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1 5 APR 2014

Dr Michael Vertigan AC
Chair NBN Panel of Experts
NBN Cost-benefit Analysis and Regulatory Review
Department of Communications
GPO Box 2154
CANBERRA ACT 2601

Dear Dr Vertigan

VICTORIAN SUBMISSION TO THE NATIONAL BROADBAND NETWORK COST-BENEFIT ANALYSIS AND REGULATORY REVIEW

The Victorian Government welcomes the opportunity to contribute to the Commonwealth Government's Panel of Experts, '*Cost-benefit analysis of national broadband policy and review of the regulatory arrangements for the National Broadband Network*'.

The Victorian Government considers it vital that the Commonwealth Government's NBN fulfils the overriding objective to provide affordable, accessible and high-quality broadband infrastructure that meets the needs of Victorian businesses and consumers.

The attached Victorian Government submission reflects this expectation, as well as our desire to prioritise the NBN rollout to businesses in order to drive productivity, support regional economic development and help the transition of Victoria's economic base.

The submission proposes the implementation of a more market-based, competitive and demand driven approach to the NBN. Doing so will encourage greater innovation and diversity in broadband products and services to better serve Victorians in the short and long term and will ensure the most appropriate infrastructure is used in different markets to meet Victoria's needs.

If you have any queries in relation to this submission please do not hesitate to contact Mr Matthew Dummett, Director, Science and Technology Policy, Victorian Department of Business and Innovation on (03) 9651 9107. This submission may be made publicly available.

I wish the Panel well in its deliberations on this vital area of national telecommunications policy.

Yours sincerely

GORDON RICH-PHILLIPS MLC
Minister for Technology

Encl.

Victorian Government Submission

Cost-Benefit Analysis and Review of Regulatory Arrangements for the National Broadband Network - Regulatory Issues Framing Paper

Victorian Government Submission

To the Independent Panel

Cost-Benefit Analysis and Review of Regulatory Arrangements for the National Broadband Network

Regulatory Issues Framing Paper

April 2014

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Digital utility

Digital services are a general purpose technology "input'' for all Victorian businesses, government, and citizens (that is, they are a utility). High up-take and availability of digital services is important to realise productivity benefits for Victorians. A digital infrastructure system should be built with flexibility to enable it to adapt to emerging technologies and changes in consumer demand.

Policy stability and certainty

After a decade of broadband uncertainty, there is a pressing need for policy and regulatory stability to foster private sector investment and innovation for the long term. Once this framework is in place, the imperative for Victoria is an affordable, rapid, and well-targeted broadband upgrade in the State, to assist Victoria through the challenging structural changes occurring to its economy and to rectify past neglect of Victoria in NBN rollout priorities.

Key priority is "digital utility" and broadband affordability

The Victorian Government's overarching broadband aim is for the lowest price "digital utility" that meets users' coverage, and performance needs. Affordability for end users is the primary objective. Minimising NBN build costs is critical to avoid broadband prices escalating steeply over time. Timely rollout is also a key objective as no benefits can flow until people have access to the NBN. The positive network effects from universal access to a minimum standard of high speed broadband mean the timeframe for completing the national rollout is critical. Technologies that allow rapid rollout should be favoured.

Address supply gaps for business demand

The original NBN did not strike the right balance in its policy settings to maximise the benefits offered by the rapid rollout of a strategically-targeted and reasonably-priced high speed broadband network. Recent NBN rollout reports show Victoria has received only 17 per cent of the national fibre upgrades to existing premises, even though it has 25 per cent of the national population. Of particular concern are the significant gaps in broadband infrastructure and service availability relative to business demand that persist in regional areas.

Recent estimates from broadband demand-supply analysis conducted by Deloitte Access Economics for the Victorian Government show unmet demand for broadband by businesses across Victoria is substantial. Close to 100,000 businesses (25 per cent in regional Victoria) have unmet demand for FTTP services (services greater than 50 Megabits-per-second [Mbps]). The analysis also shows that 25,600 regional businesses in Victoria (24 per cent of all regional businesses) would take a 50-100 Mbps service if available, and an additional 5,000 would take an 8-50 Mbps service if it were available. Addressing this business shortfall will benefit all citizens by boosting economic activity. This demand analysis combined with the Commonwealth Government's supply work provides a powerful tool to effectively refocus NBN rollout priorities.

Fit-for-purpose NBN design

Adhering to the original NBN plan of providing all households and businesses with very high speed broadband based primarily on fibre-to-the-premises (FTTP) technology, well in excess of the foreseeable needs of most users, is unlikely to be economic. Rather, the Victorian Government encourages the Commonwealth to both (a) adhere to its broad pre-election 25 Mbps and 50 Mbps targets for 2016 and 2019 respectively and (b) strategically address the very high speed broadband needs of business precincts and individual customers with a combination of co-funding, network design and policy to minimise the cost of upgrade for businesses.

NBN design needs to allow for fibre deployment where there is demand

Additional FTTP connections should be designed into the network and rolled out by NBN Co where clusters of users with high speed needs exist and can be served efficiently. Specifically, these pockets of current and latent demand need to be identified. Furthermore, providing these additional fibre services when the area-by-area NBN rollout occurs will be more efficient than retrofitting, possibly requiring pre-rollout commitment from users to take fibre services. This needs to be done in parallel with universal availability of minimum speed services. In addition, to meet the needs of outlier users, co-funded fibre extension programs are necessary.

A proposed model for economically-driven and fair national rollout priorities

The Victorian Government proposes a rollout priority model that allocates rolling 3-year rollout volumes between the States on the basis of population, with the States working closely with the Commonwealth and NBN Co to determine intra-state deployment priorities on the basis of business demand gaps in underserved locations.

A mixed technology network approach

The Victorian government supports a mixed-technology approach using existing infrastructure where available, as it facilitates optimisation across the four outcomes objectives—affordability, availability, performance, and adoption.

To adequately address all users' requirements, the Victorian Government emphasises the need for a fit-for-purpose approach to network design. This can be achieved in a mixed technology environment, through:

- Fibre-to-the-node and HFC as the core technologies to provide the necessary base level of service to meet the requirements of the majority of users,

- A fixed network design that comprehends fibre-to-the-premises (or fibre to micro-nodes) being rolled out to pockets of businesses with very high speed demand and outlier individual users as the NBN is built, and scope to meet such needs in the future as demand evolves, and

- Use of 4G wireless technology as part of the NBN in regional, rural and remote areas.

Combining a revised NBN approach with the $100 million Mobile Coverage Program provides an important opportunity to quickly and effectively address the seemingly-intractable mobile infrastructure gaps across Australia and meet the more general demand for very high speed broadband in regional areas.

Competition and market structure

A key task for the Panel is identifying policies that minimise the resource cost of duplicated networks and the funding burden on NBN Co regional network on the one hand while maximising the efficiency benefits from infrastructure competition on the other.

The Victorian Government encourages the Panel to seriously consider opportunities for beneficial network competition. In particular, the Panel should not be constrained by previous policy reasoning for a nation-wide, government-owned statutory monopoly that provides wholesale high speed broadband services to all Australians. While challenging, the productive and dynamic efficiency rewards from the Commonwealth implementing statutory and regulatory frameworks that allow beneficial network competition to occur are potentially high.

The Victorian Government favours vigorous competition wherever possible—including at the retail level, through NBN open access and removal of backhaul cost barriers on non-contestable routes; and at the network level in all urban and the more densely populated regional areas. The Victorian Government emphasises the importance of NBN Co, given it is a government-owned partial monopoly, being no larger than is minimally necessary to achieve this aim, and avoiding substantial non-transparent cross-subsidies that inhibit competition.

Strengthening retail competition in regional areas is a particular interest of the Victorian Government. A number of smaller ISPs have submitted evidence to the ACCC on the challenges they face competing with their larger rivals in providing NBN-base broadband services in regional Australia. This is because backhaul imposes a major cost disadvantage relative to the large ISPs with their own backhaul infrastructure.

The Victorian Government, as a major user of regional telecommunications services, experiences a serious lack of retail contestability for fibre services to its regional government premises. Many of these sites are currently served by a single operator using its own proprietary fibre link, with no scope for fibre competition. Telstra has an extensive point-to-point fibre network already in place in Victoria.

The Panel is encouraged to consider opportunities to use Telstra's (and other carriers) fibre assets in relation to the NBN's policy objective and fibre needs. For example, this same approach could be used to provide the fibre backbone from which co-funded fibre lines to individual users could be built to service precincts that demand high speed broadband.

Universal Service Obligation (USO) policy should be reformed

The Victorian Government considers the voice-focussed specification of the USO has been superseded by the broadband revolution and requires major reform.[1] The Victorian Government posits that meaningful reform requires:

- Including a standard high speed broadband service in the USO,

- Specifying these services as technology-independent performance requirements (rather than network-specific services) that allow mobile services to qualify,

- Recognition of NBN Co's implicit role of wholesale service provider of last resort (thereby bearing the main financial burden of the USO),

- The associated appointment of a retail service provider of last resort, and

- Reconsideration of funding options.

Commonwealth-Victorian Government partnering

The Victorian Government is keen to work with NBN Co and the Commonwealth to scope and develop such initiatives, and notes that existing Victorian initiatives for regional fibre, greater mobile coverage, emergency services networks, and greater digital accessibility all align with the NBN.

Victoria is an attractive location to trial new NBN rollout approaches, including a strategically-targeted mixed technology fixed network complemented by coordinated mobile investment. Victoria's high population densities, compact geography, access to State Government telecommunications related infrastructure (including optic fibre, towers, buildings and land), and unique availability of detailed information on broadband demand-supply gaps mean it is an attractive test bed for these new approaches.

The Victorian Government submission makes a number of recommendations to the Panel.

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[1] The previous Commonwealth Government introduced a number of USO reforms, changing the USO from a statutory mandate (a Telstra licence condition) to a contractual obligation, introducing contestability, establishing TUSMA to manage USO contracts and the contestability process, and ensuring copper network retention beyond the 93 per cent NBN fixed network footprint. However, these changes have had limited visible impact to date.

Victorian Government Recommendations to the Panel

1. The Panel recognises, and recommends to the Commonwealth, that the key imperative is setting a stable broadband policy and regulatory environment, to revitalise private sector investment and innovation, for the long term, after a decade of change and uncertainty

2. The Panel acknowledges, and recommends to the Commonwealth, that prime attention be given to the affordability of NBN services

3. The Panel recommends to the Commonwealth that a speedy NBN rollout also be given high priority, with the rollout allocated between the States on the basis of population and rollout within each State prioritised on the basis of business demand-supply gaps

4. The Panel recommends to the Commonwealth that the results of the Department of Communications broadband availability audit be provided to the States, and the audit be complemented with demand analysis to guide rollout priorities

5. The Panel advises the Commonwealth (subject to cost-benefit analysis) to implement a strategic mixed technology approach, including; the Coalition's 25/50 Mbps targets, FTTP rollout to business and government precincts where demand warrants, and co-funded fibre extension programs available for outlier individual customers

6. The Panel advise NBN Co to develop consumer and business entry level services and pricing structures that will boost take-up, involving cooperative engagement with retail service providers (RSPs), and direct discussions with business and residential end users and state governments

7. The Panel gives serious attention to options for stimulating retail competition, including competition for fibre services to regional state government campuses through NBN use of existing third party fibre assets. Telstra and other operators have extensive point-to-point fibre network in place, and the Panel is encouraged to seriously consider the potential utility of open access to these networks in its competition deliberations

8. The Panel gives priority to identifying industry structures and policies that foster network infrastructure competition while minimising network duplication costs and NBN Co's regional cross-subsidy funding needs—with any policies selected still effective if NBN Co is privatised and no longer subject to direct Commonwealth control. Competition policy stability and certainty in particular is an imperative

9. The Panel develop and recommend to the Commonwealth an updated USO that (a) includes a standard broadband service, (b) specifies the USO in term of technology-independent performance, (c) recognises NBN Co's implicit role of wholesale service provider of last resort, (d) appoints a (contestably-selected) retail service provider of last resort, and (e) specifies a funding mechanism for the regional network cross-subsidy

10. The Panel advises the Parliament to retain four-yearly Regional Telecommunications Reviews, and the Commonwealth to commit to responding publicly to the findings

11. The Panel recommends to the Commonwealth that the Commonwealth, state governments and other stakeholders partner closely on the NBN and related digital infrastructure, through tangible projects with a level of accountability to both Commonwealth and state government Ministers.

Section 1:   Introduction

The Victorian Government strongly endorses the appointment of an independent Panel of Experts (the Panel) charged with conducting a cost-benefit analysis of broadband policy and reviewing the regulatory arrangements for the national broadband network (NBN). We encourage the Panel to be unconstrained in its purview by previous NBN policies, plans, and popular conceptions. The Panel needs to open-mindedly and transparently consider all reasonable current, medium term, and longer term policy and regulatory options, limited only by the broad dimensions of the pre-election *Coalition's Plan for Fast Broadband and an Affordable NBN*.

