recovery mechanisms. It is not the ACCC's role to manage NBN Co's operations; to try to do so would compromise the ACCC's regulatory independence. The ACCC does not have either full visibility of the necessary data or the expertise, and even if it could seek to acquire these, it would be a massive undertaking.

No less importantly, it is the board of NBN Co, not the ACCC, that is responsible for the management of the undertaking and that must be held accountable for outcomes. Vesting what amount to management decisions in the ACCC would compromise that accountability, aggravating the already substantial risks taxpayers bear. Rather, it should be the task of NBN Co's leadership to manage, including in terms of taking product and pricing decisions, within the parameters set by legislation, and that of the ACCC to regulate, that is, to review those decisions in so far as they may be at odds with the legislated provisions.

The panel is therefore comfortable with a framework in which NBN Co provides undertakings. Consistent with NBN Co's commercial orientation, the panel is also supportive of NBN Co being responsible for the work involved in developing those undertakings. This conclusion was reached on the understanding that NBN Co's activities are subject to ACCC scrutiny, that the ACCC is free to reject the SAUs and provide its own terms and conditions, and will do so if required; and that the relevant ACCC decision will be fully subject to merits review.

While this view may be seen as being at odds with the panel's ongoing support for the ACCC making access determinations under Part XIC in relation to other declared services, the difference in approach can be readily explained. NBN Co is a start-up company undertaking a complex and far-reaching new project. It does not have, but will soon develop, a substantial asset base with associated sunk costs. The fact that all its services must be declared, and that those services must be supplied on a wholesale-only basis, means its actual cost base and its regulated cost base can and should coincide.

As a result, its position contrasts sharply with that which bedevilled the undertaking mechanism that emerged from the 1997 legislation. That mechanism applied first and foremost to Telstra; it encountered recurring difficulties with determining and allocating sunk costs and joint and common costs in a manner that could reconcile competitive neutrality with investment certainty. The issues that tension created were then worsened by deficiencies in the framework itself, and by the actions of access seekers, access providers and

the regulator in responding to those deficiencies. The decision to replace that framework with one based on regulatory determinations was an inherently pragmatic one, made in the context of the transition to a new industry structure. As a 'cleanskin' scheme focussed on NBN Co, that new structure could avoid the problems that undermined its predecessor, while the regulatory determinations already made should give some certainty during the transition to the NBN.

It is, in other words, easier to apply an undertaking model to a 'cleanskin' NBN Co than it was, as a matter of reality, to a vertically integrated incumbent with myriad products, layer upon layer of joint and common costs and substantial sunk network costs. Moreover, the inherent uncertainty about NBN Co's future costs and revenues makes such a framework desirable, as it can reconcile – largely through the 'fixed principles' mechanism – the flexibility needed to modify outcomes as new information comes to light with the certainty the 'fixed principles' provide. The modular approach that has been adopted in the SAU is, in the panel's view, a sensible way of pursuing both those goals, allowing new data to be 'plugged into' key pricing determinations as and when it comes to light.

In the panel's view, the process has therefore dealt adequately with many of the recurring issues in this area, at least to date. It has produced transparency in relation to NBN Co's products and a mechanism for developing new products and withdrawing old products. It has also yielded transparency in relation to NBN Co's pricing, while those prices have been scrutinised by the regulator and are to some extent subject to the regulator's review. NBN Co's costs can also to some extent be tested (albeit with some significant exceptions and exclusions from the prudency rules) and recovered over time. In each case, these matters have been subject to the ACCC's scrutiny, with extensive consultation, while the ACCC's powers give it an ongoing role in critical areas.

It is important to note that the panel is not necessarily endorsing the specific elements of the SAU or the outcomes which they might yield, for instance in terms of price levels and structures. The panel understands the issues about the SAU that submissions have raised and sees merit in some of the concerns. However, it has not sought, and could not properly have sought, to place itself in the position of the ACCC and re-determine those issues. Rather, the panel's task is to assess the adequacy of the policy and legislative framework within which those matters have been determined: to consider the rules, rather than their application in a particular fact situation.

The panel's proposal that merits review be reintroduced for decisions such as those relating to the SAU would allow the concerns submissions have raised to be tested by a structure designed for that purpose. Providing for merits review is all the more important as those concerns, or others of substance, will doubtless recur in the years ahead. It is not satisfactory for matters of such importance, and with so great a bearing on end-users, taxpayers and investors, to be determined by a regulatory body, operating under legislation that itself

provides only very general guidance, with virtually no possibility of substantive review. The panel's proposal for merits review would extend to redeterminations made under the SAU, although it would exclude re-opening fixed principles once those had been accepted.

Overall, the panel's conclusion is that while that framework should be reformed, including in the areas proposed in the panel's *Statutory Review*, it is satisfied that the broad structure of the framework is adequate.

NBN Co needs more incentive to develop products and upgrade its network

The progressive upgrading of the telecommunications network has been an especially contentious area in Australian telecommunications policy. Prolonged negotiations between Telstra and the Government in the period from 2005 on failed to reach agreement on a framework for deploying high-speed broadband; two Commonwealth tenders to solicit and consider upgrade proposals also failed; the ultimate outcome was the formation of NBN Co to pursue the objective of universal access to high-speed broadband, with little regard to the costs involved.

Views inevitably differ as to the factors that made the problems so intractable. Although it is not the panel's task to address, much less resolve, that question from a historical perspective, avoiding the recurrence of those problems is at the heart of its work. In this context, the panel considers that the severity of the difficulties was greatly accentuated by the interaction between a market structure in which competition struggled to develop and a regulatory framework which lacked predictability and accountability and provided too few incentives for investment.

The panel's recommendations seek to place Australia's telecommunications future on a sounder basis. The changes the previous Government made to the access regime, in particular the provision for fixed principles, were a step in the right direction; those changes need to be complemented by reforms that strengthen the fixed principles approach, better guide regulatory discretion and enhance the regulator's accountability.

At the same time, the panel's proposals for disaggregating NBN Co would, for the first time, create a sustainable basis for network competition – and the more competitive is the market structure, the greater the extent to which network upgrades will occur as and when demand warrants them. Moreover, should the Government conclude that externalities or social considerations justify a greater degree of upgrading than market forces alone would provide, a competitive market structure creates opportunities to contract for those upgrades on reasonable terms and conditions. The panel's disaggregation proposals are therefore a way of ensuring dynamic efficiency – that is, the development of new products and services in line with technological opportunity and consumer demand – at the network layer.

However, even with those reforms in place, the issues associated with upgrading the network, and expanding the range of services it offers, will not disappear. And those issues will be especially acute were NBN Co to remain as an integrated firm with a *de facto* monopoly, either for a transitional period or even more so, permanently. In that case, the regulatory arrangements would have to replace, however imperfectly, some of the impetus for innovation competition would otherwise generate. At the same time, structural separation changes the nature of the issues associated with network upgrading, and may pose new problems regulation needs to address.

Mainly at issue here are NBN Co's product development and capacity expansion decisions; these are discussed first. That is followed by a discussion of the role of, and process for setting, national broadband standards, such as those defined, until now, in the SOE successive governments have issued to NBN Co. Taken together, these issues are central to the NBN problem.

NBN Co product development

It is unclear whether NBN Co faces appropriate incentives to develop new products in response to customer demand. According to NBN Co, the fact that it can only recoup the costs it is incurring by stimulating demand for very high-speed services provides it with the incentives required. There is some force in this argument, but it needs to be balanced against the dulling effect of government ownership and of the market structure in which NBN Co operates.

For example, it could reasonably be contended that the fact that NBN Co does not face the threat of displacement reduces its incentive to innovate, especially where doing so would cannibalise its existing product lines. At the same time, vertical separation with regulated prices means it would not capture all, or perhaps even most, of the value end-users place on innovations, further blunting the incentives for the timely development of new products and services. Moreover, the stronger is downstream competition between RSPs, the more it will tend to dissipate the rents RSPs can secure from innovation. As a result, it is not clear that RSPs will themselves have the incentives to innovate that NBN Co may lack.

Non-discrimination requirements may then aggravate these problems. In practice, those requirements mean any innovations an RSP brings to NBN Co will become available to all RSPs; as competition between RSPs eliminates any 'innovation rent' the innovating RSP might otherwise have obtained, the incentive to bear the costs and risks of innovation are reduced. But even absent those requirements, vertical separation creates the risk, for an innovative RSP, that NBN Co will seek to secure for itself a larger share of the gains from innovation when it can, with that risk reducing the likelihood that the innovation will occur in the first place.

To that extent, the combination of vertical separation and upstream monopoly may prove especially harmful to dynamic efficiency despite NBN Co's need to recoup the very considerable sunk costs the NBN involves.

There is no way of predicting, from an analytical perspective, which of these somewhat offsetting forces will ultimately prove most powerful. Nonetheless, given the risks highlighted above, the panel is concerned by access seekers' complaints of NBN Co's 'take it or leave it' attitude and by claims that it consults on product development but does not necessarily act or negotiate. The panel noted NBN Co disputed this characterisation. For example, in its supplementary submission to the Regulatory Issues Framing Paper, NBN Co noted it 'has consulted widely with industry in formulating its WBA and through its PDF processes' (p.17).

The panel therefore welcomes NBN Co's commitment to establish a PDF in which it works with RSPs on its future product range.

There is always the risk that by encouraging cooperation between downstream rivals, such a forum may weaken downstream competition. For instance, information sharing in the PDF could facilitate tacit collusion between RSPs. The requirement on NBN Co to disclose information about new products on a non-discriminatory basis might also undermine the 'first mover' advantage any RSP could obtain, thus reducing the incentive to innovate. The panel's proposal in its *Statutory Review* to relax the non-discrimination obligations should assist in overcoming this concern.

At the same time, the mere fact of convening a Forum with RSPs does not eliminate the risk that NBN Co will not be responsive to their demands. Thus, the SAU confers on NBN Co an absolute discretion to reject a product idea (5.6) and there is no apparent mechanism for the ACCC to intervene in relation to such a decision.

The panel has therefore examined whether the ACCC nevertheless has powers to intervene. The panel's view is that in the case of the development of products which NBN Co's existing network is capable of supplying, the ACCC has powers it can exercise.

Under the NBN regime, the ACCC retains the power to declare services that NBN Co should supply. This power is explicitly confirmed in NBN Co's SAU and will be preserved under the reforms the panel has proposed to the SAOs. If NBN Co refuses to develop and provide a product which customers legitimately demand, it is open to the ACCC to declare that service when doing so would be in the long-term interests of end-users. Unlike the situation with other potential access seekers, the product does not need to be an 'active service' to be declared.

Were the ACCC to declare the service, NBN Co would be obliged to provide it to the extent to which it was capable of doing so. The ACCC would then need to determine prices in an access determination and could determine other non-price terms and conditions if it considered that

appropriate. In setting access prices, the ACCC would have to take into account NBN Co's legitimate costs and other commercial interests, including the costs of product development and implementation. On this basis, the panel considers there is an adequate path for the provision of new products on existing platforms and to remunerate NBN Co for the outlays that entails.

Having identified this mechanism, the panel notes it is not without risks of its own. It is hardly desirable for the ACCC to place itself in the position of over-riding NBN Co's board and management in determining the company's product range. As emphasised above, it is NBN Co's board and management that must be accountable to taxpayers for the entity's performance; but if it does not control its product range, it is not clear how it could be. Moreover, the exercise of such a power of compulsion would be especially problematic were NBN Co privatised, and the attempt to exercise those powers might give rise to challenge as amounting to an acquisition of property.

As a result, these powers should be used very sparingly, and a future review should examine their implementation. Moreover, before using its powers to this end, the ACCC should issue guidelines setting out its general approach to new product development by NBN Co. Nonetheless, on balance, the panel believes these powers provide an adequate instrument for resolving any disputes with respect to incremental product development decisions.

Recommendation 12: The ACCC issue guidelines setting out its general approach in dealing with issues relating to new product development by NBN Co.

Capacity expansion and network upgrades

A further issue the panel has considered is whether the correct incentives are in place for an integrated (that is, non-divested) NBN Co to upgrade its network over time, for example in terms of additional capacity upgrades.

The NBN regulatory regime was based on the view that FTTP was the ultimate network technology and therefore little upgrading would ever be required. Regardless of whether or not that view was correct, it clearly does not hold for the 'multi-technology' strategy, in which upgrading decisions will arise about pushing fibre out further to premises in the FTTN and HFC footprints, adopting new technology in the wireless footprint as demand for bandwidth grows, or acquiring additional satellite capacity. Whether NBN Co's incentives to upgrade its network are aligned with the long-term interests of end-users will therefore be crucial.

