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Submission on the National Broadband Network Request for Proposals

Submission to the National Broadband Network Expert Panel

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Introduction

This submission is in response to the call by National Broadband Network panel of experts for comments into the specifics on the request for proposals to construct a national, high-speed broadband network in Australia. My comments here are based on research I conducted into the nature of Australia's broadband needs and the constraints on broadband investment. That research was published by the Committee for the Economic Development of Australia (CEDA) in December 2006¹ and in the journal, *Public Policy* in 2007.²

In this submission, I outline some options that I believe would (a) improve the appropriateness of broadband provision across Australia and (b) increase the degree of competition amongst potential providers. Each is based on the notion that there is local variation in both broadband demand and the appropriate means of supplying broadband. I outline the sources of that variation first before considering how this impacts on tender design.

Local variation in demand and supply³

I begin by outlining the local variation in both the demand and supply of broadband. What this means is that we need to **challenge** a common perception that the 'solution' for Australia's national broadband provision must be a single provider. When both the needs and the technical solutions vary from locality to locality, the scale arguments made for one provider do not necessarily exist and there is potential for there to be a number of providers.

Indeed, it is first useful to note that statistics that demonstrate that Australia's national broadband performance is poor conceals considerable local variation that already exists. First, higher-speed broadband connections are available across Australia. The cable network passing over two million households now offers speeds for up to 30 Mbps, and DSLAM (Digital Subscriber Line Access Multiplexer) investments in exchanges allow faster ADSL2+ connections to many establishments (more so now that Telstra has switched on its equipment across many exchanges).

Second, there are even better options for business. Most central business districts have high-speed broadband access with fibre connections right to the establishment, offering Internet access comparable with the best overseas services. Indeed, for researcher networks, AARNet provides 10Gb connectivity linking key health and education centres.

What this means is that where economic activity relies on high-speed broadband access, Australia has options. As in the early days of the Internet, it may be that businesses need to consider carefully their location to exploit them. But if a business needed connectivity to compete, they could procure it from within Australia.

Broadband access is, however, an issue for households and businesses outside the central business areas. But this has very different implications for national economic growth and competitiveness.

Where are the economies of scale?

The recent debate over a possible Telstra and G9 fibre-to-the-node (or FTTN) roll-out in Australia has centered on the vexing issue of 'economies of scale'. Its advocates argue that FTTN requires a substantial lump of investment and unless private firms can be assured of earning a decent rate of return on that entire lump, it is not worth investing. For this reason, therefore, limited investment taking place.

It is very easy to be seduced by this argument. But one should be sceptical about equating plans for lots of investment with an argument based on economies of scale. Indeed, the early history of the Internet demonstrates the danger of assuming

¹ Joshua Gans, "The Local Broadband Imperative: Appropriate high-speed internet access for Australia," *Information Paper*, No.86, CEDA.

² Joshua Gans, "[Looking Local on Broadband.](#)" *Public Policy*, Vol.2, No.1, 2007, pp.10-24.

³ Parts of this section are drawn from *ibid.*

the existence of scale economies. A dial-up connection could be provided relatively easily and affordably to a small set of users. The end result: dial-up ISPs emerged all over the place.

Access to broadband poses a tougher task. However, it is not necessarily a national endeavour. If you want to build, say, a large base-load power plant, you need to be assured of demand from a million or more households or establishments. With broadband, each investment required is in the tens of thousands of users, in a very limited geographic area. With enhanced broadband, each investment (for example, a FTTN connection) requires revenue from several hundred customers. And when we get down to fibre-to-the-home (FTTH), it is one connection per home.

What this means is that to justify improvements to broadband infrastructure, a firm does not require a return over all areas. Instead, it must make an adequate return on an area-by-area basis. Not surprisingly (as with similar services), the prospects of making a return will vary from one location to the next. For the same reason, we should expect broadband infrastructure investments to vary between locations.

If there are economies of scale that justify government protection from competition and/or funding, they are not national in scope. Indeed, for the investments needed to connect most households to higher-speed connections, the economies (if they exist) are local in nature, at the level of exchanges or even streets.

It is worth noting that one 'national economy of scale' argument that does not appear to be proffered is the idea that one technology will fit all locations. It appears that when it comes to this choice, the geographical issues are hard to ignore. Essentially, the chief bottleneck (at least in non-regional areas) appears to be on investment in the last mile connecting households with the broader network. Many different technologies can be used – including both wired and wireless solutions – and the best technology is likely to depend on – and has costs based on – local conditions. Consequently, the appropriate solution may differ from exchange to exchange. Efficient investment decision making will require mechanisms responsive to local conditions.

Are the applications national?

Even if the investment required is not national, it is often argued that adoption needs to be national to encourage the development of applications that give value to Internet access and use. The argument is one that often seems rather compelling. First, without content, the Internet is just lines and equipment. Second, content development has economies of scale. Hence, it is argued that without sufficient access, content will not be developed – that the value of broadband adoption is subject to network effects.