The Victorian Government supports subjecting all significant policy decisions to rigorous cost-benefit analysis to identify the most favourable options—not the least for the NBN with its potential for substantial economic and social benefits on the one hand, and large and potentially risky outlays of public funds on the other. But NBN cost-benefit analysis should not be restricted to network design and deployment. Choosing between regulatory options also warrants cost-benefit scrutiny given the inevitable trade-offs.

The Victorian Government submission provides a range of network design and policy options for the Panel to consider and makes a number of recommendations to the Panel, without usurping the Panel's critical role by advocating prescriptive solutions.

The submission is structured as follows:

• Section 2 presents an overview of key Victorian broadband imperatives,

• Section 3 discusses some critical trade-offs and synergies between NBN objectives,

• Section 4 provides the Victorian Government's overarching broadband objectives and principles,

• Section 5 provides a detailed consideration of eight priority broadband issues—affordability, availability, performance, adoption, infrastructure type, competition and market structure, regional needs and Commonwealth-State government partnering,

• Appendix A provides responses to the questions posed by the Panel, and

• Appendix B provides the results from the Deloitte Access Economics demand-supply analysis.

The submission does not address the detailed regulatory issues foreshadowed in the Framing Paper, noting there will be opportunities to comment on these matters as the review progresses.

Section 2:   Overview of Victoria's broadband needs

> **Recommendation 1:** The Panel recognises, and recommends to the Commonwealth, that the key imperative is setting a stable broadband policy and regulatory environment, to revitalise private sector investment and innovation, for the long term, after a decade of change and uncertainty.

The Victoria Government sees a pressing need for policy and regulatory stability to foster private sector investment and innovation, for the long term, after a decade of broadband uncertainty.

Once this framework is in place, the imperative for Victoria is affordable, rapid, and well-targeted broadband upgrade in the State, to assist the Victorian Government in addressing the challenging structural changes occurring to its economy and to rectify past neglect of Victoria in NBN rollout priorities.

2.1   Affordable high speed broadband services to drive economic growth

The Victorian Government has been concerned for some time that the original NBN did not strike the right balance in its policy settings to maximise the benefits offered by the rapid rollout of a strategically-targeted and reasonably-priced high speed broadband network. Of particular concern are the significant gaps in broadband infrastructure and service availability relative to business demand that persist in regional areas.

In response to these concerns, the Victorian Government recommends the Panel carefully test—using cost-benefit analysis—the veracity of a multiple-technology NBN that:

- Employs existing as well as new-build infrastructure—to avoid unnecessary stranding, reduce costs, and speed up of delivery,

- Strategically matches different users' foreseeable needs with network capability, including additional NBN-funded and co-funded fibre-to-the-premise (FTTP) where warranted,

- Quickly achieves affordable full coverage (availability),

- Encourages network competition as well as retail competition wherever markets allow,

- Optimises immediate cost and rollout completion requirements and the ongoing benefits from network competition,

- Prioritises rollout to underserved areas of Victoria—particularly regional areas and locations of business demand, and

- Reduces the risk of an on-budget Commonwealth Government (Commonwealth) contribution imposition on taxpayers.

If this NBN approach is supported by the Panel's cost-benefit analysis and adopted by the Commonwealth, the role of NBN Co will need to be re-defined. The previous deterministic objective of building and operating a high speed broadband network using FTTP

technology for 93 per cent of premises, and wireless and satellite technology for the rest, will need to be replaced with a more nuanced statement reflecting the following possible roles:

• Key national broadband investment coordinator,

• Network builder of last resort, and

• Prime wholesaler of Layer 2 high speed broadband access services.

2.2   Victorian regional broadband needs

Recent estimates from broadband demand-supply analysis conducted by Deloitte Access Economics for the Victorian Government show that 25,600 regional businesses in Victoria (24 per cent of all regional businesses) would take a 50-100 Mbps service if available, and an additional 5,000 would take an 8-50 Mbps service if it were offered. Hence prioritising regional demand for higher-speed broadband services would provide significant economic benefit to end users and more immediate revenues to NBN Co. These benefits, conservatively calculated as the spending increase from servicing regional premises with unmet demand for higher-speed broadband, are well in excess of $200 million per annum for regional Victoria alone.

Recent NBN rollout reports show Victoria has received only 17 per cent of the national fibre upgrades to existing premises, even though it has 25 per cent of the national population. The Victorian Government is concerned that this below-par rollout of high-capacity broadband services in the State, if continued, will damage Victoria's competitiveness and restrict its ability to absorb the closure of significant manufacturing activities (such as Ford and Holden) through new business activities. It would also restrict the efficient online delivery of government services to Victorians.

The Victorian Government places particular emphasis on closing regional business demand-supply gaps for high speed broadband as it is here that the mismatch is greatest. Victoria's economy is in transition and must quickly restructure to higher value industries which can create economic growth through use of world class digital infrastructure. The speed and effectiveness of transition depends on the early availability of this infrastructure. Addressing this business shortfall will benefit all citizens by boosting economic activity.

A rollout prioritisation approach that addresses past imbalances is proposed in Section 5.7.

2.3   Fit-for-purpose NBN design

Adhering to the original NBN plan of providing all households and businesses with very high speed broadband based primarily on FTTP technology, well in excess of the foreseeable needs of most users, is unlikely to be economic. Rather, the Victorian Government encourages the Commonwealth to both (a) adhere to its broad pre-election 25 Mbps and 50 Mbps targets for 2016 and 2019 respectively and (b),strategically address the very high speed broadband needs of business precincts and individual customers on a fit-for-purpose basis. Additional FTTP connections should be designed into the network

and rolled out by NBN Co where clusters of users with high speed needs exist and can be served efficiently. This needs to be done in parallel with universal availability of minimum speed services. In addition, to meet the needs of outlier users, co-funded fibre extension programs are necessary.

In short, demand considerations—in particular business demand for above-normal speed—as well as supply factors are critical in realising full benefit from NBN investment. The Victorian Government is keen to work with the Commonwealth, local councils, and other stakeholders on the design and implementation of such programs.

Combining a revised NBN approach with the $100 million Mobile Coverage Program provides an important opportunity to quickly and effectively address the seemingly-intractable mobile infrastructure gaps across Australia and meet the more general demand for very high speed broadband in regional areas. In the same way that a mixed-technology approach will deliver a more efficient fixed network rollout, so too would coordinating and leveraging regional fixed and mobile infrastructure rollout. Making this an explicit objective of NBN deployment would efficiently deliver elusive economic, social, and emergency management benefits in more remote areas.

Victoria is an attractive location to trial new NBN rollout approaches, including a strategically-targeted mixed technology fixed network complemented by coordinated mobile investment. Victoria's high population densities, compact geography, access to State Government telecommunications related infrastructure (including optic fibre, towers, buildings and land), and unique availability of detailed information on broadband demand-supply gaps mean it is an attractive test bed for these new approaches.

Section 3:   NBN trade-offs and synergies

The challenge for the Commonwealth in deciding the details of its "*Plan for Fast Broadband and an Affordable NBN"* is to opt for NBN technologies, network design, business model, and regulatory constructs that minimise the occurrence of costly trade-offs (potential benefits forgone), optimise outcomes where unavoidable trade-offs exist, and capitalise on available synergies.

> **Synergies**
>
> The key synergies the Victorian Government anticipates the Panel should consider are:
>
> • Maximising adoption and affordable pricing—greater adoption allows costs to be distributed over a greater base, which in turn allows yet lower pricing and realisation of benefits,
>
> • Using existing infrastructure and cost minimisation technology choice—FTTN allows investment to be staged, with fibre progressively moved closer to the premises as demand materialises. HFC has similar benefits within its footprint,
>
> • Cost minimisation and speed of deployment—copper upgrade (FTTN) can be deployed more quickly and cheaply than ubiquitous FTTP rollout, and existing HFC plant can be used to provide wholesale NBN services in its footprint sooner than ubiquitous FTTN rollout, and
>
> • Integrated use of fixed and mobile services—both need fibre nearer to people and premises.

3.1   Not all apparent trade-offs are real

The usual characterisation of the prime trade-offs in establishing a national high speed broadband network is tensions between cost, coverage, timeliness, and performance (speed).

While the Commonwealth's proposed mixed technology approach might be characterised as trading off performance in the interests of lower costs, faster rollout, and possibly wider coverage, the Victorian Government considers that viewing this as a trade-off is in practice more notional than real. The opportunity cost of foregoing FTTP speeds and opting instead for fibre-to-the-node (FTTN) speeds as the base level of performance is likely to be low. Where more significant speeds are necessary, the strategic deployment of higher speed solutions where there is demand can be pursued. Even with a degree of trade-off tension between some broadband objectives, there is also scope for synergies based on FTTN's lower costs, faster rollout times, and potentially wider coverage relative to FTTP (based on copper's bigger footprint).

Actual speeds experienced by customers in countries that have invested in fibre networks are typically well below achievable network speeds, as major content suppliers (such as Netflix in the United States) set the speed at which content is streamed to the minimum necessary to meet desired quality levels (typically 2-8Mbps). Even with an upgrade to ultra-high definition video (4,000 horizontal pixels—4K), Netflix advises that "consumers won't need more than about 15Mbps to stream 4K video files once the content is up and running on the site, which is

slated to happen within the next two years."[2] If and when the 4K revolution is televised, Netflix considers subscribers will only need 15Mbps to watch it.[3]

3.2   Key strategic trade-offs

The Victorian Government sees a number of strategic trade-offs risks facing the Commonwealth:

- A technology risk and a Telstra risk,

- A competition risk and a short term focus risk, and

- A pricing risk and a policy risk.

Table 1 describes these strategic trade-offs, with possible risk management strategies for the Panel to consider.

Table 1. Strategic trade-offs facing the Commonwealth and management of risk

Trade-offs	The alternatives		Risk management strategy
	This	**versus this**	
Technology Risk	Track the global market with a mixed technology approach and risk other countries getting ahead versus ------------------>	"Betting the farm" on a particular technology such as fibre or wireless as the way of the future with the risk of going down the wrong path	Mitigate the technology risk by being a fast follower of broadband network trends and keeping options open—for example able to extend fibre ever closer to the premises, or use small wireless cells rather than cable lead-ins
Telstra relationship	Leverage Telstra within the current financial envelope while retaining structural separation (for example, incorporating its hybrid fibre-coaxial cable (HFC) network in the NBN) versus ------------------>	NBN Co and Telstra continuing to act independently (either decommissioning the HFC network or letting it compete with the NBN),	Mitigating the rollout risk by Telstra playing a greater role in NBN construction and operation—transferring the construction risk to Telstra while achieving structural separation by NBN Co being the sole wholesaler of the NBN access services (fibre, copper, coax, wireless) provided to it by different network operators
Competition	Continue to clamp down on network competition to avoid the attendant investment duplication and NBN Co regional funding issues versus ------------------>	Allowing network competition and its associated costs to occur to reap longer term competition-induced technology innovation benefits	Mitigating the competition risk by allowing network competition but with the larger players (Telstra and Optus?) restricted to using existing infrastructure for 5 years, and requiring any of NBN Co's competitors reaching a certain size threshold to pay a levy to NBN Co to help fund its loss-making regional rollout
Short term / long term	Short term policy and regulatory solutions that address present needs versus ------------------>	Long term market power risks from these solutions, particularly if NBN Co is privatised	Mitigating the timing risk by choosing current policy and regulatory solutions that would manage any future NBN Co competition and consumer protection risks due to NBN private ownership

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[2] Digital Trends.September 24, 2013. http://www.digitaltrends.com/home-theater/netflix-ceo-says-4k-streaming-will-only-require-15mbps-bandwidth
[3] It is not be surprising that content suppliers limit the speed of their offerings, as higher speeds drive higher server infrastructure costs and limit audience numbers. Content providers seek a balance between the benefits of higher quality (including in some cases higher revenues) and the associated costs and audience limitations—for example, restricting those on mobile devices. The overall result has been progressively improving access speeds and content delivery quality. However, the two are not tightly coupled, with content usually adapting to the wide range of access speeds encountered even in advanced economies.