Structural separation again complicates this question. In a vertically integrated firm, its downstream operation will capture some, and potentially much, of the gain upstream capacity expansion creates. To that extent, the vertically integrated firm 'internalises' the downstream benefits of its decisions. The scope vertical integration offers to coordinate

upstream and downstream investments increases the strength of that effect, also by reducing the risk investment decisions entail. Moreover, information sharing within the vertically integrated firm allows it to more accurately assess downstream willingness to pay, further reducing investment risk. While integration can raise issues of market power, it therefore also produces a degree of alignment of investment incentives which is lost under structural separation.

As a result, there is a case, at least in theory, for seeking to recreate these benefits in a vertically separated context by establishing mechanisms through which downstream firms – in this case, RSPs – can credibly signal their willingness to pay for upgrades (and more generally, for network extensions and expansions) and on that basis contract with the upstream firm (NBN Co) for those upgrades to occur. In practice, however, the myriad attempts which have been made in other vertically separated infrastructure industries, such as airports, rail, ports and electricity grids, to define such mechanisms have been beset with difficulties. Having examined these attempts, the panel does not believe they could or should be imitated in the context of the NBN.

Of course, in its role as shareholder, the government could instruct NBN Co regarding its expectations of NBN Co's performance in terms of innovation and service development. However, while general guidance in this respect may be appropriate, it would be neither feasible nor desirable for the Government to take managerial decisions about how those objectives should be met. Moreover, guidance from Shareholder Ministers will obviously fall away as and when NBN Co is privatised.

The panel has therefore come to the view that the best way of dealing with the issue of network upgrades and capacity expansion is first, to ensure the regulatory framework offers credible incentives for investment, with the result that profit maximisation should help induce timely extension, expansion and upgrading; and second, for the Government, for so long as it owns NBN Co, to ensure its board operates on a clearly commercial basis, and so itself has incentives to respond to the profit opportunities of new investment. While these mechanisms cannot perfectly correct the problems structural separation creates, they should at least reduce their impact.

Setting a 'national broadband standard'

The issues discussed above, and the policy function of NBN Co, suggest there will be continuing pressures for the Government to define and periodically revise a standard for the level of broadband access all Australians should enjoy.

Whether setting such standards is desirable is obviously debatable. After all, the level of broadband access could be determined primarily by market forces; and under the panel's disaggregation proposal, there is every reason to believe competitive pressures would prove

effective in so doing. Of course, investment may not occur in areas where costs are especially high and/or willingness to pay relatively low; and there may be externalities that government believes ought to be remedied. However, selective intervention targeted to areas of market failure should be capable of dealing with these situations.

That said, even in the context of such selective interventions, a national standard may be helpful in identifying shortfalls in availability and guiding corrective action. Moreover, at least as it has worked to date, it is national standards that have defined NBN Co's mission. Were the panel's disaggregation proposals implemented, that would no longer be necessary, as competitive pressures would provide the impetus for progressive network upgrading; but even then a national standard could still be of use in informing policies for dealing with any market failures.

In the panel's view, setting any such national standard is a significant economic and social decision for Australia. As the panel's cost-benefit appraisal shows, it is crucial that any decision about such a standard be informed by a rigorous and transparent process that examines the costs and benefits setting or altering that target involves. That process should include periodic consideration of whether the existing 'national broadband standard' is appropriate or whether it should be adjusted, presumably upwards, for example, in line with consumer demand for broadband capability, innovation in infrastructure and applications, international developments and the resulting costs and benefits of changing the standard. The process could also include advice on how any new standard would best be implemented.

Although the frequency of such reviews is somewhat arbitrary, the panel recommends this be done at least every six to ten years. The review should be conducted by an independent body such as the Productivity Commission. The requirement for such a review should be set out in the Telecommunications Act, with the provisions specifying that it must take account of and publicly report on the costs and benefits of any change in the national target, including the implications for consumers and taxpayers.

That will naturally raise the issue of how any upgrades should be financed. It seems inherently undesirable for taxpayers to be forced to finance investments that would otherwise be undertaken by private investors. As a result, the review should be required to identify the component of any upgrade that is likely to prove inherently un-commercial and government funding ought to be limited to those components.

Recommendation 13: To ensure national standards for broadband infrastructure and services are appropriate, an independent body, such as the Productivity Commission, review them at least once every six to 10 years, with the results used by the Government to confirm or adjust the national broadband standard. This review requirement be set out in legislation. Such a process should be a prerequisite to any imposition by Government of a new national broadband standard.

Recommendation 14: If, following an independent review, the Government decides to raise the national broadband service standard, it should initiate a process with NBN Co and other relevant operators to establish the most cost-effective way of implementing that new standard. In doing so, the primary emphasis be on upgrading networks commercially, including through increased user charges. The Government should only consider funding assistance when a desirable upgrade would not otherwise be undertaken on a commercial basis.

9.6 Operational issues relating to terms of access

In addition to the structural issues, submitters expressed a range of concerns relating to the specifics of NBN Co's products, prices, other terms and conditions, and costs. Similar issues were identified by the panel's own analysis in this area. Interestingly, given the range of matters in this area and the potential scope for disagreement, the number of issues is relatively small.

Non-price terms and conditions

The panel is aware of access seekers' concerns in relation to some of NBN Co's non-price terms and conditions, particularly relating to service level commitments and liability for end-user connections. The panel shares access seekers' concerns on these matters.

The ACCC made some high-level remarks on these issues in the context of its assessment of the SAU in early 2013, including asking NBN Co to work with access seekers on further developing ways of managing them, but has not formally assessed proposed approaches or made any regulatory determinations.

The SAU contains provisions for NBN Co to organise an SFAA forum to work with access seekers on developing future WBAs. The panel expects NBN Co will further develop and refine its non-price terms and conditions in response to its access seekers' concerns in this forum. In the event that these concerns are not addressed in the next WBA or SAU variation, there is also scope for the ACCC to make access determinations on these matters.

To the extent that access seekers' concerns are caused by NBN Co's restrictions on discriminating between access seekers, that is, requiring NBN Co to offer all access seekers

exactly the same terms, these issues may be alleviated by the changes proposed to the non-discrimination provisions recommended in the *Statutory Review*.

Points of interconnection for satellite traffic

The panel recognises RSP's concerns around NBN Co's proposed practice of routing satellite traffic to the point of interconnection that is geographically closest to the customer on the LTSS. These providers argued (in submissions to the ACCC's review of POIs and the review of Division 16 of Part XIB of the CCA by a team from Deloitte Access Economics led by Dr Ric Simes) that this was an artificial simulation of the routing of traffic on the terrestrial network, because the traffic is actually collected at one of NBN Co's data processing centres (DPCs). This practice would, however, force RSPs on the satellite service to purchase CVC capacity in each point of interconnection where they had a satellite customer. RSPs argued that this would only be feasible if they could acquire sufficient customers per point of interconnection.

In its *Strategic Review* of the fixed wireless and satellite networks, NBN Co recommends:

> *Adopt[ing] a single Point of Interconnect (POI) architecture for LTSS, which recognises that given that all LTSS traffic will necessarily be concentrated at the DPC, it is required to also offer interconnection at that point. As the DPC has geographical redundancy it is also prudent for the POI to have a geographically diverse back-up location. (p.43)*

At least on the basis of the information available to it, the panel sees merit in NBN Co's position in principle and considers that it is a more efficient way of delivering satellite services.

Migration to the NBN

As indicated in the *Statutory Review*, issues have arisen as a result of NBN Co products not supporting a smooth migration from legacy networks to the NBN. The NBN rollout involves significant transaction costs for parties and this is reflected in the results of the CBA. All parties have an interest in minimising these costs, as well as providing a smooth path for consumers, but vertical separation inevitably compounds the difficulties of migration and the risks of disruption. The panel sees merit in the Communications Alliance leading a multiparty self-regulatory initiative, following on from the guiding note that it has already prepared in collaboration with Telstra and NBN Co. In the absence of this, regulatory intervention, for example through a licence condition, might be required to resolve the issues. This matter is covered further in section 4.8.3 of the *Statutory Review*, including Recommendation 34 in that report.

Issues where the panel does not share submitters' concerns

There are a number of matters raised where the panel does not share submitters' concerns.

While the panel has recognised there are concerns around NBN Co's use of the ICRA, in particular in relation to its effects on NBN Co's incentive to upgrade its network during the cost recovery period, the panel considers the use of an ICRA is acceptable – indeed can be necessary – as a means of recovering large upfront costs. ICRA mechanisms have been used in other regulated industries. The fact that the revenue cap does not apply to NBN Co's revenue until the ICRA is extinguished does not obviate NBN Co's requirement to abide by the price caps set out in the SAU.

In terms of NBN Co's pricing of its CVC product, this was reviewed by the ACCC in the course of its assessment of the SAU. The ACCC accepted that the SAU, including the pricing arrangements contained within it, as consistent with the LTIE. The panel is not convinced that the ACCC's criteria for assessing the SAU were flawed and in any event does not regard it as appropriate to replace the ACCC's judgment. The panel notes that by proposing review on the merits of ACCC decisions on these issues, the panel has sought to ensure there are safeguards against possible regulatory error. It is obviously of substantial importance that merits review should apply to decisions made under the SAU, rather than simply to the initial decision to accept it.

In response to suggestions that NBN Co should be required to provide interconnection at locations other than the list of POIs, offer its products on an unbundled basis and offer its multicast service on a standalone basis, the panel similarly observes that these matters were assessed by the ACCC in its assessment of the SAU. The panel has recommended, in relation to uniform national wholesale pricing, the repeal of Division 16 of Part XIB of the CCA (which authorises NBN Co to bundle its services if reasonably necessary to achieve uniform national wholesale pricing). In the absence of these statutory authorisations, NBN Co can seek ACCC authorisation under Part IV of the CCA if required. These authorisations would be open to appeal to the Australian Competition Tribunal.

It was suggested that NBN Co should offer 'open pipe' services, whereby NBN Co's various AVC services are collapsed into a single service that provides the end-user with as much speed and capacity as is available on the network, and that it offer Layer 1 (for example, dark fibre) services. The panel's response is that the details regarding individual products are best left to the provider, subject to ACCC oversight. The panel notes that the ACCC retains the power to declare new NBN services. The current product offerings have been scrutinised by the ACCC against statutory criteria and processes and it is satisfied that they are capable of satisfying consumer needs, at least in the short term. It is not appropriate for the panel to re-run the ACCC's assessment: those judgements are a matter for the regulator and the associated review mechanisms.

It has also been suggested that NBN Co should make greater use of alternative technologies and leverage its fixed wireless and transit networks in regional and rural areas to provide wholesale mobile and mobile backhaul services to end-users, or its fibre assets to assist the deployment of small cell architecture in cities. While NBN Co does not currently offer these services, there are no regulatory restrictions preventing it from developing them. To prevent it from having an adverse impact on existing contested markets, NBN Co should generally apply competitive neutrality principles, including in relation to a commercial cost of capital. The panel also recommends that the Government should monitor such activity closely in terms of NBN Co's appropriate role in the market place. NBN Co is currently developing mobile backhaul products in cooperation with mobile network operators; its Fixed Wireless and Satellite Review did not recommend pursuing wholesale mobile products at this time. This situation, combined with the strong investment that is continuing to occur in the mobile market, makes it difficult to justify any Government intervention in relation to the supply of wholesale mobile products.

However, the panel's disaggregation proposals would result in specialised operators for the fixed wireless and satellite networks that would have very strong incentives to make the best use of their assets. Having purchased those assets through a competitive process, there would be no competitive neutrality concerns should they aggressively pursue opportunities in markets for wholesale mobile and mobile backhaul services. The panel therefore sees its proposed market structure as the best way of addressing the concerns submitters have expressed.

Submitters to the ACCC consultation on the SAU, including Macquarie[33], Optus[34] and Telstra[35], expressed concern that the network design rules and the prudent design condition are not stringent enough and undermine the prudency measures that are in place, irrespective of ACCC review powers. The panel accepts that some elements of the SAU prudency arrangements may provide NBN with scope to 'gold-plate' its network, leading to higher long term prices for access seekers and end-users. The panel has doubts about the wisdom of provisions that deemed expenditure by a government business enterprise to be prudent; it is questionable whether those provisions should ever have been accepted. That said, the panel is equally concerned that prudency tests should not be used to effect arbitrary asset write-

33 Macquarie Telecom Submission to the ACCC Consultation Paper on the NBN Co Limited 2012 Special Access Undertaking, January 2013 (www.accc.gov.au/system/files/Macquarie%20Telecom%20submission%20-%20SAU%20consultation%20paper%20%2818%20January%202013%29.pdf), p.20.

34 Optus Submission to the ACCC Consultation Paper on the NBN Co Limited 2012 Special Access Undertaking, January 2013 (http://www.accc.gov.au/system/files/Optus%20submission%20-%20SAU%20consultation%20paper%20%2818%20January%202013%29.pdf), pp.59-62.