Network effects have played a role in the adoption of many general purpose technologies including electricity and telecommunications. In the case of the latter, there were doubts that the need was there. When the first long-distance telegraph was introduced, Henry David Thoreau said 'They tell us that Maine can now communicate with Texas. But does Maine have anything to say to Texas?' Not then, but soon enough it did, and the actual communications was the chicken that followed the egg of pre-emptive investment in telecommunications. Similarly, it was the development of reliable electric power flows that eventually convinced businesses to reorganise themselves around electric power.

Network effects mean that early adopters may require subsidies because the full benefits of adoption only arise as more users come online. Network effects also mean that infrastructure providers will need to be patient because returns will be 'back-loaded' over time. There are, however, several layers of network effects. And the impact of these network effects determine how long the network providers will have to wait for adopters to place full value on broadband improvements.

To see this, consider the layers of network effects. The first layer is global: an application that utilises the Internet and the content available on it is "world wide" in its network effects. The more adopters there are around the world, therefore, the greater the case for an Australian to adopt. Similarly, for applications that require higher bandwidth, the more users there are with that bandwidth, the more likely it is that appropriate applications will be developed.

The good news for Australian investors is that Australia is a laggard. That means that if there are global network effects, they will already be realised as a result of demand and adoption elsewhere. Thus, there will be no reason to wait and subsidise early users. The value is already there. Indeed, it is well known that Australians are among the more prolific downloaders of

music and video content. While this does not benefit copyright owners, the ability to do this can drive broadband adoption. This is how a global network effect can be exploited without the usual cost associated with delayed adoption.

Similarly, gaming applications that have grown with higher-speed broadband investments in Korea and Japan are available now, and with similar investments here, Australian residents would be able to access these applications. However, the value of that is person by person and not national in scope. Hence, the development of such content does not require high national broadband take-up within Australia.

The proponents of a national broadband plan have recognised this and have argued that, in fact, the network effects are national in scope. For this reason, high-definition television, video-on-demand and movie download services are often touted as reasons to improve Australian broadband. Proponents argue that without sufficient adoption, those services would not be possible. But as noted earlier, the case for such instant content provision to drive or justify broadband improvements is weak.

The best contender for a national layer of network effect relates to the use of e-commerce. The more businesses that offer online services to consumers in particular country, the greater the value of adopting reliable Internet connections in that country. The issue is, however, that it is difficult to see these benefits as being substantially improved by improving broadband beyond current levels. Put simply, there is little evidence to suggest that bandwidth is the critical constraint here. The data flows required for transactions can be achieved without broadband.

If there are to be new network effects within Australia from better broadband, they are likely to be highly localised. As noted earlier, the applications most likely to make improvements in broadband valuable are social in nature. For activities such as video conferencing and business collaboration, these applications may appear to be largely independent of distance. Social Internet interactions, however, are likely to be driven by people you know and who are most likely located close to you:

Most email exchanges (excluding spam) occur between people located in the same city. Teenagers who are engaging in instant messaging are doing so with their friends who attend the same local school. Thus, it would not be surprising that a medical diagnosis conducted over the Internet would be with your local doctor (to avoid waiting rooms), even if what we imagine is the greatest social value will be longer-distance diagnosis. Collaboration and conferencing tools will also assist in telecommuting, which will largely take place between users in the same city.

In summary, there is a case that the network effects from the adoption of improved broadband services are likely to be local. It is for this reason that countries that have led in the investment in these services have also led in the adoption of them. If the network effects were global, adoption would have lagged.

Implications for the Tender Process

The notion that local variation matters for broadband value and provision has implications for the tender process. Already that variation has meant that high-speed broadband has been provided in some localities and also over mobile networks. It has been provided where demographics and geography combine to make it affordable. It has been provided where business interests are most concentrated. And it has been provided where competitive pressures have driven investment.

What the current push by government to invest in high speed broadband relates to are those areas where it is not currently available; where we can't rely on the market to provide those services. However, that does not mean that we want to generate a single national provider as the outcome of this tender process. **The government can potentially have multiple providers to assist it in a national roll-out.** Moreover, the tender process itself -- thoughtfully constructed -- can sort out that very issue.

The notion that a tender process need not compel a single provider has long been recognised in telecommunications. The auctions for spectrum for use in mobile networks over the last decade resisted calls for licenses that covered the nation or even units like states. Instead, locality-based licenses were offered and while some parties bid for them all, others bid for some of the more densely populated ones. The end result was an increase in competition and a mixture of providers.

The very same possibility exists for broadband. **A FTTN network can be constructed and bid for exchange by exchange.** If it turns out that it is efficient for there to be a single national provider, that provider will win all of the exchanges. However, it may also be that competition is so intense for some localities that no public outlay is necessary and in those localities multiple providers can emerge. Moreover, in some localities, providers may opt for superior solutions than a FTTN network (perhaps a fibre to or within the home arrangement).

The details regarding auction design based on combinatorics have been tried in Australia in spectrum and also in other areas such as forestry. They have established credentials around the world.⁴ **Utilising them could save the Commonwealth Government hundreds of millions of dollars.** Moreover, when combined with regulation to allow multiple provision of high speed solutions from a given exchange, the network constructed can be provided to consumers in a relatively cheap manner.

⁴ For a good starting point in review see Paul Klemperer, *Auctions: Theory and Practice*, Princeton University Press, 2004 (also available [here](#)).