Pricing risks	NBN Co pricing for affordability and rapid adoption (such as low-priced entry level products) versus ------------>	Standard prices that more directly covers costs	Mitigating the pricing risk by NBN Co offering both entry-level and standard plans to appeal to different market segments and customers at different stages of their high speed broadband life cycle, and mitigating the risk of mobile substitution by integrating mobile services into the NBN
Policy risks	Broader policy risks—taking one policy direction versus ------------>	Other possibilities	Mitigating the policy risks by trialling/piloting alternatives and different approaches in different markets

3.3   Other trade-offs

The Victorian Government has identified other more practical trade-offs that it recommends the Panel consider. One is the trade-off between maximising use of NBN Co's investments to date (such as network cabling and OSS-BSS software) rather than writing off these investments and comprehensively shifting to more efficient choices. Possible options for addressing this trade-off are:

- In urban areas, limit blanket FTTP rollout (that is, FTTP as the standard solution) to current commitments and greenfield developments, and selectively deploy FTTP in certain localities depending on local demand, to more closely and efficiently address the range of customer needs than a blanket FTTP rollout. That is, an option would be meeting the standard requirements of the majority of users with FTTN in parallel with:

  - Addressing the higher-speed needs of business and government precincts by rolling out FTTP (or fibre to micro-nodes) to these pockets of very high speed demand, and

  - Meeting the demands of outlier individual customers through co-funded fibre extension programs (possibly in conjunction with industry bodies and local or state governments wishing to fulfil their economic development objectives).

- For regional, rural and remote areas, an option is to reduce costs and improve performance through better technology choices (including 4G mobile) that can be merged with in-place NBN fixed wireless and satellite services. Possible solutions the Panel might consider are negotiating modifications to the NBN fixed wireless rollout with Ericsson to include 4G mobile broadband (at least in mobile black spot areas), and a sale and lease-back arrangements for the NBN satellites (possibly leasing back reduced capacity if 4G is used to serve some customers in the last three per cent footprint).

Another practical trade-off is between the regulatory simplicity and downstream competition benefits of structural separation and the associated absence of direct visibility of end user needs. Options the Panel might consider to optimise this trade-off include NBN Co fostering a more constructive (less deterministic) supplier-customer relationships with RSPs, and NBN Co engaging directly with end users—including state governments—in determining its network architecture and product set as is now being done by wholesale-only electricity network operators.

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Section 4: **Victorian Government's broadband objectives, principles, and issues (the lowest priced "digital utility" that meets users' needs)**

The Victorian Government has established an overarching digital infrastructure objective and a set of key principles and issues to guide broadband development that supports the State's economic and social priorities. The Victorian Government's key broadband objectives and principles are shown in Table 2.

Views on Commonwealth broadband policy priorities, industry structure, and the role of NBN Co reflect these state-level considerations and the trade-offs and synergies that exist between them.

Table 2: Victorian Government broadband objectives and principles

Objective	**Victoria needs the lowest price "digital utility" to meet user needs (coverage, performance. and affordability)** • Digital services are a general purpose technology "input'' for all Victorian businesses, government, and citizens (that is, they are a utility) • High up-take and availability of digital services is important to realise productivity benefits for Victorians • The price and quality of digital services (not the type of infrastructure) is the main influence on take-up and usage • A digital infrastructure system should be built with flexibility to enable it to adapt to emerging technologies and changes in consumer demand.
Principles	**Competition drives lower prices, the evolution of services and infrastructure** • Digital services are best enabled by a market—commercial investment and competition in supply • Competition in supply of infrastructure and services will drive prices lower • Competition in supply of infrastructure and services will deliver new products and services for consumers.
	The Commonwealth Government is responsible for ensuring that the markets for digital services work well in Australia • The Commonwealth should create the competitive environment for the private sector to develop digital services. Regulatory certainty is important • The Commonwealth has roles where markets are not competitive and where markets will not provide adequately for public good requirements (such as public safety) • Regulation and subsidy should be efficient and transparent.
	There is not a single market for digital services—there are different markets with differing levels of service demand and competition • Within metro and regional locations there are different business requirements, population demographics and densities, and existing infrastructures • Victoria's markets are not the same as other states. It has a different population density, industry mix, and comparative advantages • A one-size-fits-all approach will hold back Victoria's economic development.
	State governments are important actors in relation to digital infrastructure • State governments hold information and manage processes that facilitate infrastructure development • State governments are major customers for digital services with unique needs regarding essential services • State governments will deliver many of the benefits of digital utility—in health, education, emergency services, and transport.

Section 5:   Key broadband imperatives—critical issues for the Panel's consideration

The Victorian Government has identified eight key imperatives from the broadband objectives, principles, and issues outlines in Section 4. Each of these imperatives is discussed in detail in this section. Recommendations to the Panel are highlighted.

The eight imperatives are:

1. *Affordability*—end user affordability is the key imperative

2. *Availability*—speedy rollout is critical so the benefits of the NBN can begin to flow, including network effects from universal availability

3. *Performance*—the NBN needs to be fit-for-purpose to meet demand at the local and individual user level

4. *Adoption*—rapid take-up allows rollout costs to be defrayed more quickly

5. *Infrastructure type*—using existing infrastructure can save costs and speed up rollout, provided a clear upgrade path is available

6. *Competition and market structure*—leverage competition to reduce prices, drive innovation and expand end user choice; do not rely solely on NBN Co

7. *Regional needs*—flexibility in technology choice (including 4G mobile) and product design is essential as regional needs and supply challenges are more complex

8. *State government collaboration*—benefits for all end users can be maximised by genuine partnering with state governments and other key stakeholders.

5.1   Affordability—end user affordability is the key imperative

> **Recommendation 2:** The Panel acknowledges, and recommends to the Commonwealth, that prime attention be given to the affordability of NBN services

Affordability for end users is the primary objective. Overseas and Australian studies and market experience show consumer resistance to paying higher prices for the speed capability of all-fibre networks—customers expect enhanced broadband capability for the same price over time.

Minimising NBN build costs is critical to avoid broadband prices escalating steeply over time (or a substantial on-budget Commonwealth contribution). Overseas experience demonstrates that the price-utility balance offered by copper-based and mixed technology networks meets the needs of most residential customers and many small business users. Parallel pockets of FTTP (or fibre to micro-nodes) for business and government precincts, and co-funded fibre extension programs for outlier customers, offer a cost-effective means of optimising the functionality and price nexus (see section 5.3)—they avoid the large cost burden of a "highest common denominator" FTTP solution.

A 2008 study for the Victorian Government by Concept Economics found price "critical or important" in survey respondents' choice of internet plan, with respondents identifying a key

NBN benefit as higher speed at the same or lower price.[4]Only one-quarter of the businesses surveyed indicated they would be willing to pay more for faster internet speed (12Mbps, a substantial uplift when the study was conducted), and only about half were willing to pay up to 25 per cent more for a 50Mbps service. These views accord with consumer experience; Australia's monthly costs of fixed broadband have fallen in real terms over the last 10 years, while speed and data allowances have increased by factors of up to 1000.[5] Household sensitivity to price makes affordability critical to efficient and effective online provision of government health, education, and emergency services, with the full cost and convenience benefits only occurring with high broadband take-up.

A European Commission study (2012) shows that 82 per cent of those surveyed are not prepared to pay more for higher speeds and increased download limits.[6] A study by Takada in 2013 found that fibre has only sold well in Japan when the price has been reduced to that of other options.[7]A 2011 study of nine international broadband markets by Venture Consulting concluded that "In markets where fibre take up has been high, it has been priced to compete with copper and HFC."[8] A study by Analysys Mason in 2013 comparing broadband development in different countries shows broadband penetration is closely linked to the cost of broadband relative to personal disposable income.[9] The 2009 review of broadband demand elasticity by Hassett and Shapiro indicates a high degree of price sensitivity, particularly for "second-wave" adopters (the majority of users), who take up services after they are bedded down in the market and the early adopters have demonstrated their value.[10]

In summary, affordability is particularly relevant to Victoria with its pressing need for economic restructuring assisted by reasonably priced access to high speed broadband services throughout the State.

5.2 Availability—speedy rollout is critical so the benefits of the NBN can begin to flow

> **Recommendation 3:** The Panel recommends to the Commonwealth that speedy NBN rollout also be given high priority, with the rollout allocated between the States on the basis of population and rollout within each State prioritised on the basis of business demand-supply gaps
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> **Recommendation 4:** The Panel recommends to the Commonwealth that the results of the Department of Communications broadband availability audit be provided to the States, and the audit be complemented with demand analysis to guide rollout priorities

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[4] Concept Economics "Economic Impacts of the National Broadband Network" 2008 (unpublished report for the Victorian Department of Innovation Industry and Regional Development).

[5] PP Consulting/Consultel "Victorian Broadband Review: Phase 2 Report." November 2012 (unpublished report for the Victorian Department of Innovation Industry and Regional Development).

[6] European Commission "Special Eurobarometer 381, E-communications household survey summary." 12 October 2012. See: http://ec.europa.eu/public_opinion/archives/ebs/ebs_381_en.pdf(accessed Sept 22, 2013).

[7] Takada, Yoshihisa (Project Officer). "Promoting Broadband - The Case of Japan."Workshop on Promoting Broadband. Geneva, Switzerland: ITU, 2003.See:
http://www.itu.int/osg/spu/ni/promotebroadband/presentations/06-Takada.pdf (accessed Sept 22, 2013

[8] Allen &Overy and Venture Consulting. "NBN options for a Coalition Government". March 2013". See: http://www.allenovery.com/SiteCollectionDocuments/NBN%20options%20for%20a%20Coalition%20Government.pdf (accessed Sept 22, 2013).

[9] Analysys Mason, "Bridging the Digital Divide: Connecting the Unconnected." 2013. http://tinyurl.com/lxoq4wt (accessed Oct 2013).

[10] Hassett, K. A. and Shapiro, R.J. "Towards Universal Broadband: Flexible Pricing and the Digital Divide" The Georgetown Centre for Business and Public Policy, August 2009. See:
http://www.gcbpp.org/files/Academic_Papers/AP_Hassett_Shapiro_Towards.pdf

Timely rollout is also a key objective as no benefits can flow until people have access to the NBN.[11] The positive network effects from universal access to a minimum standard of high speed broadband mean the timeframe for completing the national rollout is critical. Technologies that allow rapid rollout should be favoured. It also makes inclusion of broadband in the USO an imperative (see Section 5.7 below).

In moving towards universal coverage, prioritised rollout that targets regional areas with the largest demand-supply disparity for businesses is likely to have the biggest economic (and social) impact. Victoria's economy is in transition and must quickly restructure to higher value industries that can create economic growth through use of world class digital infrastructure. Analysis by Concept Economics shows that while NBN rollout in regional areas is more expensive than urban rollout, the productivity uplift for businesses is greater because the improvement in broadband speed, reliability, and availability is greater.[12] However, the effective delivery of emergency services and remote area development requires looking beyond connecting premises, to land mass coverage. Coordination of fixed and mobile infrastructure rollout is especially important in addressing these two issues.

5.2.1   A proposed model for economically-driven and fair national rollout priorities

The Victorian Government proposes a rollout priority model that allocates rolling 3-year rollout volumes between the states on the basis of population, with the states working closely with the Commonwealth and NBN Co to determine intra-state deployment priorities on the basis of business demand gaps in underserved locations. This would facilitate access to existing government-funded digital infrastructure. For example, key underserved regional centres in Victoria such as Mildura, Swan Hill, Leongatha, and Warrnambool have high capacity links deployed for the Regional Backbone Blackspots Program (RBBP) and the Victorian Fibre Strategy (VFS – Refer to Section 5.6.1) which have not been exploited by NBN Co. These links could be readily utilised to provide these regional communities with access to important communication services

Analysis by Concept Economics for the Victorian Government indicated the economic benefit is significant if prioritising rollout to underserved areas (including regional locations).[13]

Victoria is an attractive location for testing targeted regional rollout. It has accurate information on the demand-supply gaps for businesses, government and household consumers in regional areas. It also has geographic advantages from greater population density and shorter backhaul distances, and substantial State Government telecommunications infrastructure to leverage (including optic fibre, towers, buildings and land). The Victorian Government notes that state level information on regional broadband demand-supply would be strengthened by access to results from the Department of Communications audit of broadband availability. The Victorian Government recommends the Commonwealth provide the broadband availability audit results to the states and complements its supply-side audit with demand analysis.

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[11] The financial viability of the NBN investment is also likely to improve from faster rollout. The Broadband Rethink Financial Model developed for the 2013 PP Consulting/Consultel study referenced above shows that the cash flow effect of earlier availability of revenues outweighs the earlier incursion of costs.

[12] Concept Economics, *ibid*.

[13] "Economic Impacts of the National Broadband Network" Concept Economics 2008, pages 113-114 (unpublished report for the Victorian Department of Innovation Industry and Regional Development).

5.3   Performance

> **Recommendation 5:** The Panel advises the Commonwealth (subject to cost-benefit analysis) to implement a strategic mixed technology rollout approach, including; the Coalition's 25/50 Mbps rollout targets, FTTP rollout to business and government precincts where demand warrants, and co-funded fibre extension programs available for outlier individual customers

The key issues here are achieving minimum universal speed standards in parallel with ensuring the network is fit-for-purpose on a locality and individual user basis.

5.3.1   Minimum standards—lowest common denominator, not highest

The Victorian Government recognises minimum speeds are important to mitigate the risk of exclusion from important applications developed for high speed broadband, and to maximise the network effects. However, the benefits from universal availability of very high speed broadband to all residential users have been over-stated, and are unlikely to stand up to cost-benefit analysis. In reality, most residential consumers will not benefit from having fibre to the premise at this point in time, although they may require it longer term.