35 Telstra Submission to the ACCC Consultation Paper on the NBN Co Limited 2012 Special Access Undertaking, January 2013 (http://www.accc.gov.au/system/files/Telstra%20submission%20-%20SAU%20consultation%20paper%20%2818%20January%202013%29.pdf), pp.72-75).

downs, thereby compromising investors' confidence in the regulatory regime. As a result, rather than disturb existing arrangements, the panel recommends that the ACCC, in using its still considerable powers under the SAU to prevent gold-plating, be careful not to unnecessarily increase regulatory risk.

Resolving issues related to access terms

The panel has not attempted to develop detailed policies to address all these issues: nor is it sensible for it to do so. Most, if not all, of the concerns raised can, if necessary, be dealt with by NBN Co and the ACCC in upcoming processes.

The panel's understanding is that both NBN Co and the Government expect the company will seek a variation to its SAU to implement the multi-technology model. In seeking a variation, NBN Co should at the same time work to resolve the issues identified in submissions and by the panel. The ACCC, in considering a variation request, should also seek to resolve residual concerns as part of the variation process. If those parties fail to satisfactorily deal with the issues, access seekers will inevitably raise them again during consultation on the SAU variation. If this does arise, the case for regulatory changes designed to address outstanding matters should be considered by the Government.

Recommendation 11 in the panel's *Statutory Review* is also relevant to these issues. The panel recommended that: 'Arrangements should be put in place to enable carriers and service providers to have effective recourse to the ACCC for a specified period on the terms and conditions of an access agreement they are entering into with NBN Co and which they consider unreasonable.' Such arrangements would provide an incentive for NBN Co to pre-empt issues and provide an effective mechanism to resolve them where they nevertheless arise.

NBN Co should work to resolve any outstanding issues related to access terms through the next NBN Co SAU variation process.

Supply by NBN Co of services that are not declared

Under the regulatory framework applying to the NBN, NBN Co is only permitted to supply services that are declared for the purposes of the Part XIC access regime. This is the mechanism by which NBN Co services are subject to ACCC oversight and regulation as required.

In its submission to the consultation paper on Telecommunications Regulatory Arrangements, NBN Co proposed that in certain circumstances, it should be allowed to provide services that are not declared and so are not subject *prima facie,* to ACCC regulation. NBN Co proposed three such circumstances: (1) where NBN Co is proposing to offer the service only as part of a

pilot or a trial; (2) services related to integrating other networks into the NBN; and (3) where NBN Co proposed to offer the service in a contestable market. Because of the broad structural implications of this proposal, the panel decided to address this issue in this report rather than in the *Statutory Review*.

For so long as it remains an integrated entity, NBN Co will have substantial market power, entrenched by its agreements with Telstra and its access to taxpayer funding on non-commercial terms. As a result, the panel does not believe it would be appropriate to provide NBN Co with a sweeping exemption from regulatory supervision. The panel recognises, however, that there may be a need for greater flexibility.

This flexibility can be delivered in part under the relaxation of NBN Co's non-discrimination obligations proposed in Recommendation 13 of the *Statutory Review*. This relaxation would provide NBN Co with additional flexibility to treat participants in trials in preferred ways; however, the ACCC would still retain the oversight powers applying to declared services generally.

This relaxation could also assist with issues arising from the integration of new networks into the NBN. As NBN Co notes, these issues are likely to be transitory in nature and a degree of flexibility is likely to be required. However, transition issues could also potentially be significant. For example, NBN Co appears to be raising this in the context of the renegotiation of the Definitive Agreements, in which complex issues about the integration of the copper and HFC networks arise. Were these networks indeed to be integrated, rather than allowed to compete, then both the resulting services and the transition process should be regulated.

In the case of NBN Co's offering of services in a contestable market, the panel questions why NBN Co would be operating in these markets given that its primary mission is to provide next generation broadband where the market has failed in its delivery. That said, where NBN Co has the capacity to also operate in markets where service provision is already being provided to an NBN-consistent standard, there could be benefits in its doing so in terms of improving competitive pressure, providing it does so on a competitively neutral basis. In these circumstances, there may be some grounds for NBN Co to be exempted from immediate ACCC oversight under Part XIC but only if appropriate safeguards with respect to competitive neutrality are in place.

On balance, the panel proposes Part XIC be amended to provide a mechanism by which the ACCC can determine that a particular NBN Co service or class of service is not declared for the purposes of Part XIC if the ACCC is satisfied it is in the long-term interest of end-users. In doing so, the ACCC should be required to take account of whether there are reasonable assurances with respect to competitive neutrality.

Recommendation 15: NBN Co should generally continue to be permitted to supply only declared services within the meaning of Part XIC of the *Competition and Consumer Act 2010*. However, to provide flexibility to deal with situations such as pilots and trials, the integration of new networks, the provision of services in contestable markets, and greater competition following full disaggregation, Part XIC should be amended to allow the ACCC to determine that specified NBN Co services are not to be treated as declared services in circumstances where the ACCC is satisfied this is in the long-term interests of end-users.

9.7 NBN Co overbuilding and competitive neutrality

Concerns have been raised with the panel about whether NBN Co has been behaving in a competitively neutral manner in the way it recovers its costs from servicing new estates, and how it makes decisions to overbuild an existing broadband network already providing service to a standard that meets the Government's broadband service objectives. At issue here is whether NBN Co's behaviour in these types of situations is being regulated appropriately.

As part of the competition reforms of the 1990s, the Government and all state and territory governments undertook to ensure that their publicly owned businesses did not enjoy any net competitive advantage simply because of being publicly owned. In 1996, each government published a competitive neutrality policy statement. NBN Co, as a government business enterprise, is bound by the competitive neutrality principles set out in the Commonwealth Competitive Neutrality Policy Statement 1996.

The Commonwealth Government Business Enterprise Governance and Oversight Guidelines (October 2011) also require NBN Co to operate efficiently and price efficiently[36]. This requirement is, however, qualified in that the Government may impose price conditions on GBEs providing goods and services in a monopolistic market or Community Service Obligations (CSOs).

Almost all the recommendations made by the panel will, in one way or another, assist in differentiating between situations where NBN Co must adopt strict competitive neutrality principles from those where their adoption can be tempered legitimately by CSO considerations. For example, clarifying where CSOs genuinely exist, moving to more cost-reflective pricing and reducing the extent of and reliance on cross-subsidies will make it clearer where competitive neutrality principles must apply in full; while NBN Co's competitors in the new development market can compete knowing NBN Co's terms and condition of supply had been assessed by the ACCC against competitive neutrality criteria.

36 Australian Government, Department of Finance and Deregulation, Commonwealth Government Business Enterprise - Governance and Oversight Guidelines (October 2011), page 5.

The panel does not wish to see NBN Co unduly restricted from competing against other infrastructure providers, but at the same time believes that this competition should occur on the merits and thus be fair and effective. NBN Co should therefore be subject to an obligation to act in a manner consistent with competitive neutrality, other than where it is clearly fulfilling explicitly defined social and economic policy objectives or where it has received authorisation from the ACCC for conduct which would otherwise breach that obligation.

However, administering any new legislated rules regarding how, where and when NBN Co is to adopt competitive neutrality principles would be impractical at this time. For example, it would be difficult to determine whether NBN Co had entered a market so as to meet its social obligation to provide service in cases of market failure or whether it was advancing its purely commercial objectives. The reasons NBN Co enters a market will likely never be clear cut: a failure to fully respect competitive neutrality principles might be justified when entry is intended to fulfil its service obligations; or because it wants to protect profit margins used to fund service provision elsewhere – which may itself be a legitimate goal under current policy settings.

That said, it would be better for NBN Co to have clearer instructions than it currently has about how it is to behave in situations where market failure is not usually an issue, and be required to report on how it has given effect to those instructions.

The best way this can be done, were NBN Co disaggregated, is through the SOE. It should specify NBN Co's priorities and its commercial objectives; including ensuring that where it overbuilds an existing network, it has acted as a prudent investor, taken full account of the opportunity cost of capital and has been mindful of the fact that overbuilding premises that had adequate alternatives reduces its ability to service those that do not.

There should also be a requirement on NBN Co to modify its conduct, should that conduct be the subject of a competitive neutrality complaint that is upheld.

Concerns about anti-competitive behaviour in relation to overbuild should be dealt with through Part XIB and Part IV of the CCA.

Against this background, the panel considers it is undesirable to retain the adequately served policy into the future, as it seems to cut across the NBN Co Board's responsibility for deciding rollout priorities. Operating in a well-established policy framework, the NBN Co board should take decisions on establishing rollout priorities relying on their requirement to act commercially.

One of the implications of the Government continuing with the current NBN Co structure is an acceptance that it effectively sacrifices the scope for competition because, even with a competitive neutrality requirement, the threat of NBN Co entering every potentially profitable market will deter competing investments. Were this the case, the panel recommends

competitive neutrality requirements in respect to decisions about entry and expansion should be given legislative form. Notwithstanding potential administrative problems, NBN Co's market power as an integrated entity – and hence ability to deter investments by alternative providers – will require this step so as to make compliance with competitive neutrality principles a legal requirement that can be enforced.

Recommendation 16: Were the Government to decide to retain NBN Co as an integrated entity, competitive neutrality requirements in respect of decisions about entry and expansion be established in legislation. Should NBN Co be disaggregated, the Government give NBN Co clearer instructions through the Shareholder Ministers' Statement of Expectations about how it is to behave in situations where market failure is not usually an issue. This includes:

a) instructing NBN Co to act in a manner consistent with competitive neutrality principles other than where it is clearly fulfilling explicit social and economic policy objectives or has ACCC authorisation;

b) instructing NBN Co as to its priorities and its commercial objectives, including ensuring that where it overbuilds an existing network it acts as a prudent investor, takes full account of the opportunity cost of capital and is mindful of the fact that overbuilding premises that have adequate alternatives reduces its ability to service those that do not;

c) ensuring that concerns about anti-competitive behaviour by NBN Co in relation to overbuilding are appropriately dealt with through Part XIB and Part IV of the *Competition and Consumer Act 2010*.

9.8 Telstra's price controls

Under s.157 of the *Telecommunications Consumer Protection and Service Standards Act 1999*, the Minister can establish retail price control arrangements for Telstra's services. The price control regime has three main objectives: to restrain significant market power; to encourage efficiency in service pricing; and to give effect to any social equity objectives such as that of uniform national retail pricing. The controls may also support the licence condition which requires Telstra to develop and comply with a plan to assist low-income consumers to access telecommunications services, and the regulatory arrangements in respect of the availability of untimed local calls to customers in Extended Zones (regional and remote areas of Australia).

The Terms of Reference require the panel to consider, in the context of NBN Co's proposed pricing structure, the extent to which retail price controls should be continued. The panel has determined that the most appropriate way to treat this task is to examine the treatment of Telstra's retail price controls on NBN and generally.

Telstra's pricing on the legacy copper network

In relation to the legacy copper network, Telstra may retain a dominant position on its copper network both in the lead up to the migration to the NBN fixed-line network and in areas where NBN Co will provide fixed wireless and satellite services and Telstra's copper network will continue to be used to supply voice services.

The Department of Communications has separately commissioned an economic analysis of Telstra Retail Price controls as they apply to Telstra services on its legacy networks. The report concludes that the Telstra retail price controls are no longer necessary[37]. As a result, the price control determination was not renewed, so some controls will lapse by 30 June 2015.

The panel has not duplicated that work. However, it would support the removal of these retail price controls where retail competition does or can provide effective disciplines over the exercise of significant market power. Moreover, in those areas where retail competition has not developed, the Government should consider whether price controls have contributed to the problems by holding prices down to unprofitable levels – and if so, should remove or relax those controls. However, the Government should retain the power to apply controls in the future to help address particular areas of retail market failure, for example, in the geographic areas where Telstra is contracted to retain its copper network.

Telstra's pricing on the NBN

In the context of the rollout of the NBN and the controls on NBN Co's wholesale pricing, there is a question of whether price controls on Telstra's services remains relevant on the NBN.

Since 2012, price controls do not operate for Telstra services provided over the NBN (or other networks captured by Parts 7 and 8) with the exception of charges for untimed local calls and the disallowance provision of charging for directory assistance services. The increased level of competition and low barriers to entry on the NBN were seen as rendering retail price controls on such networks as generally unnecessary. However, these two controls were maintained in the interests of social inclusion and consumer protection.[38]

The 2012 report on price controls said the NBN "provides an open platform for the development of robust retail level competition ... it responds to longstanding concerns about barriers to competition in the Australian telecommunications market flowing from Telstra's

37 http://www.communications.gov.au/deregulation

38 Price Control Arrangements, Notification and Disallowance Determination No. 1 of 2005 (Amendment No. 1 of 2012) - Explanatory Statement to Telstra Carrier Charges, p.12. The disallowance provision of charging for directory assistance services enables the Minister for Communications to disallow pricing proposals for these services.

control of the access network and its vertical integration."[39] Further, the 2012 report proposed that although the TUSMA Agreement does not set prices, it could be renegotiated.

Panel's view

The panel recognises the complexities of the debate around retail price controls on Telstra in the transition to an environment designed to encourage retail level competition.

The NBN provides a basis for ensuring that all service providers have scope to compete on the merits and that consumers have access to a wide range of service providers, including in regional areas. There is therefore no reason for price controls to apply to Telstra's retail services on the NBN where it will be competing with other retail service providers on a level playing field. As for affordability issues, these are best addressed through the arrangements recommended in chapter 8.

This raises the issue of whether the power of the Minister to make price control determinations should be retained. The panel believes it should, for prudential reasons, but that it ought to be more tightly confined to clear instances of market failure.

If there are areas where competitive mechanisms are demonstrably not working to provide affordable prices for consumers (for example, because RSPs have failed to enter or have withdrawn from market segments), the Government should examine carefully why this is the case. In the event that there are pricing outcomes for end-users that the Government considered are unacceptable, these concerns should be primarily addressed through properly targeted and transparent subsidies, rather than through the inherently distorting, poorly targeted and opaque instrument of price controls. However, where subsidies are inappropriate, the Government might consider the targeted use of price controls directed at the problem areas, not broad-brush controls as has been the general practice to date. Such an approach may be warranted, particularly in the satellite and fixed wireless footprint where voice services will continue to be provided over the Telstra copper network in the longer term.

The panel therefore recommends that legislation be amended to allow retail price controls to apply only to situations where there is enduring market failure; where price controls will not entrench that market failure by deterring competing entry; where wholesale price regulation does not provide a reasonable alternative to regulating retail prices; and where it is reasonable to believe the benefits of retail price controls would outweigh the costs.

39 National Broadband Network Companies Bill 2010 Telecommunications Legislation Amendment (National Broadband Network—Access Arrangements) Bill 2011—Revised Explanatory Memorandum, p. 9.

Recommendation 17: Retail price controls not be applied to Telstra services on the NBN unless there is clear evidence of consumer detriment due to Telstra facing inadequate actual and potential competition in a particular market segment. The Minister's power to make price control determinations be retained in a form that allows it to be applied to services provided over the NBN, for use only as a reserve power and subject to that power being confined to areas of clear market failure.

10. Privatisation and governance of NBN Co

The rules for NBN Co's ownership and governance are established in legislation. These rules allow considerable flexibility in the management of NBN Co's assets, and give the Government significant powers to determine the structure of the company. These powers can facilitate the structural reforms to increase competition and improve long-term industry outcomes that the panel has recommended.

10.1 Privatisation arrangements

The NBN Companies Act establishes the arrangements for NBN Co ownership, privatisation, asset disposal and functional separation. NBN Co also operates subject to the PGPA Act, which sets out standard business oversight rules for Commonwealth-owned companies, and the Commonwealth Government Business Enterprise Governance and Oversight Guidelines 2011.

NBN Co was established in such a way that it can be privatised in the future. However, under current legislation, the Government must retain full ownership of NBN Co until a series of actions are taken. The Minister for Communications must first make a declaration that the NBN is built and fully operational. The Productivity Commission must then conduct an inquiry into regulatory, budgetary, consumer and competition matters relating to the NBN, and a Parliamentary Joint Committee must consider the findings of that report. The Finance Minister must then make a disallowable declaration that conditions are suitable to sell NBN Co.

These arrangements mean that privatisation of NBN Co would not require legislative amendments. Transitional provisions also allow for NBN Co to continue reporting to the Communications and Finance Ministers as long as it remains in majority government ownership.

10.2 Management of NBN structure and assets

The Government may require NBN Co to implement measures to provide greater transparency and equivalence of treatment in its operations, including the appropriate form of separation at any time. Separation arrangements could involve full functional separation of all business units or could be more 'light touch', such as requiring separate financial statements and asset registers for different business units. These powers enable business units to be further separated if required (for instance, in terms of separating the passive network from the active network; wireless from fixed line; or along the lines of each technology platform). NBN Co already has accounting arrangements to identify active, passive and transit assets and costs, and reports annually to Shareholder Ministers at a high level on this basis. The underlying systems allow much more granular reporting.

NBN Co may also dispose of assets as part of its normal business activities. Under Division 4 of Part 2 of the NBN Companies Act, the Communications and Finance Ministers may give directions about asset divestiture by an NBN corporation, having regard to whether this will promote the LTIE. The Ministers may also require the ACCC to provide advice on a proposed divesture.

Panel's view

The panel's proposals for disaggregation involve some degree of asset divestiture but do not require or entail the privatisation of NBN Co. Given that NBN Co is still in the early years of deploying FTTx, the ownership arrangements for these assets should be revisited at a later stage, for example, once 80 per cent of the NBN has been built and is operational.

Should disaggregation not proceed, the separation powers could be used to improve transparency within NBN Co, particularly with regard to cross-subsidies between the different network technologies, and to preserve the option of future disaggregation. At a minimum, establishing different functional business units within NBN Co for each of the technologies being used in the rollout would provide this transparency, and would also prepare the company for any future divestiture of networks. The panel's full recommendations on this matter are contained in chapter 6.

Full privatisation is already provided for in the current legislation; however, the mechanics they envisage are cumbersome, and rather than recognising the importance of injecting the disciplines of private capital markets and reducing the burden on taxpayer funding, seem more suited to the days when government ownership was the default position. As a general matter, imposing on taxpayers the high costs and far-reaching risks that projects such as the NBN involve is undesirable; the Government should therefore actively explore options for lightening the load taxpayers are being forced to shoulder so long as that can be done without compromising the policy objectives. However, while a more streamlined legislative framework for achieving an eventual full sale would be desirable, it is clearly not an immediate priority.

The panel considers that the existing separation and divestiture powers are sufficient to implement any of the structural options recommended by the panel, so does not recommend any changes to these arrangements.

Recommendation 18: Arrangements relating to the privatisation of NBN Co as a company are not an issue that requires immediate consideration; they be revisited once the NBN is further established.

11. Administration of economic regulation of the telecommunications industry

11.1 Introduction

A central feature of the panel's work has been identifying the best economic regulatory arrangements for the broadband market going forward. In this context, the panel also considered how the future administration of what will inevitably become an increasingly complex industry framework could be undertaken in the most efficient way.

The ACCC is currently responsible for economic regulation of the telecommunications industry and was the focus of the panel's consideration of this issue. In contrast, the panel did not consider technical regulation or carrier and service provider consumer-related regulation which lies with the ACMA.

The Regulatory Issues Framing Paper sought submissions on whether the ACCC should remain responsible for the economic regulation of the Australian telecommunications industry. That paper noted that Australia is unusual in vesting responsibility for economic regulation of telecommunications in a generalist body whose responsibilities include administration of the competition laws.

The ACCC's current telecommunications-specific roles include:

- assessing and enforcing the terms and conditions of access to services on the NBN;
- assessing and enforcing Telstra's SSU and plan to migrate Telstra's fixed line customers to the NBN;
- setting wholesale prices and terms and conditions of access for declared services;
- monitoring and reporting on prices and competition in the telecommunications sector; and
- investigating claims of anti-competitive conduct by carriers and carriage service providers, and the issuance of competition notices and Binding Rules of Conduct.

11.2 Stakeholders' views on the ACCC's role

Submissions in response to the panel's Framing Paper were generally supportive of the ACCC and felt that it should remain the institution to regulate telecommunications competition and consumer policy. The main exception to this view was CIMB, which was critical of the ACCC's impact on industry certainty and investment incentives.

Most submitters either made no suggestions for change or sought marginal improvements. Suggested changes that could be made to the ACCC's current role included that it be required to prepare regulatory impact statements when making decisions and manage a register of cost to industry for its regulatory decisions, along with the establishment of a regulatory review panel to provide a right to challenge decisions made by the ACCC (and the ACMA).

11.3 Future administration of economic regulation of the telecommunications industry

The panel is mindful of the fact that many of its recommendations will create additional regulatory tasks and that, in any event, the industry structure associated with the deployment of high-speed broadband services will create a wide range of regulatory challenges. Far from reducing the complexity of the regulatory task, structural separation imposes new functions on economic regulation, most acutely in the transition stage but also once that transition has been effected. The fundamental question is what institutional design is best capable of meeting the challenges that lie ahead.

The history that led to the ACCC's current role is helpful in addressing that question.

Fundamentally, the ACCC was tasked with the responsibility for economic regulation of telecommunications as a result of three factors.

The first was the experience with AUSTEL, the industry-specific regulator established as a result of the 1989 reforms, and whose powers were enhanced with the introduction of limited infrastructure competition in 1991. By the time of the duopoly review in 1995-96, it was recognised that reliance on an industry-specific regulator involved a number of substantial risks, including that of distorting investment through differences in the treatment of telecommunications compared with other regulated industries.

Second, while telecommunications reform began somewhat sooner than that of the other industries traditionally run as government monopolies, the period leading up to the 1997 reforms coincided with the development of National Competition Policy, and more generally of what became known as the 'Hilmer reforms'.

An important thrust of those reforms was the emphasis on national uniformity of approach to industry regulation, which was accepted as desirable because it avoided distorting investment and – by ensuring that decisions taken in respect of one regulated industry could set a precedent in respect of others – would enhance the certainty, predictability and quality of regulation. Additionally, by vesting responsibility for regulation in a single entity, economies of scale and scope could be achieved in undertaking regulatory functions.

Third, at the time of the 1997 telecommunications reforms, it was envisaged that a reasonably timely transition would occur to a workably competitive telecommunications market,

including at the infrastructure layer. As that transition progressed, industry-specific economic regulation was expected to fall away, eventually merging into more 'light touch' arrangements based both on the new Part IIIA of the then Trade Practices Act (now CCA) and on enforcement of the general competition laws. While it was recognised that there were risks associated with the very broad span of control that was being placed on the leadership of the ACCC, vesting regulatory responsibilities in the ACCC was considered an appropriate way of facilitating the expected transition to a regime increasingly based on the non-industry-specific competition laws.

Looking to the future of telecommunications regulation, the need for industry-specific regulation will not diminish, at least in the near to medium term, particularly if the integrated model for the NBN remains in place. As a result, the earlier rationale for vesting those arrangements in the ACCC – namely, the expected move to an approach primarily reliant on non-industry-specific competition policy instruments – is no longer valid.

Moreover, the sheer scale of the regulatory tasks that lie ahead and the high costs of regulatory error suggest a need for those tasks to be undertaken by an entity whose leadership is focused on regulatory functions (particularly network access regulation) and whose performance is primarily and transparently assessed on the basis of its efficiency and efficacy in the discharge of those functions.

These factors do not suggest reverting to an industry-specific regulator. Even though many aspects of telecommunications regulation will remain 'bespoke', there are now sufficient commonalities between regulated industries – for instance, the reliance on what amounts to a 'building blocks' model of price-setting – as to create opportunities for economies of scale and scope in network access regulation. Additionally, the stress the Hilmer report placed on the importance of avoiding the distortions that would arise, were investment in the various regulated industries treated differently, remains timely. So does the desirability of ensuring each regulated industry has an interest in monitoring the performance of a common regulator, thus increasing the pressures on that regulator to carry out its functions to the highest standards.

As a result, the panel believes there is a compelling case for vesting the economic regulation of all network industries in a 'networks regulator', which should be a specialised body with its own leadership and staff. This entity's sole responsibility would be the economic regulation of network industries; it would be charged with seeking, to the greatest extent practicable, consistent treatment of those industries; and its accountabilities and performance reporting would be specified in terms of those functions.

The panel recognises that the future role and functions of the ACCC are being assessed in the current Competition Policy Review. It therefore believes that as part of its work, that review, mindful of the panel's recommendation, should examine the scope for establishing a single 'networks regulator'. In terms of the implications for telecommunications, such a transfer

would likely leave the current competition powers under Part XIB (should they be retained) in the ACCC, which however would be required to consult the networks regulator in exercising those powers; the other telecommunication-specific regulatory functions would vest in the new entity.

If the competition policy review did not recommend the formation of such a 'networks regulator', or such a recommendation was made but not accepted, the Government could consider working with the States and Territories to expand the scope of the current arrangements for the AER. Adding the telecommunications functions to a redesigned AER, which would presumably continue in its current relationship to the ACCC, would go some way to achieving the objectives set out above. However, as has become apparent, the complex relationship between the AER and the ACCC blurs accountability and has the potential to reduce the effectiveness of regulation, making this a second best option.