This is demonstrated by two overseas examples. First, the average actual speeds for both fixed and mobile broadband in Korea (a leader in FTTP deployment) are just 16.6Mbps, far below tested line speeds for both technologies.[14] The access network is not the limiting bottleneck; rather, it is the content providers' servers which are set to optimise server capacity and user experience (see footnote 2 in section 3.1 above).Secondly, Netflix subscribers on Google fibre experience on average a download speed of just 3.45Mbps (March 2013), while the United States average is 2.35Mbps across all types of broadband networks (fibre, HFC cable, and copper)—with the difference most likely reflecting users on Google fibre consuming more Higher Definition (HD) movies than their faster access lines.[15]

On the cost side, the Victorian Government commissioned PP Consulting/Consultel to model the financial implications of designing the network to provide FTTP.[16] The modelling showed that an up-front financial contribution of more than $20 billion from the Commonwealth to NBN Co would be necessary to off-set the greater rollout cost of an FTTP network compared to an FTTN rollout. Alternatively, NBN Co's average revenue per user would need to be $13 per month higher to offset FTTP's higher network costs (assuming no demand response to higher prices).

In summary, adhering to the original NBN plan of providing households with very high speed broadband, well in excess of the foreseeable needs of most users, is likely to be very costly, unnecessary, and hence uneconomic. Rather, the Victorian Government supports a strategic approach to NBN design and deployment involving pursuit of the Coalition's proposed target of broadband upgrades to an initial 25 Mbps by 2016 followed by a step-up to 50 Mbps+ over the subsequent three years. This should be completed in parallel with initiatives that ensure the network is fit-for-purpose where higher speeds are demanded. While overseas and Australian

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[14]Kim, Denny. (Interview with) "Strategy Director for KT, Korea: "The last mile of fibre infrastructure is becoming more and more important.".
  Broadband Asia. March 2013. http://asia.broadbandworldforum.com/denny-kim-kt/ (accessed Sept 22, 2013).
[15] See http://blog.netflix.com/2013/04/updated-isp-speed-index-for-march.htmlhttp://blog.netflix.com/search/label/Cablevision and
  http://ispspeedindex.netflix.com/usa
[16]PP Consulting/Consultel *ibid.*

evidence suggests the targeted universal speed goals of 25Mbps and 50 Mbps are expected to be adequate for the majority of users, business and government precincts characterised by higher speed user requirements, and outlier individual customers, also need to be addressed for maximum effectiveness. The Victorian Government's proposed fit-for-purpose strategic approach is outlined below for the Panel's consideration.

5.3.2 Fit-for-purpose provisioning—strategic network design to meet demand for FTTP service

The pre-election *Coalition's Plan for Fast Broadband and an Affordable NBN* (April 2013) (the Plan) posited a mixed technology network with 22 per cent of premises served by FTTP (in-place network, existing commitments and greenfield developments), 71 per cent FTTN, and the remaining 7 per cent fixed wireless and satellite—see page 7 of the Plan. The goal was to deliver universal access to a 25 Mbps service by 2016, and 50 Mbps by 2019 for 90 per cent of the premises in the fixed line footprint (page 6 of the Plan).

However, it is apparent from the Deloitte Access Economics demand-supply study for the Victorian Government (refer to Appendix B) that there will be substantial unmet demand for users in a variety of circumstances:

- Business precincts within the fixed line footprint where many end users require higher speed broadband than FTTN will initially provide,

- Government premises in regional areas either within or outside the fixed line footprint that are currently served by fibre (with no competition). For example, Victoria identified 400 state schools already using fibre services that were not in the NBN 93 per cent fibre rollout,

- Outlier individual end users within the fixed line footprint who require faster broadband than the bulk of their neighbours, and

- End users outside the fixed line footprint who need FTTP performance.[17]

The Coalition has proposed a limited solution to these requirements, a co-funded fibre extension program (page 11 of the Plan). The Victorian Government proposes to the Panel that a more comprehensive solution is required, that addresses each of these circumstances. Key issues include how to provide additional fibre in the most efficient manner where there is demand, how to most efficiently provide for future demand for fibre services, and how to price these fibre services relative to the proposed 22 per cent of premises that will get fibre as a matter of course under the Coalition's pre-election NBN Plan.

Business precincts within the fixed line footprint where end users require FTTP broadband speed

To meet the needs of business precincts not satisfied by the 25 Mbps and 50 Mbps broadband speed upgrades proposed by the Coalition, the NBN design needs to allow for fibre deployment where there is demand. Specifically, these pockets of current and latent demand need to be identified through a comprehensive broadband demand-supply study such as that conducted by Deloitte Access Economics for the Victoria Government; with the capability to meet this demand build into the network design. Furthermore, providing these additional fibre services

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[17] Government campuses in regional areas either within or outside the fixed line footprint that are currently served by a single fibre line operated on a closed basis, excluding competition. This particular case is addressed in section 5.6 below, not in this section.

when the area-by-area NBN rollout occurs will be more efficient than retrofitting, possibly requiring pre-rollout commitment from users to take fibre services.

This would mean an increase in the Coalition's pre-election estimates of FTTP deployment to 22 per cent of premises when rollout is completed, increasing the cost of the network. So that this can be done on a cost-neutral basis, a one-off contribution from the end users could be levied, with ongoing connection and usage charges for very high speed services on par with those charges for the end users in the Coalition's original 22 per cent FTTP coverage.

Outlier individual end users within the fixed line footprint who require FTTP speed broadband neighbours

Where individual business and users require additional broadband speed, a co-funded fibre extension program as proposed by the Coalition is likely to be best placed to share the additional cost of providing the FTTP line. Installing co-funded fibre extensions within an FTTN area of the fixed line footprint when the node is initially provisioned is likely to cost less than installing the same facility at a later date.[18]

End users outside the fixed line footprint who need FTTP performance

Considerable demand for very high speed broadband exists beyond the fixed line footprint. For example, the Deloitte Access Economics demand-supply study showed there are 25,600 businesses in regional Victoria that would take a 50-100 Mbps service if available. Possible models for providing fibre service beyond the fixed line footprint could include:

• Joint funding of fibre service in country town main streets, with contributions from the Commonwealth (or NBN Co) and interested stakeholders—such as local councils, Chambers of Commerce, and industry clusters themselves—for fibre running past clusters of regional businesses, and payment by the businesses themselves for the connection between business and fibre. The cost of doing this is not expected to be extraordinary, and NBN Co experience in such deployments could be exploited. A potential role for local councils or State Government is coordinating the demand aggregation required for application to NBN Co for the fibre extension,

• Interested stakeholders engaging a third party to build and operate NBN-equivalent networks in priority areas where the NBN will not be deployed for some time, with NBN Co either buying out the third party's network when its rollout program comes to the area or obtaining wholesale access from the third party to on-sell (obviating the need for NBN to overbuild), and

• Local councils, lead businesses or other stakeholders to jointly fund an open access fibre link to a business community with a number of latent users needing more than satellite or fixed wireless broadband—such as a large manufacturing facility with high-technology support industries clustered nearby. This would address the investment blocker of the first mover needing to meet the substantial up-front costs. Here again local or State Government could play an important demand aggregation role.

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[18] A lower-cost alternative to a dedicated fibre line from the node to the premise is the use of a micro-node (distribution point), as described in section 5.5 below.

The Victorian Government is keen to work closely with the Commonwealth and NBN Co on the design of such programs.

5.4 Adoption—Australia is behind most of the developed world for fixed line take-up

> **Recommendation 6:** The Panel advise NBN Co to develop consumer and business entry level services and pricing structures that will boost take-up. This should involve cooperative engagement with retail service providers (RSPs), and direct discussions with business and residential end users and state governments

Rapid take-up of high speed broadband both spreads the network costs over more users, and maximises the benefits. At present Australia ranks only 18th in fixed broadband penetration (1st for mobile broadband).[19] While the NBN rollout will naturally stimulate high speed broadband take-up, the Victorian Government considers it is important that the Panel and the Commonwealth consider how to maximise the take-up of services, in parallel with policies that support continued strong mobile broadband adoption.

The Victorian Government suggests improving the take-up of NBN services market-focussed and strategically-priced NBN product options that address the needs of users will be necessary. For example, informal feedback indicates there would be substantial uptake of services tailored for small, medium, and larger businesses (including carrier grade symmetric services). While NBN Co is prohibited from selling to retail customers, there is no legal or regulatory restriction on the company working closely with end users as well as RSPs on the key performance characteristics of NBN-based products they want.

Alternative NBN price structures may also increase take-up. A paper by John de Ridder on adoption experience concludes that if NBN Co offered a an entry level plan with a low monthly access charge and relatively high usage charges, and shifted from its current speed-dependent pricing, NBN adoption would be significantly strengthened.[20]

5.5 Infrastructure type

Key considerations here are the NBN as a:

- A mixed technology network,
- A fit-for-purpose network, and
- A future proof network.

5.5.1 A mixed technology network

The Victorian government supports a mixed-technology approach using existing infrastructure where available, as it facilitates optimisation across the four outcomes objectives— affordability, availability, performance, and adoption. Overseas and Australian evidence suggests this approach would:

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[19] "OECD Broadband Statistics Update" June 2013, Item 1d. See: http://www.oecd.org/sti/broadband/oecdbroadbandportal.htm#Penetration
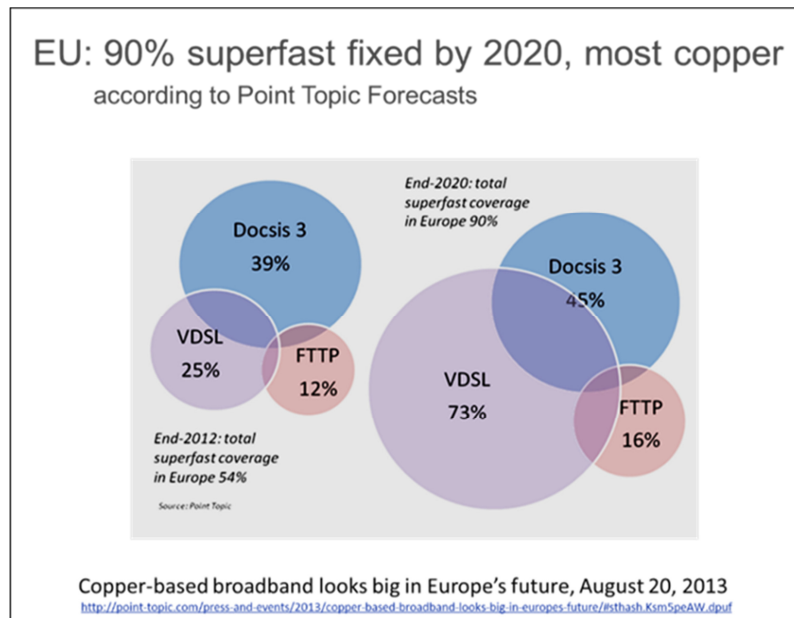[20] See: http://www.deridder.com.au/files/Entry%20Level%20Pricing%20for%20Fixed%20Broadband-August.pdf

- Keep network build costs to a minimum—without much greater maintenance and technology-interworking expenses,

- Allow rapid universal broadband rollout,

- Adequately meet foreseeable user needs—including pockets of very high speed demand, and

- Encourage take-up through lower prices.

FTTP deployments commenced in the United Kingdom (British Telecom, BT), Germany (Deutsche Telekom, DT), and United States (Verizon) with no or only small government subsidies. In each case the rollouts have largely stopped beyond greenfield sites as other technologies—(xDSL), HFC networks and 4G wireless —have successfully competed for customers on the basis of the price-performance nexus. On current trends, all three countries are likely to have a higher level of copper based broadband (FTTN) than either HFC or FTTP by 2020 and beyond. These leading countries illustrate how it is possible to successfully evolve existing national infrastructure to economically stay ahead of consumer demand with no or minimal government contributions.

PointTopic estimates the European Union-wide market uptake of the three main fixed broadband technologies at 2020 to be 73 per cent copper (VDSL), 45 per cent HFC (DOCSIS 3 standard), and 16 per cent FTTP (with some over-lap), as shown in Figure 3 below.[21] While uptake of HFC and FTTP services is forecast to be moderately higher in 2020 than 2012, copper-based superfast broadband penetration almost triples.

Figure 3:European uptake of fixed line broadband technologies by 2020

Copper-based broadband looks big in Europe's future, August 20, 2013
http://point-topic.com/press-and-events/2013/copper-based-broadband-looks-big-in-europes-future/#sthash.Ksm5peAW.dpuf

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[21]Johnson, Tim. "Copper-based broadband looks big in Europe's future." PointTopic. 20 Aug 2013. http://point-topic.com/press-and-events/2013/copper-based-broadband-looks-big-in-europes-future/(accessed 22 Sept 2013).