In short, taking account of:

- the scale and complexity of the regulatory challenges arising from the deployment of high-speed broadband;
- the need to ensure those challenges are vested in an entity with a manageable span of control, and whose primary accountability lies in the efficacy and efficiency with which it discharges its regulatory functions; and
- the desirability of securing uniformity of economic regulation, and of the administration of access regulation, across the network industries,

the panel concludes, on balance, that economic regulatory functions should be vested in a specialist 'network regulator', whose operations would cover the entire range of infrastructure industries.

The panel notes that the ACCC's powers under Part XIB currently include both competition notices and binding rules of conduct. Currently, these instruments have different (though overlapping) scope, are subject to different forms of review, and are applied using different tests. This arrangement generates uncertainty about the legislative powers to be used in particular cases. The review of Part XIB recommended by the panel in the *Statutory Review* should consider the outcome of the Competition Policy Review to determine how these powers might be aligned with broader competition law to improve the efficacy of conduct regulation.

Recommendation 19: The current telecommunications specific functions of the ACCC, with the exception of those related to Part XIB of the *Competition and Consumer Act 2010*, should be transferred to a 'networks regulator'. The current Competition Policy Review, which is to report by December 2014, should examine the establishment of such a regulator which would have responsibility for access regulation for all infrastructure industries.

Strengthening the telecommunications policy process

While many factors caused the recurring difficulties which culminated in the establishment of the NBN, the problems were aggravated by the blurring of the distinction between responsibility for policy, on the one hand, and for regulation, on the other. The former involves setting objectives and framing the rules required to ensure those objectives are pursued; the latter involves applying the rules to particular situations. While the dividing line between these can never be watertight, there is no doubt that it was considerably more clearly defined in the energy industries than in telecommunications, where it became undesirably unclear.

In practice, the ACCC, rather than administering the rules, became a primary source of policy advice, even in areas where it lacked the necessary expertise. The potential counterweights, however, proved insufficient to inject the balance required, creating risks to the quality of the policy process.

Whatever regulatory and policy settings are now put in place, there will be a need for their ongoing review in the light of experience. The panel believes it is important that there be a strong capability within the relevant government department for that review, and urges the Government to consider how that capability can be ensured. It also believes it is important to clarify the separation between policy and regulation, including by making it plain, in the accountabilities set for the regulator.

To bring added clarity to that distinction, the Government should consider issuing a policy white paper on telecommunications that, among other elements, could respond to the panel's report. As a general matter, the panel believes it is desirable for such policy statements to be issued and updated regularly, setting out the current situation, the policy objectives being pursued and the instruments that will be used to pursue them, as well as the indicators that can serve to measure whether those objectives are indeed being achieved.

Appendix 1 - Terms of Reference

The purpose of the *Independent cost-benefit analysis and review of regulation* is to analyse the economic and social costs and benefits (including both direct and indirect effects) arising from the availability of broadband of differing properties via various technologies, and to make recommendations on the role of Government support and a number of other longer-term industry matters.

Information flowing from the *NBN Co Strategic Review* should be considered as input to this analysis/review.

The review is to report to the Government within six months of these terms of reference being received on the following questions:

1. What is the direct and indirect value, in economic and social terms, of increased broadband speeds, and to what extent should broadband be supported by the government?

    a. This should consider the economic and social benefits of bringing forward improvements in broadband speed and the respective benefits of alternative / potential technologies.

    b. It should also consider the extent to which market pricing mechanisms can capture the value of benefits (including benefits to Australian governments).

2. What are the optimal long-term ownership and regulatory arrangements for NBN Co?

    a. This should include coverage of the requirements of the statutory review of the telecommunication industry access arrangements required under the *Competition and Consumer Act 2010*.

3. How should the activities of NBN Co be constrained given its mandate to efficiently build, operate and maintain a wholesale-only access network?

    a. This should include consideration of the issues associated with infrastructure based competition and the economic benefit of alternatives.

    b. Recommendations should be made on the structure of the Australian wholesale broadband market, including regulatory arrangements.

4. How should NBN Co's capital investment, products and pricing be reviewed and regulated?

    a. This should consider advice on how products should be structured to promote efficiency, consumer choice and competition.

    b. This should also consider, in the context of NBN Co's proposed pricing structure, the extent to which retail price controls should be continued.

Appendix 2 - Current broadband industry structure and regulation

The Australian broadband market

Broadband services are delivered using a range of technologies to homes and businesses across the country.

Fixed-line networks

Telstra operates the most extensive fixed-line telecommunications customer access network nationally, providing near ubiquitous coverage to all Australian premises. Telstra and other RSPs use this to deliver broadband services via asymmetrical digital subscriber line (ADSL) technology which relies on Telstra's extensive network of twisted copper pair lines. Approximately 9.9 million premises (91 per cent) have access to fixed line broadband services delivered via ADSL technology[40] by Telstra or other RSPs. As at December 2013, there were approximately 4.9 million DSL subscribers[41].

The remaining fixed line broadband access networks include:

- Telstra's HFC networks in Sydney, Melbourne, Brisbane, the Gold Coast, Adelaide and Perth, capable of serving approximately 2.5 million premises[42];
- Optus' HFC networks in Sydney, Melbourne and Brisbane, capable of serving approximately 1.4 million premises[43];
- TransACT/iiNet's HFC networks in Victoria (coverage not publicly available) and FTTN networks in the ACT, capable of serving approximately 60,000 premises[44];
- Telstra's FTTP networks in South Brisbane, capable of serving more than 13,000 premises[45] and Velocity new housing estates;

40 Source: Department of Communications, Broadband Availability and Quality Report, December 2013, p.3.

41 Source: Australian Bureau of Statistics 8153.0 - Internet Activity, Australia, December 2013.

42 Source: ACCC Emerging Market Structures report (June 2003), p.52.

43 Source: Optus submission in response to the ACCC's Draft Determination on the Application for Authorisation of the HFC Subscriber Agreement between NBN Co Limited and SingTel Optus Pty Ltd and other Optus entities, p.8.

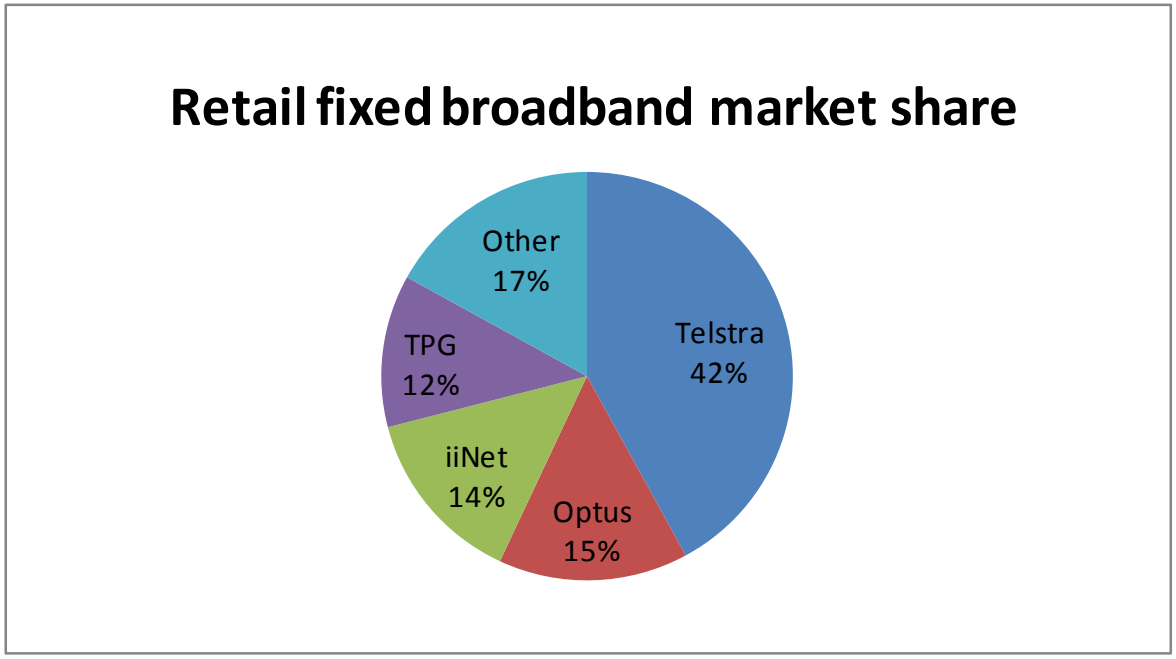
44 Source: Paul Budde Communication Pty Ltd: Australia - Telco Company Profiles – TransACT Communications Pty Limited (April 2011), p.2.

- NBN Co's FTTP network, currently capable of serving 513,280 premises[46]; and
- smaller carriers' networks, which include FTTP networks in new housing developments.

As of December 2013, there were around 944,000 HFC subscribers and 167,000 fibre subscribers[47]. As at 31 July 2014, NBN Co's FTTP network had 168,790 active services[48].

In terms of retail market share of fixed broadband services, the ACCC reports that, as at June 2013, Telstra had 42 per cent, Optus 15 per cent, iiNet 14 per cent, TPG 12 per cent with others (including the M2 group which owns Primus and Dodo) making up the remaining 17 per cent[49] (see Chart A2.1).

Chart A2.1: Retail fixed broadband market share



Source: ACCC report: Telecommunications competitive safeguards for 2012–13.

45 Source: Telstra media release: South Brisbane exchange migrations completed http://exchange.telstra.com.au/2013/01/24/south-brisbane-exchange-migrations-completed/

46 Source: National Broadband Network – Rollout Information, 31 July 2014.

47 Source: Australian Bureau of Statistics 8153.0 - Internet Activity, Australia, December 2013.

48 Source: National Broadband Network – Rollout Information, 31 July 2014.

49 Source: ACCC report: Telecommunications competitive safeguards for 2012–13, p.26.

Mobile and wireless networks

There are three mobile network operators in the Australian mobile market: Telstra, Optus and Vodafone Hutchison Australia (VHA). While mobile networks were originally constructed to provide voice services, the opportunity of providing high-speed and reliable broadband over these networks has seen these carriers upgrade their networks to provide enhanced data services, first over 3G and now over 4G/Long Term Evolution (LTE) technology.

Analysis undertaken by the Department of Communications for its December 2013 Broadband Availability and Quality Report estimates that, nationally, approximately 8.8 million premises (81 per cent) have access to a 3G mobile broadband service and about 6.4 million premises (59 per cent) have access to a 4G mobile broadband service.[50] Telstra has recently announced the extension of its 4G network coverage to 85 per cent of the population.

Mobile broadband can be accessed via mobile handsets, tablet devices and laptops as well as PCs using wireless modems and dongles. As at December 2013, there were more than six million mobile broadband subscribers.[51]While network coverage and adoption of mobile broadband is widespread, it is still considered as complementary to fixed-line networks. The ACCC reports that the amount of data downloaded in Australia increased by 59 per cent between June 2012 and June 2013, but of the data downloaded, less than three per cent was downloaded using mobile broadband networks.[52]

There are also a limited number of fixed wireless networks, typically operated by smaller carriers in specific regional areas where fixed-line services are not available. Following the rollout of comprehensive 3G and 4G services, many of these providers are now reselling mobile broadband services and are also beginning to retail NBN Co's wireless service. As at December 2013, there were approximately 48,000 fixed wireless subscribers across all networks.[53] As at 31 July 2014, NBN Co's fixed wireless network covered 115,468 premises, with 18,548 active services.[54]

50 Source: Broadband Availability and Quality Report, p.34.

51 Source: Australian Bureau of Statistics 8153.0 - Internet Activity, Australia, December 2013 (note: The ABS reports that, as at 31 December 2013 there were 20.3 million mobile handset subscribers in Australia; for its figures for mobile internet subscribers, the ABS advises that ISPs with more than 1000 subscribers were asked to report the number of subscribers with internet access connections via a mobile handset, as at 31 December 2013).