5.5.2   A fit-for-purpose network

To adequately address all users' requirements, the Victorian Government emphasises the need for a fit-for-purpose approach to network design. This can be achieved in a mixed technology environment, through:

• FTTN (and HFC) as the core technologies to provide the necessary base level of service to meet the requirements of the majority of users,

• A fixed network design that comprehends FTTP (or fibre to micro-nodes) being rolled out to pockets very high speed demand and outlier individual users as the NBN is built, and scope to meet such needs in the future as demand evolves (see Section 5.3), and

• Use of 4G wireless technology as part of the NBN in rural and remote areas.

5.5.3   A future-proof network

A key aspect of network infrastructure/technology choice is ensuring scope exists to cost-effectively meet future mass market demand for very high speed broadband when and if it evolves. The previous NBN model for doing this involved the technology risk that immediate universal deployment of an all-FTTP was the best way to proceed, with initial government ownership and financing necessary in the absence of credible public sector investors.

Pre-election analysis by the Coalition, and subsequent analysis on behalf of the Victorian Government (PP Consulting/Consultel) and the new NBN Co board (Boston Consulting Group, CordaMentha, and Deloitte Access Economics), all point to universal FTTP being a high-cost high-risk solution. These studies show costs unlikely to be recovered at reasonable prices and take-up rates, and a substantial risk of stranding from a greater-than-expected preference and use of mobile broadband services.

For a mixed technology, fit-for-purpose network solution to be acceptable, however, requires confidence that the infrastructure and technologies involved can upgraded to higher speeds at a reasonable cost if and when required. All fixed line technologies currently used in Australia are capable of delivering mass market (as well as targeted) high speed broadband, and technology inter-working is not a barrier to using a mixed technology approach.

FTTN, HFC and FTTP access networks are all capable of delivering very high speed broadband, with their relative performance dependent on how close fibre is taken to the end customer—with the upgrade costs substantially lower than the cost of a new network. For example, in the case of HFC, it has been suggested that: "the cost to the company of offering 500 Mbps service rather than 30-50Mbps should be $3-4 per month over three years."[22] Copper upgrades are also affordable, with equipment costs of the order of $200 to $375 per line.[23] Overseas operators such as BT, DT, and Verizon are finding that they can compete effectively by simply upgrading existing plants, as are cable operators in these countries.

Concerns that copper speeds are dependent on the length of the copper loop, including speed differences between lines served by the same node, can be ameliorated by on-going

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[22] "960-1200 Megabit Cable Modems Ready To Go." Fast Net News (FNN).30 Aug 2013. http://fastnetnews.com/docsisreport/163-c/4968-960-1200-megabit-cable-modems-ready-to-go(accessed Sept 22, 2013).

[23]"Adtran: Vectored VDSL Is Ready, $200-375/home."Fast Net News (FNN). 20 Dec 2012. http://fastnetnews.com/dslprime/42-d/4879-adtran-vectored-vdsl-is-ready-200-375home(accessed Sept 22, 2013).

technology advances. An Alcatel-Lucent "micro-node"[24] readily allows extension of fibre to a distribution point serving a small number of copper access lines where the distance from the node is too great for very high DSL speeds.[25] That is, very high speeds can be achieved without incurring the major expense of FTTP deployment.

In short, the technologies for broadband over existing copper, coaxial cable, and wireless networks are improving much faster than the technologies of physically installing fibre—digging trenches, tunnelling under roads and drilling walls. The costs of installing FTTP are simply too high relative to the majority of end users' needs and willingness to pay, except in greenfield areas, or where costly copper remediation would otherwise be required.

Victoria is an attractive location to trial an NBN mixed technology, fit-for-purpose approach. The State's high population densities, compact geography, State readiness to participate, substantial State Government fibre infrastructure, and unique information on broadband demand-supply gaps make it a low cost, high return test bed for this new approach.

5.6 Competition and market structure

> **Recommendation 7:** The Panel gives serious attention for stimulating retail competition, including competition for fibre services to regional state government premises through NBN use of existing third party fibre assets. Telstra and other operators have extensive point-to-point fibre network in place, and the Panel is encouraged to seriously consider the potential utility of open access to these networks in its competition deliberations
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> **Recommendation 8:** The Panel gives priority to identifying industry structures and policies that foster both retail and network infrastructure competition while minimising network duplication costs and NBN Co's regional cross-subsidy funding needs—with any policies selected still effective if NBN Co is privatised and no longer subject to direct Commonwealth control. Competition policy stability and certainty in particular is an imperative

The Victorian Government favours vigorous competition wherever possible—including at the retail level, through NBN open access and removal of backhaul cost barriers on non-contestable routes; and at the network level in all urban and the more densely populated regional areas. The Victorian Government emphasises the importance of NBN Co, given it is a government-owned partial monopoly, being no larger than is minimally necessary to achieve this aim, and avoiding substantial non-transparent cross subsidies that inhibit competition.

5.6.1 Retail competition

Retail competition in Australian telecommunications markets needs strengthening. Despite open access for high speed broadband across Australia under the NBN, 15 years of copper access regulation by the ACCC, and falls in real prices for broadband over a long period, there is

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[24]Shown at the 2013 Broadband World Forum in San Francisco. October 2013
[25]Wilton, Petroc. "The 'micro-node': a missing link for the NBN plan?" Communications Day.24 October 2013, page 2. The micro-nodes come in a range in sizes from 1 to 192 ports, with the smallest no larger than a book.

evidence of substantial ISP consolidation and widening retail margins over the past four years.[26,27]

Strengthening retail competition in regional areas is a particular interest of the Victorian Government. A number of smaller ISPs have submitted evidence to the ACCC on the challenges they face competing with their larger rivals in providing NBN-base broadband services in regional Australia. This is because backhaul imposes a major cost disadvantage relative to the large ISPs with their own backhaul infrastructure.[28]

One possible measure is to shift away from NBN Co's CVC-based and speed-dependent pricing. John de Ridder has pointed out the current NBN pricing based on CVC capacity discriminates against smaller ISPs, in effect operating like a volume discount. His preferred approach from a competition perspective is pricing based directly on gigabytes of data transmitted.[29] The Victorian government encourages the Panel to consider this and other NBN Co pricing options to strengthen retail competition.

Options for strengthening regional competition also require the Panel's attention, including more stringent regulation of backhaul prices on weakly contested and uncontested routes. The Regional Broadband Blackspot Program (RBBP) has demonstrated that where backhaul competition is strengthened, there are improved retail service offerings. The Victorian Government is aware of anecdotal evidence from access seekers that the ACCC's econometric-based access pricing model for long distance transmission has resulted in regulated wholesale prices above already-high commercial rates. If so, regulated prices on these routes are clearly providing little pricing discipline on parties owning transmission infrastructure.

An option proposed by some smaller access seekers is to reduce the number of NBN Co's regional Points-of-Interconnection (PoIs), to eliminate the least contestable backhaul routes necessary for a smaller internet service provider (ISP) to cover to achieve widespread direct connection to the NBN.[30] Depending on how this is implemented, however, this approach could result in the undesirable consequence of increased reach of NBN Co's "access network" (through longer NBN transit backhaul links), with consequent increases in NBN prices. It could also strand existing backhaul assets, unless they are acquired or leased by NBN Co.

These and other options to improve regional backhaul completion need to be considered carefully by the Panel, including the unintended consequences.

The Victorian Government itself has responded to the lack of backhaul competition on certain routes through the Victorian Fibre Strategy (VFS), an initiative involving investment in fibre on weakly contested routes (for example, a fibre link from Geelong to Warrnambool) to

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[26] ISP consolidation is apparent in the most recent Australian Bureau of Statistics internet publication "Internet Activity, Australia", June 2013 (ABS Ref. # 8153.0). See:
http://www.abs.gov.au/ausstats/abs@.nsf/Products/8153.0~June+2013~Chapter~Number+of+Internet+Service+Providers+(ISPs)?OpenDocument

[27] De Ridder, John. "Australian Retail Broadband—Competition has Stalled" September 2013. See: http://www.deridder.com.au/files/September-2013.pdf

[28] For example Harbour ISP, a small regionally-based ISP providing NBN satellite services to around 10,000 residential and small business customers nationally, and NBN fibre and wireless services to approximately 2,500 customers in five PoI areas (at March 2013), has tendered evidence that its per customer margins are negative or insufficient to meet overhead costs. See Harbour IT "Submission to the review of policies and procedures relating to the identification of listed NBN points of interconnect" March 2013 at
http://transition.accc.gov.au/content/item.phtml?itemId=1110883&nodeId=88d78f769bbdf182574f5d12222c31c2&fn=HarbourIT%20submission.pdf

[29] See: De Ridder, John. "NBN Pricing Discriminates against Smaller Players" May 2013 and "CVCs—a Final (?) Word" July 2013
athttp://www.deridder.com.au/files/NBN%20Discrimination.pdf and http://www.deridder.com.au/files/CVC-%20Final%20Word.pdf

[30] For example Harbour IT "Submission to the review of policies and procedures relating to the identification of listed NBN points of interconnect" March 2013. See:
http://transition.accc.gov.au/content/item.phtml?itemId=1110883&nodeId=88d78f769bbdf182574f5d12222c31c2&fn=HarbourIT%20submission.pdf

strengthen private sector investment, contestability and reduce backhaul prices. Through the VFS, Aussie Broadband has been provided access to the Government's new Geelong to Warrnambool fibre and will use it to:

• Offer services up to 100 megabits per second (Mbps) for businesses in Warrnambool's CBD area and Colac's CBD area via mid-band Ethernet,

• Diversify its service offering in Warrnambool and offer current customers higher data allowance for the same price they are already paying,

• Improve its wireless services (through providing higher data allowances) in Port Fairy, Hamilton, Portland, Koroit, Camperdown, Mortlake and even Mt Gambier,

• Install a new high speed wireless network in Terang, and

• Install new ADSL2+ services in Colac.

The Nextgen Group will also use the Government's fibre to market wholesale services to other retail telecommunications services providers including mobile carriers. Nextgen Group will also provide retail services to its enterprise customers in the Warrnambool area, including high speed data communications, data centre and cloud services. As a wholesale service provider, the Nextgen Group's presence in the market along the route is expected to stimulate greater competition for telecommunications service provision.

The Victorian Government, as a major user of regional telecommunications services, experiences a serious lack of retail contestability for fibre services to its regional government premises. Many of these sites are currently served by a single operator using its own proprietary fibre link, with no scope for fibre competition. Contestable fibre-based services are critical to keeping the Government's regional operating costs as low as possible and stimulating service innovation. This serious competition shortcoming was not addressed by the previous NBN model, with only ineffective contestability provided by NBN Co's relatively low bandwidth fixed wireless service.

The Victorian Government urges the Panel to seriously consider options for addressing this issue. One possibility is for the NBN to provide a fibre-based service to any state government premises currently served by a single fibre link. This need not require addition NBN capital expenditure, as the retail contestability result required could be achieved by agreement with the fibre owner to provide open access—for example, through the revised Commonwealth-NBN Co-Telstra agreement currently being re-negotiated. For campuses not currently served by fibre and requiring such a service, this should be provided as part of the strategic NBN rollout discussed above.

More broadly, Telstra has an extensive point-to-point fibre network already in place in Victoria. The Panel is encouraged to seriously consider the potential utility of access to this network in its NBN deliberations. In the previous approach to the NBN, Telstra's fibre was not utilised extensively other than NBN accessing parts of its transmission network—Telstra's fibre access network was largely ignored. The Panel is encouraged to consider opportunities to use Telstra's (and other carriers) fibre assets in relation to the NBN's policy objective and fibre needs. For example, this same approach could be used to provide the fibre backbone from which co-funded fibre lines to individual users could be built to service precincts that demand high speed broadband.

These arrangements require appropriate compensation to third party network operators (including Telstra) for NBN access to their networks, through regulatory arrangements put in place for this purpose, such as payments equivalent to NBN wholesale charges. For Telstra, these arrangements would also feature in the revised Commonwealth-NBN Co-Telstra agreement.

In summary, there are a variety of means to stimulate retail competition, which the Victorian Government urges the Panel to examine, not simply assume retail competition will be strong from existing wholesale regulation.

5.6.2   Network competition

A key task for the Panel is identifying policies that minimise the resource cost of duplicated networks and the funding burden on NBN Co regional network on the one hand while maximising the efficiency benefits from infrastructure competition on the other.

The Victorian Government encourages the Panel to seriously consider opportunities for beneficial network competition. In particular, the Panel should not be constrained by previous policy reasoning for a nation-wide, government-owned statutory monopoly that provides wholesale high speed broadband services to all Australians. While challenging, the productive and dynamic efficiency rewards from the Commonwealth implementing statutory and regulatory frameworks that allow beneficial network competition to occur are potentially high.

Accordingly the Panel is urged to consider, develop and test different network competition models that achieve these ends wherever possible. Importantly, the model selected needs to be equally effective if NBN Co is privatised as under current circumstances where NBN Co is wholly government owned and guided in its behaviour by shareholder ministers, Statement of Expectations—this convenient control tool may not be available in the future.

The Victorian Government understands that significant policy change in this area is possible and desirable. However, we are also mindful that there has been a 10 year period of high speed broadband policy change and uncertainty, with inevitable negative impacts in investment and innovation. Accordingly, once the Panel has concluded it deliberations on network competition options, it should recommend a firm long-term policy position to the Commonwealth and highlight the extreme importance of policy stability—and the negative consequence of ongoing uncertainty.

The Victorian Government proposes the following network infrastructure competition model as an option for the Panel to consider, in conjunction with options proposed by other parties. While not wedded to particular elements of this model, the Victorian Government firmly supports harnessing competitive forces wherever possible, to drive efficiency and innovation.

Options / roles to consider for broadband network competition

<u>#1: Retention of rural-urban telecommunications parity policy, involving:</u>

• Universal access to high speed broadband services—with the critical introduction of a fit-for-purpose criterion so users get the grade of service they require (at a commensurate price), and

• Uniform national pricing for wholesale broadband services, so regional users are not disadvantaged relative to their urban peers from higher broadband prices and/or narrow choice of service provider.

<u>#2: NBN Co's role:</u>

• Playing a key investment coordinator and broadband wholesaler role—including wholesaler-of-last-resort,

• Minimising its own network build-own-operate involvement to that necessary to fill gaps in the market (such as network deployment in uneconomic regional areas),

• Acquiring wholesale services from existing and new entrant network operators for on-selling to retail service providers, including:

  o services over the Telstra and/or Optus HFC networks

  o services over Telstra's fibre network (see Section 5.6.1 above)

  o services provided by smaller operators targeting particular market niches such as multi dwelling units

• Establishing by precedent the terms on which these third party network operators can sell wholesale service directly to retailers (instead of, or as well as, providing wholesale services to NBN to on-sell), and

• Remaining strictly wholesale-only.

<u>#3: Telstra and Optus roles:</u>

• Continuing, in effect, to be structurally separated even not in a strict ownership sense,

• Using their existing infrastructure to provide NBN services to NBN Co and/or NBN-equivalent services directly to retail service providers,

• Providing universal access in any area in which they are deemed to be the prime infrastructure operator (to avoid the inefficient expense of NBN Co needing to fill gaps in partial coverage),

• Possibly being restricted from building new broadband infrastructure for a period of, for example, five years to ensure existing infrastructure is used as much as possible and to allow smaller service providers to get established in the market, and

• Paying a levy to an NBN Co Regional Network Build Fund that cross-subsidises NBN Co's cost-revenue gap in uneconomic locations.

#4: Smaller fixed line operators' role:

• Using existing and new-build infrastructure (their own and third parties') to service economic areas and individual customers—including, for example, the recently announced TPG plan to run fibre to the basement of medium density units and use existing in-building wiring to reach the end customers with high speed broadband,[31]

• Providing NBN wholesale services to NBN Co for on-selling and/or selling NBN-equivalent services directly to retailers,

• Paying a levy to the above-mentioned NBN Co Regional Network Build Fund once they reach a certain market share threshold—which could possibly also trigger a universal coverage requirement,

• Being excluded from network over-build for a limited period (for example, five years) where they agree to universal coverage—tempered by recognition that some of these operators will be subsidiaries of large international companies with deep funding and risk-bearing capacity, and

• Being able to provide themselves with retail services—at an arms-length and NBN-consistent basis—for up to (say) five years, so they have an incentive to invest (as they will have exclusive access to any technology and service innovation benefits they introduce for this period).

#5: Recognition that the best approach for urban and regional markets may differ, given their very different economic characteristics.

In short, the Victorian Government urges the Panel to think carefully about how the benefits of competition—lower prices, greater technology and service innovation, and wider customer choice—can be improved at the network level in a manner that minimises wasteful infrastructure duplication and allows sustainable funding of uneconomic network build.

5.7 Regional broadband needs

> **Recommendation 9:** The Panel develop and recommend to the Commonwealth an updated USO that (a) includes a standard broadband service, (b) specifies the USO in term of technology-independent performance, (c) recognises NBN Co's implicit role of wholesale service provider of last resort, (d) appoints a (contestably-selected) retail service provider of last resort, and (e) specifies a funding mechanism for the regional network cross-subsidy
>
> **Recommendation 10**: The Panel advises the Parliament to retain four yearly Regional Telecommunications Reviews, and the Commonwealth to commit to responding publicly to the findings

The Victorian Government accords high priority to closing the State's regional broadband demand-supply gap. A flexible approach is essential as needs and efficient solutions can be complex.

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[31] The TPG MDU initiative is described in "TPG's radical plan to rollout FTTH to 500K premises" Communications Day. 18 September 2013, page 1.

5.7.1 Using existing copper lines outside the 93 per cent fixed line footprint

One approach afforded by mixed-technology broadband architecture which the Panel is encouraged to consider is leveraging the approximately 800,000 in-place fixed access lines outside the original 93 per cent fibre footprint that Telstra is contracted to keep in service. While some of these lines will not be copper (microwave for remote sites), and in some cases the copper loops will be too long or degraded to support high speed broadband, many would be suitable for xDSL services. A co-funded micro-node could be made available to service customers with demand for very high speed broadband. Victoria would be an attractive location to test this approach, as the incidence of this rural/remote copper is on average likely to be greater for Victoria than for the less densely populated States, and the Victorian Government has fibre backhaul in place to a number of more remote locations.

5.7.2 Using mobile networks

Another possible approach is to capitalise on recent mobile high speed broadband technology advances, through Commonwealth coordination of its parallel Mobile Coverage Programme implementation and review of the NBN. Technological potential clearly exists to complement NBN satellite and fixed wireless services with 4G service, and there appears to be potential for savings by the Commonwealth avoiding double payment for improved mobile coverage and NBN wireless infrastructure. Vodafone has proposed this approach in recent comments on the Mobile Coverage Programme, claiming there are no technology barriers to such a solution and an opportunity for substantial saving (and competition benefits).[32] Furthermore, substantial overseas precedent exists:

- The United Kingdom Government recently extended its broadband funding and goals, targeting 99 per cent of the population to have superfast fixed-line or wireless connections by 2018, with wireless seen as a reasonable "superfast" alternative,[33]

- Recent Deutsche Telecom announcements have included a wireless LTE build-out to 85 per cent of the population by 2016, with data transmission rates of up to 150 Mbps,[11]

- Both Verizon and AT&T have announced investment programs covering fixed and mobile broadband.[34,35] Both operators expect to achieve around 99 per cent population coverage with LTE, but only about 75 per cent with fixed broadband coverage, and

- The NBN fixed wireless vendor Ericsson is partnering with operators in the provision of 4G services in a number of regional areas in the United States such as Appalachian Wireless (Kentucky), Agri-Valley Communications (Michigan), Bluegrass Cellular (Kentucky), and South Georgia Regional Information Technology Authority (Georgia).[36]

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[32] See Vodafone comments: http://www.smh.com.au/business/vodafone-calls-for-nbn-co-rural-mobile-network-20140309-34ff0.html 10 March 2014 (accessed 23 March 2014).

[33] Kobie, Nicole. "Government targets 99% superfast broadband coverage by 2018." PC Pro. 27 June 2013. See: http://www.pcpro.co.uk/news/broadband/382696/government-targets-99-superfast-broadband-coverage-by-2018(accessed Sept 22, 2013).

[34] Goldstein, Phil. "Verizon adds 941K post-paid subs in Q2, crosses 100M total retail connections." FierceWireless. 18 July 2013. See: http://www.fiercewireless.com/story/verizon-adds-941k-postpaid-subs-q2-crosses-100m-total-retail-connections/2013-07-18 (accessed Sept 22, 2013).

[35] Weissberger, Alan. "AT&T to Expand U-Verse & IP-DSLAM; Bring Fiber to Commercial Buildings & Cover 99% of US with LTE! ." The Viodi View. 08 Nov 2012. See: http://viodi.com/2012/11/08/at-bring-fiber-to-commercial-buildings-cover-99-of-us-with-lte/ (accessed Sept 22, 2013).

[36] Ericsson statement on its website. See: http://www.ericsson.com/news/120508_ericsson_works_with_regional_wireless_operators_to_bring_benefits_of_lte_to_rural_america_244159019_c(accessed 25 October 2013).

More generally, the co-funded fibre extension models outlined earlier could also be used to provide a solution for meeting the high speed needs of individual regional customers and localities.

5.7.3   Resilience of regional telecommunications networks

The Victorian Government understands that the previous NBN design allowed for multiple diverse paths between important facilities and was therefore potentially more resilient than the existing Telstra network. However, the previous NBN plan to establish a national wholesale infrastructure monopoly from scratch foreclosed opportunities to utilise existing infrastructure, with the potential to shut down certain infrastructure that can provide resilience in the State's telecommunication network (reserve pathways and contingent infrastructure).

NBN Co, as part of its design and planning, should consider the importance of these networks and facilities to the NBN and use them where appropriate to support its resilience. Specifically in regard to Warrnambool where serious service outage was caused by a fire in Telstra's exchange, the Victorian Government understands that NBN Co is proposing that the entire south west of Victoria, including the city of Geelong (Victoria's second largest city) and the fast growing communities of the Bellarine Peninsula and Surf Coast, will all be served by a single POI in Geelong (comprising over 120,000 premises).[37] The Victorian Government has concerns that the NBN is not being engineered with sufficient flexibility to re-route traffic so that services can still be provided to residents and business premises, and that there are measures in place to enable service continuity. While the NBN has the potential to improve the speed and consistency of broadband coverage in Victoria, it also has the potential to cause disruptions and weakness in telecommunications network resilience for the State.

The Victorian Government is of the view that telecommunications network resilience, reserve, and contingency positions and their emergency management requirements should be a mandatory element in the planning and implementation of the NBN. Post-hoc network fortification is unlikely to be cost-effective and will create barriers to future network hardening. We suggest a need for the Commonwealth to identify the service characteristics required of a location, including for emergency communications, and then work to achieve those characteristics. While maintaining separate copper networks may impose a significant extra cost burden, legacy systems should not be decommissioned until the capability of new systems and technologies has been proven, especially in an emergency management context.

5.7.4   Reform of the Universal Service Obligation (USO)

The telecommunications USO comprises the universal provision of a standard telephone service (STS) at an equitable price—taken to be a fixed line PSTN service with urban-rural pricing parity—and ancillary elements such as an emergency call service and provision for hearing-impaired users. The Victorian Government considers the voice-focussed specification of the USO has been superseded by the broadband revolution and requires major reform.[38] The Victorian Government posits that meaningful reform requires:

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[37]See: http://www.accc.gov.au/content/index.phtml?itemId=952292
[38]The previous Commonwealth Government introduced a number of USO reforms, changing the USO from a statutory mandate (a Telstra licence condition) to a contractual obligation, introducing contestability, establishing TUSMA to manage USO contracts and the contestability process, and ensuring copper network retention beyond the 93 per cent NBN fixed network footprint. However, these changes have had limited visible impact to date.

- Including a standard high speed broadband service in the USO,

- Specifying these services as technology-independent performance requirements (rather than network-specific services) that allow mobile services to qualify,

- Recognition of NBN Co's implicit role of wholesale service provider of last resort (thereby bearing the main financial burden of the USO),

- The associated appointment of a retail service provider of last resort, and

- Reconsideration of funding options.[39]

With the notable exception of the funding issue associated with NBN Co being the wholesale service provider of last resort (funding the regional network cross-subsidy), addressing these issues are reasonably straightforward policy matters.[40] Funding options for the USO include:

- Continuing with the previous Government's approach of granting NBN Co a legislative monopoly at the wholesale level, and setting the nationally averaged price for core services at a level that generates sufficient income to cover its full costs (urban and regional). This would forego any benefits from network level competition to ensure internal funding of the cross-subsidy. Under this arrangement, the large cross-subsidy from urban to regional end users (and from more densely populated states such as Victoria to less densely populated states) is hidden in NBN Co's internal accounts. This should be made public to inform debate relating to USO arrangements. It could also trigger recompense in cash or in kind to net contributing states (through, for example, earlier NBN rollout),

- Restricting network competition by the major service providers (for example, Telstra and Optus), but allow smaller operators to install competing infrastructure. This could still place an unsustainable burden on NBN Co, depending on the success of these competing networks in winning market share. It would also limit productive efficiency benefits from competition by excluding the most efficient operators that have economies of scale and network experience,

- Implementing an industry levy to cross-subsidise NBN Co's requirement to service high cost regional/remote areas. This is the traditional approach for telecommunications, including previously for Telstra's voice USO,

- Funding NBN Co's revenue shortfall from consolidated revenue, effectively placing the burden of network competition and uniform national pricing on all taxpayers. This approach has the economic merits of (a) funding what is in essence a broad social and economic (regional development) policy from a wide tax base rather than distorting resource allocation by increasing urban telecommunications prices relative to other goods and services, and, (b) making the cost of these policies explicit, and

- Full up-front competition to supply the wholesale market in different urban areas, with the winner selected on the size of the contribution made to funding NBN Co's unrecovered regional costs. This approach recognises the natural monopoly characteristic of many utility networks, while introducing greater competition in technology choice, use of existing assets

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[39] The requirement for NBN Co to provide a minimum speed broadband service to all (approved) premises in Australia at uniform national wholesale prices means that NBN Co is the wholesale service provider of last resort, and as such bears the main burden of the USO.
[40] Retailer of last resort arrangements could be established contestably nationally or regionally through an auction process.

versus new build network, forecast operating costs, and management of construction and volume risks.