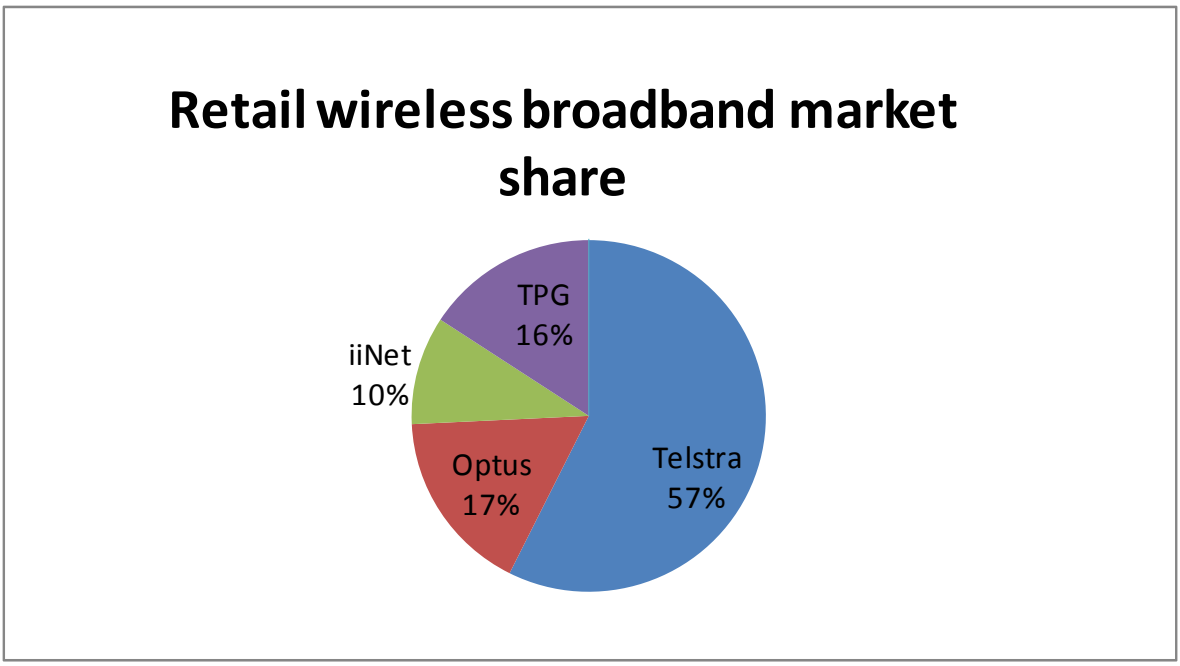
52 Source: ACCC report: Telecommunications competitive safeguards for 2012–13, p.19.

53 Source: Australian Bureau of Statistics 8153.0 - Internet Activity, Australia, December 2013.

54 Source: National Broadband Network – Rollout Information, 31 July 2014.

In terms of retail market share of wireless broadband services, the ACCC reports that Telstra had approximately 58 per cent, Optus 17 per cent, VHA 10 per cent and others (including iiNet, Primus and TPG) 16 per cent as at 30 June 2013[55] (see Chart A2.2).

Chart A2.2: Retail wireless broadband market share



Source: ACCC, Telecommunications competitive safeguards for 2012–13.

Satellite networks

In addition to terrestrial networks, all areas of Australia are covered by satellite broadband networks. However, as the service quality is relatively low compared with fixed networks and the costs of establishing and operating the networks are high, satellite is mainly used for connecting customers in outer regional and remote areas where no other economically feasible technologies are available. As at December 2013, there were approximately 91,000 satellite broadband subscribers in Australia.[56]

From July 2011, NBN Co began offering its Interim Satellite Service (ISS) which resold capacity on existing satellites owned and operated by Optus and IPSTAR. The ISS was limited to 48,000 services and reached capacity in December 2013, however, the NBN Co Satellite Support Scheme (NSS) will connect up to an additional 9,000 services until the expected launch of its LTSS in late 2015. NBN Co plans to launch two Ka Band satellites in 2015.

55 Source: ACCC report: Telecommunications competitive safeguards for 2012–13, p.35

56 Source: Australian Bureau of Statistics 8153.0 - Internet Activity, Australia, December 2013.

Backhaul networks

Backhaul is the part of the network carrying data from the Customer Access Network (CAN) to the service provider's point of presence. Telstra's high capacity inter-capital city and inter-exchange networks mean that it has by far the greatest network coverage of Australia's carriers. Optus has the second largest network, using a combination of fibre and radio technologies as well as leased capacity on others' networks. NextGen Networks is the third largest operator in this market with a network that links Australia's major capital cities and many of the larger regional centres.

Other providers in this market include TPG (through merging with Soul Pattinson Telemedia and its acquisition of AAPT and PIPE networks), Amcom, smaller providers who operate specific links (for example, Basslink) and utility providers.

In its 2010 advice to the then Government on the points of interconnection for the NBN, the ACCC advised that competition in the transmission capacity market had developed in many metropolitan and inter-capital markets and some regional markets. This meant that the vast majority of premises in Australia were served by competitive transmission routes.[57] This led the ACCC to advise the then Government that NBN Co should deploy 121 points of interconnection nationwide, extending its network footprint to, but not overbuilding, competitive backhaul routes. As such, it is necessary for RSPs to utilise backhaul networks (either their own or through a wholesale provider) to connect to NBN Co's points of interconnection.

Industry consolidation

Several internet service providers have pursued aggressive acquisition strategies as a way of building market share, particularly iiNet, M2 Communications and TPG. Among others, iiNet has acquired Internode, Westnet, Ozemail, Netspace, TransACT and Adam Internet. M2 now owns Primus, Dodo and Eftel. As noted above, TPG merged with SP Telemedia and bought Pipe Networks and AAPT.

Telecommunications competition regulation and broadband infrastructure

As part of the legislative framework surrounding the introduction of full infrastructure competition in 1997, Parts XIB and XIC in the then *Trade Practices Act 1974* (now the CCA) created a special regime for regulating anti-competitive conduct in the telecommunications

57 ACCC Advice to Government on National Broadband Network Points of Interconnect, November 2010, p.23.

industry and a telecommunications access regime. These regimes are discussed in the panel's *Statutory Review*. Various amendments have been made to these parts since then.

Broadband infrastructure developments in Australia from 1997 to 2008 were significantly influenced by the access provisions contained in Part XIC and the way in which they were administered by the ACCC.

Before access-seekers can gain regulated access to a service, it must first be declared. The ACCC can 'declare' carriage services and related services following a public inquiry to determine whether declaration would promote the long-term interests of end-users. Where a service has been declared, the standard access obligations require an access provider to supply the service to an access seeker upon request, subject to specified limitations and exceptions. The SAOs set out key principles for providing access to the service, including in relation to technical and operational quality, fault detection and rectification, ordering and provisioning, billing information and interconnection of facilities.

The ACCC has declared wholesale access to a suite of bottleneck services on Telstra's network, allowing access seekers to resell key services. In 1999, the ACCC declared the ULLS. This imposed a legal requirement on Telstra to provide local loop access to competitors' Digital Subscriber Line Access Multiplexer (DSLAM) equipment in its exchanges, which are used to provide DSL broadband services.

Broadband ADSL services were initially limited by Telstra to 1.5 Mbps download speed and were bundled with PSTN voice services. However, other providers, using their own DSLAMs, pioneered offering ADSL2+, which is now the dominant fixed-line technology for accessing the internet. Some providers also pioneered offering 'naked' broadband services without a PSTN voice service.

While the ACCC's declaration of the ULLS led to competition in all CBD exchanges and almost 80 per cent of metropolitan exchanges, only 13 per cent of regional and rural exchanges, and less than one per cent of remote exchanges, have competitive DSLAM equipment installed.[58]

Other than DSLAM exchanged-based infrastructure, facilities-based competition in Australia only evolved in markets where costs were low and/or revenues high, for example, CBDs, backhaul, mobile, and in those high value residential areas where Optus rolled out its HFC network. Apart from the deployment of broadband equipment in exchanges and wireless services, significant investments by competitors to Telstra in next generation fixed access infrastructure has not occurred since the end of Optus' rollout.

58 Source: ACCC report: Telecommunications competitive safeguards for 2012–13, p.24.

One exception to this was TransACT. Between 2000 and 2004, as Phase-1 of its network rollout, TransACT deployed a VDSL network in Canberra using an FTTN architecture. TransACT's FTTN network passed approximately 60,000 premises. However, as Phase-2 of its network rollout, TransACT opted to use Telstra's ULLS to provide ADLS2+ services to the majority of the remaining premises in Canberra and in nearby Queanbeyan, and from 2009 onwards restricted its FTTP deployments to new housing developments. Another exception was Neighbourhood Cable, now a subsidiary of TransACT, which was operating a HFC network rollout in regional Victorian cities Mildura, Ballarat and Geelong in 2003. TransACT's deployment was underwritten by ACTEW, Canberra's monopoly supplier of water and power and directly and indirectly subsidised by ACT ratepayers, who bore the ultimate burden of the losses it incurred.

Given the limited scope of these deployments, Telstra remains the sole infrastructure access provider to a large number of premises. As at June 2013, of the more than 9.4 million voice and broadband services provided over its network, just over 1.3 million services were provided by competitors using the ULLS and just over 630,000 services were provided using the line sharing service.[59]

Causes for the slowdown in fixed-line infrastructure investments

Two related causes for the slowdown in investment in fixed line infrastructure can be identified: the access regime proved ineffective in promoting innovation and investment, in part because of the way in which regulated prices for access were determined; and the chilling effects this had on investment were prolonged and aggravated by uncertainty over who would upgrade the last mile of the customer access network as a whole, combined with concerns that upgrading would strand existing DSLAM investments.

Under the telecommunications access regime, as it applied following the introduction of full competition in 1997, access seekers would first of all negotiate terms of access with the access provider and then seek arbitration from the ACCC if negotiations could not produce acceptable terms. This negotiate-arbitrate model proved to be slow, cumbersome and vulnerable to gaming. Between the introduction of full competition in 1997 and amendments being made to the relevant legislation in 2010, 182 access disputes were lodged with the ACCC for resolution. One access dispute relating to ULLS access that was notified to the ACCC in early 2005 was not fully resolved until late 2007, even though previous arbitrations on ULLS had been made. Each arbitration only applied to the parties to the dispute and did not have wider application to supply as a whole. Increasingly, judicial reviews of the ACCC's decisions were being sought, further slowing down resolution of access disputes.

59 ACCC, Snapshot of Telstra's customer access network as at June 2013.

While those features of the regime would have undermined investment and innovation in any event, their effects were significantly worsened by the ACCC's approach to determining access prices for declared services, particularly for access to infrastructure (as against resale services), where the approach was based on the total service long-run incremental cost (TSLRIC) concept. TSLRICs were calculated using the hypothetical costs of an optimised 'new build' network, rather than being based either on current replacement costs (that is, the cost of replacing the existing assets) or on embedded (that is, historical) costs. In general terms, the aim was to establish the minimum level of payments that would have been required to compensate an access provider for building at each date a new network to provide the service in question. The entirely hypothetical nature of this exercise made it inherently contentious and incapable of objective testing; the ACCC's approach, of redetermining these hypothetical costs at virtually every dispute, then made the results even more unpredictable. In practice, the redetermination of prices from time to time by the ACCC typically led to regulated prices falling substantially over the period from 1997 at rates that far exceeded conceivable increases in productivity.

The net result was that an infrastructure provider had little if any chance of recovering the costs it incurred in developing new infrastructure supporting declared services, or faced the threat of future service declaration limiting its cost recovery ability. In contrast, the price setting processes followed in other sectors have typically involved a far more mechanical approach, that relies on establishing an opening Regulated Asset Base and then allowing for it to be rolled forward, determining an essentially fixed price path over a multi-year period.

Somewhat paradoxically, the ACCC abandoned its TSLRIC approach just as a new network – the NBN – began to be deployed, largely eschewing its previous focus on optimisation despite the efficiency questions that must arise when investment and operations decisions are taken by a heavily subsidised, government owned, monopoly. The pricing principles now being used by the ACCC for telecommunication services are more akin to those used for other utilities such as energy and largely lock in the investments NBN Co makes.

Partly reacting to the uncertainty surrounding access prices, during 2005 to 2007, Telstra proposed building an FTTN network in Sydney, Melbourne, Brisbane, Adelaide and Perth to provide access to broadband speeds of up to 24 Mbps. The plan relied on a substantial financial contribution from the Government to cover deployment outside metropolitan areas, and sought what amounted to a 'regulatory holiday' from access conditions – particularly from future ACCC pricing determinations – through a favourable SAU. The then Government rejected the proposed approach largely because the ACCC considered the rate of return Telstra was seeking to be too high, and because of concerns that by extending the network from the exchange to the node, Telstra would be cutting off the DSLAM investments that its competitors had made.

On 20 April 2007, the G9 consortium submitted a draft SAU to the ACCC. This was followed on 30 May 2007 by the lodgment of a 15-year SAU by FANOC, a company created by the G9. The FANOC SAU outlined broad conditions for third parties to access bitstream services on an FTTN network, utilising Telstra's existing copper infrastructure. The project was initially to be deployed in the five mainland State capital cities and then to the more densely populated regional centres. The FANOC SAU contained details on the basic bitstream services to be offered and associated pricing. It also contained a methodology for calculating future access prices. The ACCC's draft decision[60] was that it was not satisfied that some terms and conditions in the FANOC SAU were reasonable. In particular, the ACCC concluded that FANOC had too much discretion to determine price and non-price terms of conditions.