The last two options listed, funding from consolidated revenue and competition to provide broadband services in low cost areas, warrant particularly careful attention by the Panel as they allow for the cross-subsidisation of uneconomic services while using competition to drive efficiencies in urban areas (the latter without wasteful network duplication).

5.7.5   Ongoing regional monitoring

It is important that the Parliament continues to regularly monitor the adequacy of regional telecommunications through the four-yearly Regional Telecommunications Reviews, with a commitment from the Commonwealth to publicly report on its response to the findings. [41]

5.8   State Government collaboration

> **Recommendation 11:** The Panel recommends to the Commonwealth that the Commonwealth, state governments and other stakeholders partner closely on the NBN and related digital infrastructure, through tangible projects with a level of accountability to both Commonwealth and state government Ministers.

NBN benefits will be maximised by the Commonwealth and states partnering on digital infrastructure. State governments can provide information on economic priorities, regional development and infrastructure plans, public safety objectives, and government service delivery needs. They can also assist infrastructure deployment with red tape reduction.

5.8.1   Victorian Government as a partner

The Victorian Government could provide the following material to the Commonwealth:

• Detailed information on high speed broadband demand-supply gaps (particularly for business),

• Current and prospective state development plans, with location-specific information such as land release programs, utility plans for prospective developments, and business park initiatives,

• Details on Victorian Government NBN broadband needs, covering government precincts (schools, TAFEs, hospitals) and the specific needs of particular service delivery agencies (including those responsible for delivering emergency, transport, and community services), and

• Information on non-premises service demand, and information on possible migration approaches from PSTN-based applications to all-IP applications (see Section 5.8.2 below)

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[41]See:http://www.austlii.edu.au/au/legis/cth/num_act/tlapaoma2005753/sch2.htmland http://www.rtirc.gov.au/media-and-faqs/

The Victorian Government could also work with NBN Co and the Commonwealth to facilitate NBN rollout and take-up in the State:

• Provide access to State Government telecommunications related infrastructure (optic fibre, towers, buildings and land),

• Support private sector and/or public sector broadband demand aggregation initiatives, and

• Provide revenue for the NBN through government procurement for education, health, and emergency/essential/public safety services (subject to meeting Victorian Government service requirements).

The Victorian Government is keen to work with NBN Co and the Commonwealth to scope and develop such initiatives, and notes that existing Victorian initiatives for regional fibre, greater mobile coverage, emergency services networks, and greater digital accessibility all align with the NBN.

5.8.2   Addressing the "non-premises" issue

In addition, greater attention is required on services to "non-premises" such as remote monitoring devices and security cameras. Many of these services currently rely on the legacy analogue network (the copper-based public switched telephone network—PSTN) which will be replaced as the all-digital NBN is rolled out. Timely and comprehensive solutions are required to avoid costly service disruption or inefficient individual work-arounds. The Victoria Government (and other state governments) are extensive users of non-premises services, to a range of applications including traffic lights, traffic monitoring devices, and remote sensing equipment, with a strong vested interest in timely and efficient solutions.

While NBN Co has historically had responsibility for devising solutions for connecting non-premises, we are not aware of substantial progress being made to date. Close coordination between the Commonwealth, NBN Co, state governments, industry and other stakeholders is required for effective and efficient solutions.

Appendix A: Victorian Government responses to the Discussion Paper questions

Table A.1: Working assumptions on policy and regulation

Assumption	Response
1. 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 Commonwealth has expressed a policy objective of ensuring universal access to minimum download data rates of 25 Mbps, and the NBN Co Strategic Review has proposed an approach that would provide 50 Mbps to 90 per cent of the fixed line footprint by end-2019.	Agree the Panel should <u>assume</u> a requirement on NBN Co to provide a universally-available baseline broadband service with defined minimum download and upload data rates. The Panel should <u>note</u> the possibility of adoption of the pre-election commitments of a universally-available 25 Mbps service by 2016 and 50 Mbps by 2019 (but not see them as firm policy constraints), and recognise the likely merit of a more flexible fit-for-purpose approach including additional planned FTTP network and co-funded fibre extensions to meet business demand-supply gaps—see details in Section 5.3.2 of the submission. The Victorian Government understands the Commonwealth will make a firm policy decision on these and other NBN matters only when the various NBN reviews are completed in mid-2014. The Panel should also <u>note</u> and address the option of redefining of the current voice-based Universal Service Obligation (USO) to a minimum standard broadband service—see details in Section 5.7 of the submission.
2. End-users should have access to designated services at an affordable price regardless of where they reside or carry on a business, with any inherent subsidies as transparent and efficiently delivered as is reasonably possible.	Agree the Panel should <u>assume</u> a uniform national pricing requirement for designated NBN Co services (making NBN Co responsible for a core part of a broadband USO), to be delivered as sustainably, transparently, and efficiently as possible. This is important for driving regional development and social equity—see details in Section 5.7 of the submission. The Panel should <u>note</u> that a uniform national price requirement may involve significant cross-subsidies—from urban to regional areas and from more densely populated States, such as Victoria, to less densely populated States. See funding options in Table A.2 below (Question 2).
3. NBN Co will operate on a commercial basis and is a key mechanism to ensuring that the Government's broadband policy objectives are met.	Agree the Panel should <u>assume</u> that a commercially-based NBN Co is a key mechanism for delivering the Commonwealth's broadband policy objectives, <u>noting</u> the possibility of future privatisation of NBN Co—see details in Section 5.6.2 of the submission. The Panel should <u>recommend</u> to the Commonwealth the parameters defining NBN Co's commercial operations as a GBE, including the return on investment target, how funding from the Commonwealth should be costed, and how the terminal value of the business should be calculated.
4. NBN Co will primarily operate at Layer 2 in the service	Agree the Panel should <u>assume</u> NBN Co will primarily operate at OSI Layer 2, and be restricted to the access network—see details in

stack to provide scope for downstream innovation and product differentiation.	Section 5.6.2 of the submission. The Panel should <u>recommend</u> the strictly limited circumstances under which NBN Co can operate beyond OSI Layer 2, and the regulatory instrument for approval to do so (e.g. a subordinate disallowable instrument or a shareholder ministers' Statement of Expectations).
5. Rollout of the NBN will achieve the structural separation of Telstra in respect of retail fixed network services supplied in the mass market.	The Panel should <u>assume</u> Telstra will be structurally separated (vertically), but <u>not assume</u> the rollout of the NBN will achieve this. Deployment of an FTTN network would mean the copper network is not retired in parallel with NBN rollout, and the continued ownership and operation of the copper network by Telstra (rather than NBN Co or a third party) may be the most efficient solution. The Panel should <u>recommend</u> the appropriate structural separation arrangements for Telstra in the event it retains ownership and/or control of the copper network see Section 5.6.2 of the submission.
6. Any restrictions imposed by policy, statute, or regulation on commercial investment in and supply of telecommunications services should be no greater than needed to promote the long-term interests of end-users, and should be subject to periodic, transparent, and independent review to ensure their benefits exceed their costs.	Agree the Panel should <u>assume</u> this widely-accepted principle of good public policy is an objective of the Commonwealth.
7. There should be no restrictions on retail level competition (other than those necessary for end-to-end connectivity and consumer protection).	Agree the Panel should <u>assume</u> there would be no restrictions on retail level competition other than as described. Retail regulation is not needed—and is likely to be damaging—if there is effective wholesale competition (including through regulated access to bottleneck networks). However measures to stimulate retail competition should be considered as retail margins have increased in recent years—see Section 5.6.1 of the submission.
8. If a network owner has a substantial degree of market power, there should be safeguards against behaviour that provides advantages to its own upstream or downstream operations over those of competing providers that cannot reasonably compete without access to its network.	Agree the Panel should <u>assume </u>there would be safeguards against the vertical exercise of market power by network owners. The Panel should <u>recommend</u> on the definition and identification of vertical market power, with the objective of avoiding undue restriction on innovative vertical investments by smaller operators that are in the long term interests of end users.

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9. Any regulation should be no more intrusive or burdensome than needed, and should be proportionate, transparent, predictable, and accountable in its operation.	Agree the Panel should <u>assume</u> this widely-accepted principle of good public policy an objective of the Commonwealth Government.

Table A.2: Who should provide broadband services and how should uneconomic services be funded?

Issue	Response
1. Who should provide relevant broadband services—NBN Co and/or other parties?	NBN Co's primary functions should be the NBN investment coordinator and wholesale channel. This allows the option of other parties playing a role in NBN construction, including the use of their assets. The key priority is to get universal coverage for a minimum grade service (for example, 25 Mbps) as soon as possible, and higher speed FTTP services available in pockets of existing business demand see Section 5.6 of the submission. The Commonwealth can then consider NBN Co's role in further network upgrade, including the option of contracting Telstra to do this. Telstra has the expertise and experience to do this well, but it brings the challenges of Telstra's effective structural separation, and negotiating a reasonable price for the upgrade. A key issue is how much backhaul NBN Co should provide in its wholesale access service. That is, should NBN Co keep to its current footprint as defined by the 121 PoIs, or reduce the number of regional PoIs and provide more regional backhaul? —see Section 5.6 of the submission.
2. How should non-commercial and uneconomic services be funded, and what are the implications of alternative funding options for the design and functioning of the markets in which telecoms services are provided? **(See section 3(7) of the submission)**	The options for funding non-commercial/uneconomic NBN Co services include: • Continue with the previous Government's approach of granting NBN Co a legislative monopoly at the wholesale level, and setting the nationally averaged price for core services at a level that generates sufficient income to cover its full costs (urban and regional). This would forego any benefits from network level competition to ensure internal funding of the cross-subsidy, • Restrict network competition by the major service providers (e.g. Telstra and Optus), but allow smaller operators to install competing infrastructure. This could still place an unsustainable burden on NBN Co, depending on the success of these competing networks in winning market share. It would also limit productive efficiency benefits from competition by excluding the most efficient operators that have economies of scale and network experience, • An industry levy to cross-subsidise NBN Co's requirement to service high cost regional areas. This is the traditional approach for telecommunications, including previously for Telstra's voice USO, recognising the likely resistance of MNOs to cross-subsidising their direct competitors, • Funding NBN Co's revenue shortfall from consolidated revenue, effectively placing the burden of network competition and uniform national pricing on all taxpayers. • Allow for full up-front competition to supply the wholesale market

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	in urban areas, with the winner selected on the size of the contribution it makes to funding NBN Co's unrecovered regional costs. This approach recognises the natural monopoly characteristic of many utility networks, while introducing greater competition in technology choice, use of existing assets versus new build network, operating costs and management of build and volume risks.

Table A.3: Structural issues

Question	Response
1. What broader structural model(s) for the industry should the panel consider? Why? Should the panel be considering significantly different industry scenarios to those outlined above? If so, what are those scenarios and why should they be considered.	Relevant alternative models are covered in the working assumptions above (Table A.1), and the response on ways of funding non-commercial and uneconomic services (Table A.2) – also see Section 5.6 of the submission.
2. Should the panel consider and adopt working assumptions other than the ones outlined on page 5 of the Framing Paper? How should the assumptions be prioritised and trade-offs assessed? **(See section 3(6) in the submission)**	The Panel should adopt the following additional working assumptions: • NBN Co's prime role is as investment coordinator and national wholesaler, with the option of NBN Co contracting out network upgrade/build and operation where it is efficient to do so, • A mixed technology network should be deployed, using existing infrastructure where it is efficient to do so, • Commonwealth policies that shape industry structure and specify regulatory frameworks need to be compatible with the possibility of NBN Co privatisation in the future, and • Shareholder Ministers' Statements of Expectations will be used to guide NBN Co's policy and operational decisions while it remains in full Government ownership. All the assumptions listed by the Panel in the Discussion Paper are appropriate. These should be prioritised as follows: • The two outcomes-focussed assumptions are the most important: universal provision of baseline broadband services and affordability, • The key industry structure assumptions are the next priority: NBN Co to operate commercially, NBN Co wholesale-only and Telstra structural separation, • Next in importance are the assumptions relating to where competition regulation is and isn't needed: no retail level competition regulation and regulation of upstream SMP • Finally, there are the assumptions on regulatory principles: regulation of commercial investment only if to do so is in the LTIE and regulation proportionality and transparency.
3. Should NBN Co continue to be subject to wholesale-only (structural separation) and open access requirements? If so, to what extent and under what	NBN Co should continue to be wholesale-only, given its inherent bottleneck market power. This structural solution effectively removes the scope for NBN Co to exercise vertical market power, and strengthens its incentives to treat all access seekers equivalently. This mandated "vertical separation" of NBN Co

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circumstances, if any, should those obligations apply to other market participants?	circumscribes the difficult task of regulating NBN Co and the associated risk of costly regulatory error (reduced economic efficiency from a misallocation of resources).
	If other operators with significant vertical market power (such as Telstra and Optus) are to provide broadband network services as part of the NBN, their effective structural separation could be implemented by requiring them to only supply these services to NBN Co, with NBN Co on-selling them as NBN wholesale services. For smaller operators that do not have significant market power, enforced structural separation may not be appropriate, as it could stifle their incentive to invest in creative new network solutions (such as fibre to MDUs) which can ease the new build burden on NBN Co – see section 5.6 of the submission.
4. Should all market participants, including NBN Co, be subject to the same regulations to the greatest possible degree or are specific regulations that do not apply across the board necessary and justifiable in some areas? To the extent to which there should be specific regulations, what are the purpose, nature, and scope of the differences?	A one-size-fits-all regulatory approach is unlikely to be economically efficient, as demonstrated in the response to Question 3 above. Instead, regulatory design should be based on the basic principle of regulating network operators depending on the type and extent of their market power. That is, operators with similar market power should be subject to the same competition regulation, which could differ from that for operators that have different types or degrees of market power.
5. To what extent should competitive neutrality between NBN Co and other market participants be ensured? How?	Competitive neutrality is an important public policy principle that should be followed, as part of the commercial approach for NBN Co and in preparation for possible privatisation. The general principles of competitive neutrality are well-understood, but a particular challenge exists in their application to NBN Co. This is how to neutrally cost the funding by the Commonwealth of NBN Co's large capital expenditure while setting an achievable return on investment that does not require on-budget Commonwealth contributions or sharp rises in NBN Co prices over time. The general principle is that there be an implicit government guarantee fee on funds borrowed by the government on behalf of NBN Co
6. Where there are providers other than NBN Co supplying fixed network services, should there be provisions that ensure consumers secure particular outcomes, for instance by comparison to those generally available from NBN Co?	Yes. NBN Co could eschew network investment in areas served by other operators, with either NBN Co on-selling wholesale services from the operators, or these operators selling these services to retail service providers themselves. In either case these third parties operators would need to provide baseline broadband services comparable to NBN Co's core services, with price constraints similar to those imposed on NBN Co.
	See Section 5.6.2 of the submission.

7. Where an infrastructure provider other than NBN Co delivers outcomes comparable to those delivered by the NBN, what obligations on, or restrictions to, should apply on NBN Co? For example, should NBN Co be prevented from overbuilding that network?	There may be benefit in NBN Co being prevented from overbuilding third party networks providing NBN services, at least a certain period. Limited overbuild competition holidays (for example, five years) to stimulate private sector investment have been used in some jurisdictions for major infrastructure projects. The Panel should investigate such precedents for possible use here. See Section 5.6 of the submission.
8. Were NBN Co to be restricted in supplying services in areas serviced to a specified standard by other network operators, what undertakings, if any, should those operators be required to give about ongoing performance? Noting links with Q3 on wholesale-only and open access requirements, would it be sufficient to rely on Pt XIC processes to secure access to services on these networks, or on Part XIC processes that were further refined?	See responses to questions 3-6 above for the general principles that should apply in these circumstances. The Victorian Government does not have a view on the detailed legal and regulatory arrangements necessary.
9. What are the essential characteristics that service provided over a network other than NBN Co's should have to meet for those services to be seen as operating on an NBN-comparable basis? For example, should it include the following: • Ability to support certain minimum broadband speeds, • Provision of wholesale services on an open access basis (possibly with structural separation or some equivalent method of ensuring non-discrimination) and support for retail level competition, • Obligation on at least one provider to service all customers within a service	Nothing to add to this list.

area, • Acceptable performance characteristics—for example latency, jitter, loss, and network availability, • Price structures and levels that provide affordable access, • Credible, transparent. and predictable upgrade paths to higher speeds, • The ability to support voice services and the various legacy services, and • Clear and reasonable timeframes for connection and service restoration?	
10. To what extent should the provision of non-commercial services by NBN Co be funded through cross-subsidies, and if so, what safeguards, if any, should apply to those cross-subsidies?	See the response to Question 2 above in Table A.2, and Question 11 below.
11. If it is not feasible or sustainable in a competitive market for NBN Co to earn sufficient revenue to enable it to cross-subsidise uneconomic customers, how should services to those customers be provided and funded?	An inevitable result of the Commonwealth opting for competition at the network level (infrastructure competition) is the inability of NBN Co to sustainably cross-subsidise service provision in high-cost regional areas. This reflects the inherent tension between the goals of network competition and uniform national prices—competition in lower-cost areas would limit NBN Co's scope to earn the urban margins necessary to fund uneconomic regional deployment. There are a number of possible solutions to this policy challenge: • Restrict network competition by the major service providers (such as Telstra and Optus), only allowing smaller operators to install competing infrastructure. This could still place an unsustainable burden on NBN Co, however, depending on the success of these competing networks in winning market share. It would also limit the productive efficiency benefits from competition by eliminating the most efficient operators (Telstra and Optus) that have economies of scale/scope and network build experience, • An industry levy to cross-subsidise NBN Co's requirement to service high cost regional/remote areas. This is the traditional approach for telecommunications, including previously for

	Telstra's voice USO,
	• Funding NBN Co's revenue shortfall from consolidated revenue, effectively placing the burden of network competition and uniform national pricing on all taxpayers. While this approach has economic merit, it is likely to face practical public finance constraints,
	• Alternatively, policy could allow for full up-front competition to supply the wholesale market in urban areas, with the winner selected on the size of the contribution it makes to funding NBN Co's unrecovered regional costs. This approach recognises the natural monopoly characteristic of many utility networks, while introducing greater competition in technology choice, use of existing assets versus new build network, operating costs and management of build and volume risks.
12. What approach should be taken in new developments? Do they raise particular structural regulatory issues?	Current arrangements that give NBN Co primacy in the provision of wholesale access services in new developments have created the problems of:
	• Distracting NBN Co management from rapid and efficient NBN rollout in brownfields areas,
	• Adding substantial costs to NBN Co's operations by urgent re-deployment of rollout crews to service behind-schedule new estates,
	• Long delays in getting fibre infrastructure in place in new developments,
	• Limiting competition in the construction of fibre networks, and
	• Restricting the development of fibre network rollout skills to NBN Co and its sub-contractors.
	Changing the arrangements to encourage the private sector to deploy and operate fibre networks in new developments on an NBN-equivalent open access basis would address these problems.
13. Should responsibility for the economic regulation of telecommunications remain with the ACCC?	The Victorian Government does not have a view on this matter. It proposes the matter be formally referred to the Review of Competition Policy announced by the Commonwealth in December 2013, with the following observations:
	• In many developed countries economic regulation of telecommunications is the responsibility of a specialist agency rather than the general competition regulator (e.g. Great Britain, United States, Canada, France, and Germany), and
	• A key rationale for the current arrangements, the anticipated coming together of telecommunications competition regulation with the national access regime, has not occurred. Rather, the telecommunications regime has moved further away from the national arrangements with the removal of appeal rights on ACCC arbitration decisions, and explicit

	wholesale price setting powers vested in the ACCC when declaring telecommunications access services.

Victorian Government Submission

Cost-Benefit Analysis and Review of Regulatory Arrangements for the National Broadband Network - Regulatory Issues Framing Paper

Appendix B: Demand-supply shortfall results

The following table shows the top 20 Victorian and metropolitan locations ranked by their business un-met demand for broadband services above 50 megabits-per-second.

Top 20 Victorian regional locations - ranked by unmet business demand ($ per annum) for high grade broadband services (above 50 Mbps)

Rank	Spatial unit	Number of businesses with unmet demand - 2013	Potential spend of businesses with unmet demand ($ pa) - 2013	Number of businesses with met demand - 2013	Spend of businesses with met demand ($ pa) - 2013	Average business size	Number of businesses (by employee range)				Total number of employing businesses
							1-4	5-19	20-199	200+	
1	Geelong*	2,027	17,182,182	592	5,017,020	7.8	2687	1443	530	30	4690
2	Bendigo	1,450	12,639,751	-	-	8.5	1529	850	337	6	2722
3	Mildura	739	6,468,657	-	-	8.6	733	467	169	3	1372
4	Warrnambool	671	5,725,564	-	-	8.1	573	411	144	6	1135
5	Ballarat*	637	5,279,316	959	7,952,053	7.5	1672	938	320	13	2943
6	Shepparton – Mooroopna*	532	4,586,856	466	4,018,878	8.1	944	575	206	12	1736
7	Wodonga	530	4,127,320	-	-	6.6	584	344	96	3	1026
8	Traralgon	397	3,256,131	-	-	7.6	422	279	83	0	783
9	Echuca	360	3,136,150	-	-	8.2	358	237	74	3	672
10	Sale	305	2,988,859	-	-	9.6	274	188	62	6	530
11	Wangaratta	349	2,879,031	-	-	7.6	414	234	72	0	720
12	Morwell	254	2,760,328	-	-	12.4	165	152	71	3	392
13	Horsham	333	2,642,845	-	-	7.0	370	237	64	0	672
14	Bairnsdale	309	2,594,540	-	-	7.3	318	233	52	3	606
15	Warragul	343	2,291,306	-	-	4.6	442	234	44	0	720
16	Colac	222	1,934,125	-	-	7.8	206	135	40	4	385
17	Torquay - Jan Juc	270	1,901,151	-	-	5.4	375	149	45	0	570
18	Ocean Grove - Barwon Heads	269	1,899,552	-	-	5.6	360	135	49	0	543
19	Hamilton	223	1,860,579	-	-	8.0	240	141	50	0	431
20	Swan Hill	221	1,786,741	-	-	7.4	231	154	45	0	431

* NBN construction activity is taking place in parts of Geelong, Ballarat and Shepparton

Top 20 Victorian metropolitan locations - ranked by unmet business demand ($ per annum) for high grade broadband services (above 50 Mbps)

Rank	Spatial unit	Number of businesses with unmet demand - 2013	Potential spend of businesses with unmet demand ($ pa) - 2013	Number of businesses with met demand - 2013	Spend of businesses with met demand ($ pa) - 2013	Average business size	Number of businesses (by employee range)				Total number of employing businesses
							1-4	5-19	20-199	200+	
1	Dandenong	1,009	12,687,746	-	-	15.2	625	543	303	18	1490
2	Richmond (Vic.)	1,189	11,434,818	-	-	9.7	1054	604	274	20	1952
3	Port Melbourne	1,004	11,087,976	-	-	12.3	736	468	266	21	1491
4	Dandenong South	863	10,851,046	-	-	15.2	534	464	259	15	1272
5	South Melbourne	1,058	10,078,608	65	620,551	9.6	971	550	261	19	1802
6	South Yarra	992	8,536,342	-	-	7.5	868	446	175	26	1514
7	Dingley Village	680	8,169,442	-	-	14.4	494	370	204	9	1077
8	Campbellfield	685	7,392,246	-	-	12.7	508	423	206	3	1140
9	Bayswater (Vic.)	607	7,011,612	-	-	13.0	523	380	158	9	1069
10	Mount Waverley	840	6,810,187	-	-	6.8	1007	411	145	13	1576
11	St Kilda (Vic.)	804	6,352,294	-	-	7.0	766	335	165	11	1276
12	Thomastown	674	6,211,343	-	-	9.4	558	469	161	3	1191
13	Preston (Vic.)	714	6,150,073	-	-	8.1	671	369	153	9	1202
14	Cheltenham (Vic.)	677	6,096,300	-	-	8.1	721	362	123	14	1220
15	Moorabbin	542	5,956,934	-	-	12.3	482	271	147	8	909
16	Clayton	550	5,402,207	-	-	10.4	423	304	138	7	872
17	Hawthorn (Vic.)	701	5,396,998	-	-	6.2	821	335	116	10	1282
18	Mulgrave (Vic.)	528	5,330,074	-	-	11.1	434	255	146	6	840
19	Hallam	456	5,174,236	-	-	13.1	302	269	129	6	707
20	Rowville	605	4,951,367	-	-	7.2	709	253	117	9	1088