Given that the major telecommunications players had not been able to put forward acceptable proposals, on 18 June 2007, the then Coalition Government announced that it would establish an Expert Taskforce to conduct an open and transparent process for assessment of bids to build an FTTN network. Due to the change of Government later that year, this process was never completed.

In 2008, the new Labor Government initiated a competitive process to allocate funding of up to $4.7 billion to assist carriers with the business case to build an FTTN broadband network. Six proposals were lodged, but Telstra's proposal was found to be non-compliant. The panel that assessed the proposals found that none represented value for money.

The establishment of NBN Co and amendment of the telecommunications access regime

In April 2009, NBN Co was established as a new national, wholesale-only next generation broadband platform that would operate on an open access and non-discriminatory basis to support fair and effective retail level competition. The establishment of NBN Co also addressed concerns about Telstra's dominance in the broadband market, primarily through providing a vehicle for the structural separation of Telstra by the progressive migration of its customers to the NBN.

At the same time that the Government announced that it would build the NBN, it indicated it would consider reforms to the telecommunications regulatory regime. This led to a package of legislation being put forward in 2010 to address Telstra's vertical integration by providing for its functional or structural separation and enhance the access and anti-competitive conduct regimes. The majority of these reforms were to Part XIC of the Trade Practices Act, now retitled the CCA.

60 http://www.accc.gov.au/regulated-infrastructure/communications/fixed-line-services/g9-fanoc-fibre-to-the-node-sau/draft-decision

Key changes to the telecommunications access regime

Since it was clear the 'negotiate-arbitrate' approach was not producing effective outcomes for industry or consumers, Part XIC was amended to allow the ACCC to set up-front price and non-price terms and conditions of access to declared services through access determinations. Access Determinations provide access seekers with an effective benchmark to fall back on in their negotiations with access providers.

The ACCC was also given the power to make binding rules of conduct for the supply of a declared service where it considers that there is an urgent need to address problems relating to the supply of that service. Although no binding rules of conduct have been made, industry submissions to the panel showed that they are viewed as an active deterrent to anti-competitive behaviour.

The process for assessing SAUs was also changed to allow the ACCC to suggest changes to the SAU while the assessment process is underway, rather than rejecting it and requiring the party to re-lodge it from scratch.

The changes to Part XIC also established a legislative hierarchy, in that, terms and conditions of access have priority depending on where they are set out. Access agreements have priority (on the basis commercially negotiated agreements should prevail), SAUs follow, then binding rules of conduct, then access determinations. However, terms in an access determination will apply where they are not inconsistent with an access agreement, SAU or binding rules of conduct.

Regulation of NBN Co

NBN Co is subject to the controls established in the PGPA Act and is subject to the existing telecommunications regulatory regime. NBN Co has not been given any statutory monopolies as such but special rules apply to broadband networks built, upgraded, altered or extended after 1 January 2011 and capable of delivering more than 25 Mbps to residential and small business customers. Given its unique status, NBN Co is subject to specific legislative provisions.

All services that NBN Co supplies are automatically declared and as such are subject to regulation by the ACCC. This reflects the view that the NBN, as a bottleneck access provider, should be subject to regulation from the start.

To prevent NBN Co favouring particular downstream customers, its service terms and conditions must be transparent and the company must supply services on a non-discriminatory basis. Any differences between the access agreements of NBN Co's customers must be reported to the ACCC and made publicly available on the ACCC's website. Originally, it was proposed that NBN Co would be able to discriminate where it would aid efficiency.

However, this was rejected by the Parliament largely because of concerns from smaller providers about NBN Co favouring Telstra, for example, through offering volume discounts.

The NBN Companies Act seeks to ensure that NBN Co operates as a wholesale-only provider of telecommunications services. NBN Co is limited to supplying carriers and carriage service providers. This responds to concerns about Telstra having the ability and incentive to favour its own retail operations. There is a statutory exemption for NBN Co to provide services to utilities providers that use these services for internal purposes only.

A key part of the regulatory framework that governs the price and other terms upon which NBN Co supplies services is its SAU. This document, prepared by NBN Co and accepted by the ACCC in December 2013, will apply until June 2040. It can be varied at any time with the agreement of the ACCC, and after the initial build period, key terms will be assessed by the ACCC every three to five years.

NBN Co has entered into a standard form of access agreement with its customers to underpin their commercial relationships. The agreement is known as NBN Co's WBA, which is its standard contract. As at 15 April 2014, 44 retail service providers had signed a WBA.

To focus its operation, NBN Co is also limited to operating in the telecommunications market and cannot provide content services.

The legislation also established powers for the functional separation of NBN Co and for the Government to require NBN Co to transfer or divest assets. It provides for the making of licence conditions about services that NBN Co can and cannot supply. The legislation also establishes reporting obligations on NBN Co which would apply if it was no longer wholly Commonwealth-owned.

To enable the Government to pursue its NBN deployment objectives, including coverage and network speeds, the NBN Companies Act sets out the framework for the future privatisation of the company. The process involves an inquiry and report by the Productivity Commission, examination of that report by a Parliamentary Joint Committee, and the Finance Minister declaring that conditions are suitable for the sale through a legislative instrument that can be disallowed by the Parliament.

Until this occurs NBN Co is required to comply with Part 3 of the PGPA, which involves notifying the Shareholder Ministers of significant events, keeping the Shareholder Ministers informed on operational matters and providing a corporate plan each year. It also means that NBN Co is subject to non-legislative directions through Statements of Expectations and directions from the Shareholder Ministers.

Parts 7 and 8 of the Telecommunications Act and associated provisions in the CCA apply special rules to broadband networks built, upgraded, altered or extended after 1 January 2011

and capable of delivering more than 25 Mbps to residential and small business customers. Unless otherwise exempted, such networks must offer a wholesale Layer 2 bitstream service on a transparent, open access and non-discriminatory basis. The Layer 2 bitstream service is defined by the ACCC, which also determines the maximum price for it. Further, such networks must be operated on a wholesale-only basis. These provisions seek to provide end-users of such networks with service outcomes similar to those available to customers on NBN Co's network. In effect, they also limit the commercial attractiveness of high-speed network deployment and therefore, reduce the number of competitors that NBN Co would otherwise face.

Appendix 3 - Current arrangements for funding the USO and the TUSMA Agreement

Since 1 July 2012, the USO and other public interest services have been delivered under a new, contract-based model overseen by the TUSMA. The most significant element in these arrangements is a 20-year contract with Telstra for the supply of public interest services, including:

- the USO for standard telephone services and payphones;
- Telstra's role as the Emergency Call Person for the emergency call service (subject to a competitive tender to be run by 23 June 2016); and
- migration of voice-only customers from Telstra's copper network to the NBN fibre network.

The contract, commonly known as the TUSMA Agreement, imposes a number of additional USO-related obligations on Telstra. Telstra must maintain its copper network throughout the country until elements of it are disconnected and services migrated to the NBN in accordance with the SSU and the Migration Plan. In effect, this means that Telstra must maintain its copper network outside the NBN fibre footprint. Furthermore, the contract requires Telstra to supply standard telephone services within the fibre footprint using the NBN fibre network. It is expected that the TUSMA Agreement will be renegotiated to incorporate the changes required by NBN Co's new MTM model. In particular, if copper assets were transferred to NBN Co the obligation may rest there rather than with Telstra.

The TUSMA Agreement also requires TUSMA to fund the costs of migrating payphones from copper to an alternative technology.

This contract represents a negotiated outcome of discussions between the Government and Telstra. Services provided under the Agreement, as well as TUSMA's other contracts and administrative costs, are funded by a combination of Budget appropriation ($50 million per annum in 2012-13 and 2013-14; $100 million per annum from 2014-15 onwards for the life of the TUSMA Agreement) and a consolidated TIL payable by carriers with annual eligible revenue of $25 million or more.

The TIL operates on a cost-recovery basis, which makes it difficult for the Government to fund new policy objectives through the TIL. It can only be used to fund policy objectives outlined in the *Telecommunications Universal Service Management Agency Act 2012* or under the TUSMA Regulations.

Appendix 4 - NBN Co's Fixed Wireless and Satellite Review

NBN Co's Fixed Wireless and Satellite Review considered the options of demerging and divesting the fixed wireless business and satellite business from NBN Co. It concluded that divestment would raise many questions[61]. On balance, the review assessed that the demerger and divestment option for its satellite and fixed wireless businesses did not provide financial benefits to NBN Co and should not be pursued. The panel considers the concerns raised in this NBN Co Review can either be satisfactorily addressed through alternative arrangements as part of divestiture processes or are not reasons to reject the demerger of the satellite and fixed wireless businesses.

As a general matter, the panel does not believe the criterion for assessing market structure should be whether particular arrangements are or are not financially beneficial to NBN Co; rather, the structural options need to be assessed in terms of their impacts on the Australian community. Moreover, the Review seems to consider potential difficulties with a disaggregated approach without considering any potential benefits, including those that would accrue directly to the Commonwealth. As a result, the finding reached in NBN Co's Review is at best a partial assessment of the relevant issues. Instead, the question is whether the concerns the Review identifies can be dealt with in a manner that advances the public interest as a whole.

A disaggregation of NBN Co would create the need to address clearly and transparently the issues that the Review raises, and this is a strength, not a weakness, of this approach. By contrast, if the current NBN Co structure is allowed to persist, there is a substantial danger these issues will not be properly addressed, undermining the efficacy with which NBN Co is regulated, increasing the risk of poor decisions and compromising the goal of ensuring taxpayers and consumers achieve value for money from their investment in high-speed broadband infrastructure.

Nine questions were posed in NBN Co's Fixed Wireless and Satellite Review:

- How to arrange the required subsidy streams as the cash-flow of the satellite and fixed wireless businesses are negative for virtually every year forever?
- How to adequately ensure the full service obligation is passed to that entity?
- How to balance NBN Co's unique coverage requirements for fixed wireless towers against the need to generate profits by minimising tower build costs?

61 See NBN Co, Fixed Wireless and Satellite Review, Final Report, May 2014, sections 6.2, page 50 and section 12.3, page 76.

- How to ensure Government retains the option to specify/approve modified minimum performance levels?
- How to make private ownership of a business that requires subsidisation (or cross-subsidisation) financially attractive for another owner?
- How to regulate the competition between NBN Co and the entity such that it is beneficial but does not waste subsidies?
- How to ensure the adverse impact on NBN Co's financials is acceptable?
- How to account for reduced NBN Co operational flexibility on hard to reach premises in the fixed line footprint?
- What degree of retail competition is required on the divested fixed wireless/satellite infrastructure and – by extension – how should RSPs be enabled to work on both national infrastructures effectively and efficiently, and switch end-users seamlessly?

The panel's response to these questions is set out below.

In relation to subsidy streams and full service obligations, any subsidy that may be required can be sourced from either general revenue or a specific levy on industry (including NBN Co). Presumably ongoing subsidy for service provision in wireless areas is already factored into NBN Co accounts. Replacing this with funding from general revenue or an industry levy would provide offsetting future savings for the company.

Full service obligations for fixed wireless and satellite delivery can form part of contractual arrangements at the time of divestiture, as would coverage obligations – decisions about remaining fixed wireless tower construction should be left to the purchaser. It is possible that new developments, including use of 700MHz spectrum which is now being used internationally for both fixed wireless and mobile service, will result in the successful tenderer adopting (to the extent existing contractual arrangements allow) a quite different delivery approach to the one chosen by NBN Co. More generally, it is likely such an owner would more aggressively pursue economies of scope with other wireless markets, and be more willing than an integrated NBN Co would be to deal fairly with any competitors NBN Co may face to its fixed network.

The question concerning how to ensure Government retains the option to specify/approve modified minimum performance levels is a very important one, not least because that option will be required when NBN Co is privatised. In the short term, the Government could retain this ability as part of its contractual arrangements. In the longer term, performance standards should be established using the approach set out in chapter 9, whereby proposed new standards are subject to independent review before being adopted. The Government's scope to thus vary the standards would be mirrored in the conditions of sale.

The assets being divested would have the financial attraction of a potential ongoing subsidy stream. As part of the divestiture processes outlined above, tenderers could be asked to bid for specified assets coupled with an obligation to supply and operate the required services in the specified footprints – to the extent an ongoing subsidy was sought, tenderers could specify what that amount would be or the formula by which it would be determined and (where appropriate) revised. An important benefit of that approach is that it would ensure market testing of the subsidy required – in contrast, as noted in the report, in the absence of market testing the complexities involved in assessing required subsidies make it unduly hazardous to impose any kind of levy scheme in the near future.

This approach would also avoid concerns about subsidies being wasted. To the extent to which market testing demonstrated a subsidy for supply of fixed wireless and satellite service was required, it would be limited via the tender process to customers in the required coverage areas. There would therefore be no risk of wasted subsidies because the subsidies would be confirmed by market testing and they would be confined to the footprint requiring subsidisation. Moreover, the subsidy could be designed to 'follow the customer', allowing competitive neutrality in the supply of infrastructure and retail services.

Removing the NBN Co cross-subsidy associated with the wireless networks also gives its remaining parts greater scope to compete. Those opportunities could be further enhanced if financial support that might be required in the future to assist with provision of any inherently loss-making service operations were provided through demand-side subsidies rather than direct payments to NBN Co (or other carriers) or through cross-subsidisation within NBN Co's FTTx activities – see chapter 8.

Satellite and fixed wireless divestiture processes will provide information about the forward-looking costs of servicing customers in the wireless footprints. A comparison between those revealed costs with the corresponding figures in NBN Co's Regulated Asset Base under NBN Co's SAU should allow the ACCC to establish – or confirm – that wholesale prices going forward (of both NBN Co and the new operators of the wireless assets) are reasonable and meet the normal criteria of Part XIC. To the extent those values imply a capital loss on the infrastructure investment decisions already made, it is better if that loss is brought to account early, rather than taxing consumers through excessive costs into the future.

With regard to any potential adverse impacts on NBN Co's financial position and prospects, as indicated above the panel strongly advocates against retaining any particular structure merely because the business prospects of NBN Co would be most assured. To do so would be entirely inconsistent with the National Competition Principles the Commonwealth adopted in 1995 and would arguably breach the spirit, if not the letter, of the Competition Principles Agreement. Moreover, those impacts must be weighed against the likelihood of attracting private investment sooner than would be the case in the current model. That would relieve

the pressure on taxpayers and make it more likely that deployment could proceed fully and efficiently.

The issue of reduced NBN Co operational flexibility on hard-to-reach premises in the fixed line footprint could be addressed by NBN Co seeking service supply from satellite operators or itself tendering for supply of fixed wireless services for the premises in its FTTx footprint where it has a service-provision obligation. That would ensure NBN Co did not incur excess costs in addressing any gaps in its coverage area.

With regard to retail competition, the divestiture processes could require both the satellite and fixed wireless operator to each provide the opportunity for access seekers to access all customers in their footprint via a specified maximum number of POIs. It is understood that RSPs offering satellite services will now only have to access one POI and a similar arrangement – or at least a smaller number of POIs than currently planned – could apply to the fixed wireless network. By reducing access costs for smaller RSPs, this would ensure greater retail competition than seems likely under the current structure. In any event, the situation of concern described by NBN Co – how should RSPs be enabled to work on both national infrastructures effectively and efficiently, and switch end-users seamlessly – overlooks the fact that RSPs currently acquire a range of services from different suppliers and that there are market intermediaries (most obviously the wholesale suppliers) who provide efficient aggregation services. Finally, if facilitating seamless service and portability were concerns, they could be dealt with by ensuring commonality of the RSP access platforms used by the disaggregated entities, were the ACCC to deem that reasonable.

Appendix 5 - New developments: Implementation of the panel's service-provisioning framework

This appendix provides further detail on how the panel envisages its proposed framework for new real estate developments might be implemented. It is intended as guidance only and the panel recognises that the Government will need to adapt the proposed approach in some areas in light of further information. It also recognises that given the long timeframe over which development proposals are planned and implemented, a long transitional process could be required. As such the overall framework relates to a 'steady-state' environment which may take some time to achieve, with full implementation perhaps not being achieved until the NBN rollout is nearing completion.

Objectives

The fundamental objectives the panel's approach seeks to achieve are:

- ensure people in new developments have ready access to quality, affordable high-speed broadband and voice infrastructure and services;
- create a level playing field for the competitive supply of such infrastructure and services;
- the funding of such infrastructure and service is economically efficient; and
- as far as possible, consistency of approach across markets (e.g. new estate developments versus brownfields).

Proposed framework

The key elements of the panel's framework, representing the steady-state outcome, are as follows.

Responsibilities and funding

1. Developers and end-users should be responsible for meeting the cost of the provision of telecommunications infrastructure in new developments.
2. State and Territory planning laws should be amended to ensure developers have appropriate telecommunications infrastructure provided in their developments.
3. NBN Co (or disaggregated business units) should have a legislated obligation to operate as a broadband IPOLR carrier, but on a cost recovery basis.
4. NBN Co (or a disaggregated business unit) would not be required to overbuild a development being serviced by another provider that was delivering NBN-consistent outcomes. (NBN Co would have IPOLR obligations, however, where the incumbent carrier failed to fulfil this role.)

5. Nothing would prevent NBN Co from overbuilding an estate where it considered it was commercially beneficial for it to do so. (This would place competitive pressure on other providers to develop optimal outcomes.)
6. NBN Co (or disaggregated business units) should be obliged to provide backhaul on a commercial basis to other carriers servicing new developments.
7. Carriers servicing new developments would be free to set their charges on a cost recovery basis and reflecting market factors (e.g. they may seek to recover some costs over time).

Carrier obligations

8. Carriers servicing new estates would be required to supply any wholesale service declared under Part XIC of the CCA. (Part 7 of the Telecommunications Act would be repealed.)
9. Carriers servicing new estates would need to comply with the separation arrangements under Part 8, amended as proposed by the panel. That is, carriers would need to be wholesale-only unless they have an undertaking accepted by the ACCC exempting them from this requirement.
10. If the Government is concerned to ensure appropriate solutions are provided in new developments on a nationally-consistent basis, it could establish minimum benchmarks for state and territory governments to reflect in their planning laws and/or for carriers to comply with in servicing new developments. (However, the panel notes that carriers are not normally subject to such requirements when otherwise entering the market.)
11. Minimum benchmarks could relate to aspects such as minimum broadband speeds to be offered, ability to support voice services and appropriate legacy services, and affordability.
12. Carriers servicing new developments would be subject to such access charges that were determined under Part XIC.
13. NBN Co, in setting its charges and non-price terms and conditions for new development solutions in its BCSU, would need to employ a commercial cost of capital so as to comply with competitive neutrality principles.

IPOLR arrangements

14. Pending the rollout of the NBN, Telstra should generally be the IPOLR in small developments where copper infrastructure is readily available and where copper is the most cost-effective option assuming and pending upgrade to FTTN.
15. Where a developer wishes to use NBN Co as IPOLR, it must provide NBN Co with notice that it will need to provide infrastructure by a pre-determined period (e.g. six months) in advance of trenches being opened/the estimated first occupancy date. NBN Co does not need to provide infrastructure earlier if it has not been given the notice required.

16. A competing carrier servicing a development would generally be expected to service all premises within the development. In the event it failed to do so, NBN Co would continue to have the obligation to service the premises as IPOLR. NBN Co could fulfil these obligations by overbuilding the development (thus providing an incentive for the incumbent carrier to service all premises) or by contracting with the incumbent carrier.
17. The incumbent carrier would be subject to such access charges that were determined under Part XIC which would restrict it from seeking excessive charges from NBN Co as the IPOLR.
18. As a safety net, the Government could indicate it reserved the right to impose an IPOLR obligation (generally or individually) by licence condition or statute on any carrier servicing a new development.
19. The Government could consider whether any future levy arrangements should also be used to provide financial assistance for service supply of outlier customers in new developments (e.g. an original farm house) that attracted significant IPOLR costs.

Pit and pipe

20. NBN Co should not be required to service a new development as IPOLR unless pit and pipe is provided by the developer.
21. Nothing (as is the case now) should prevent other carriers offering the provision of pit and pipe as part of a turn-key solution. Carriers are free to require the provision of pit and pipe and the transfer of its ownership as a condition of providing further infrastructure.
22. To facilitate the provision of quality pit and pipe infrastructure while fostering competition in its supply, industry should agree on lowest cost fit-for-purpose fibre-ready pit and pipe specifications, compliance with which will be acceptable to all carriers. If industry has failed to make substantive process toward this goal within six months of a government decision, the specifications should be prepared by the ACMA or the Minister.

Industry co-ordination

23. If it saw benefit in it, industry (for example, through the Communications Alliance) could consider:

a) mechanisms (e.g. a clearing house) to help co-ordinate strategic planning, the provision of infrastructure by competing providers across developments, bring network operators and RSPs together and inform consumers about who is servicing their estate;

b) an industry-based accreditation scheme to identify capable and experienced carriers to assist developers in their choice of provider; and

c) the merits of a common or standardised business-to-business interface for the wholesaling of services in new developments, potentially operated by NBN Co on a competitively neutral basis or another entity.

RSP obligations

24. Telstra will remain subject to its general USO to provide voice services Australia-wide, including in new developments.
25. Telstra should not be required to provide voice services in a development in which another provider is offering voice services.
26. If Telstra is required to provide voice services under the USO in a new development, subject to any regulatory requirements to the contrary, it is its commercial decision as to what platform it uses and it is free to provide the service by wireless technology if it chooses.

Transitional arrangements[62]

27. In established areas where Telstra has copper infrastructure, pending NBN Co being able to deliver broadband, Telstra should be able to continue to service small new developments with that infrastructure pending the availability of the NBN where it is cost-effective to do so, subject to rules being established about when a fibre, FTTN or HFC solution must be sought by the developer.
28. Telstra should be able to charge for copper infrastructure according to the same principles generally applying to the provision of telecommunications infrastructure.
29. End-user charging by NBN Co in new developments should be introduced as soon as practicable.
30. Infrastructure charging should apply immediately to all new development projects not already underway.
31. For developments already underway but for which infrastructure has not been contracted, pending acceptance by the ACCC of NBN Co's BCSU, infrastructure charging by NBN Co be introduced; initially at a low rate and then increased progressively over an appropriate period up to an acceptable maximum amount.

62 There are five broad transitional scenarios that need to be addressed: (1) Construction completed (NBN Co continues to supply; no developer charges; end-users charges); (2) Construction already underway to service development (NBN Co continues to supply; no developer charges; end-users charges); (3) Development already under contract to be serviced (try to terminate; NBN Co otherwise continues to supply; no developer charges; end-users charges); (4) Development planning (well) advanced and telecoms costs not factored in (graduated developer charges; end-users charges); (5) Earliest stages, full scope to factor in costs (full developer charges; end-users charges).

32. Charging for any NBN Co backhaul costs in excess of a specified reasonable amount should commence in line with NBN Co's introduction of network extension charges, or immediately if it is already being charged as part of standard carrier charging practices. Alternatively, a specified commencement date be determined in consultation with NBN Co and the ACCC.
33. In all instances, the new arrangements should be fully in place and operational as soon as practical.

Glossary of terms

ACCC	Australian Competition and Consumer Commission
ACMA	Australian Communications and Media Authority
ADSL	Asymmetric digital subscriber line
AVC	Access Virtual Circuit
BCSU	Broadband Connection Service Undertaking
CBA	Cost-benefit analysis
CBA Report	The panel's report on the cost-benefit analysis of the National Broadband Network
CCA	*Competition and Consumer Act 2010*
CVC	Connectivity Virtual Circuit
DPC	Data processing centres
DSL	Digital subscriber line
DSLAM	Digital subscriber line access multiplexer
DOCSIS	Data over cable service interface specification
FTTN	Fibre-to-the-node
FTTP	Fibre-to-the-premises
FTTx	Fibre to the x: a generic term for a range of fibre rollouts, including FTTN and FTTP among others
HFC	Hybrid fibre-coaxial
IPOLR	Infrastructure provider of last resort
kbps	kilobits per second
LSS	Line Sharing Service
LTIE	Long-term interests of end-users
LTSS	Long Term Satellite Service
Mbps	Megabits per second
MTM	Multi-Technology Mix
NBN	National Broadband Network
NBN Companies Act	*National Broadband Network Companies Act 2011*
NBN Co	NBN Co Limited
NPV	Net Present Value
OECD	Organisation for Economic Co-operation and Development
PDF	Product development forum
PGPA Act	*Public Governance, Performance and Accountability Act 2013*
POI	Points of Interconnect
Market and Regulatory Report	National Broadband Network – Market and Regulatory Report (this report)
RSP	Retail service provider
SAOs	Standard access obligations

Statutory Review	The panel's report on the Statutory Review under s.152EOA of the *Competition and Consumer Act 2010*.
SAU	Special access undertaking
SFAA	Standard form of access agreement
SNU	Super-fast network undertaking
SOE	Statement of Expectations
SSU	Structural Separation Undertaking
Telecommunications Act	*Telecommunications Act 1997*
TPG	TPG Telecom Limited
TUSMA	Telecommunications Universal Service Management Agency
ULLS	Unconditioned local loop service
USO	Universal Service Obligation
VDSL	Very-high-bit-rate digital subscriber line
VHA	Vodafone Hutchison Australia
WACC	Weighted average cost of capital
WBA	Wholesale broadband agreement