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**Conference Paper**

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# **Waiting for the National Broadband Network: Challenges of Connectivity in Regional Australia**

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## **Abstract**

There is enormous demand for high quality, reliable broadband service in regional Australia. But despite years of planning and promises, significant action to improve access to broadband services has not yet taken place in regional Australia. In fact, following a 2013 change in the federal government, there is now greater uncertainty as to the nature and timing of investment as the government-owned National Broadband Network company (NBN Co) is reviewing its approach and rollout schedule. This paper explores the need for better broadband in regional Australia and outlines the failure of the NBN to deliver improvements in a timely way. It notes that the prospects for immediate improvements in broadband availability in regional Australia are not good. Actions to reduce the politicization of broadband development and to diminish uncertainty in planning, to encourage the inclusion of mobile broadband in infrastructure rollout, and to facilitate more local and regional involvement in planning and funding are likely to improve longer term outcomes.<sup>2</sup>

**Keywords:** broadband, availability, regional, Australia

## **1. Introduction**

This paper presents a case study of the deployment of broadband to serve regional Australia. It uses documentary analysis to review the twenty year period from 1994, when the Australian government first commissioned a report to understand the benefits of broadband, to 2014, five years after the National Broadband Network was announced, and three years before it was expected to be completed. Concluding that the National Broadband Network

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<sup>2</sup> Note that this paper has taken a somewhat different direction than that proposed in the initial abstract submitted to the ITS 2014 conference. Timing of the research is such that we have not yet concluded the fieldwork with rural communities envisaged initially. This paper provides necessary context for research into the development of broadband in regional Australia, and offers a broader contribution as a case study of the challenges of managing a large scale public broadband deployment in a changing political environment.

has not yet been effective in substantially improving broadband access in regional Australia, it investigates the factors that have delayed the progress. Section 2 provides an overview of studies documenting demand for improved broadband, notes the long standing tradition of ensuring equitable access to communications infrastructure in Australia, and outlines previous programs designed to improve broadband availability, offering context to understand the environment in which the National Broadband Network was deployed. Section 3 describes the objectives of the National Broadband Network project, and argues that despite plans to prioritize the rollout of better broadband in underserved areas in regional Australia, these areas are still waiting for improved service. It notes the delays and uncertainties caused by a change of government, and suggests that it will be some time before widespread improvements are realized. Section 4 concludes with a reflection on the difficulties of the NBN approach, and identifies challenges and opportunities relevant to any entity attempting to improve broadband access in a non-urban setting.

## **2. Background and literature review: Broadband in regional Australia before the National Broadband Network**

The question of how to ensure Australians have the broadband communication services they need has been on the Commonwealth (federal) government's agenda since 1994. This section begins with an overview of initiatives designed to understand demand for broadband across the country, with a specific focus on various inquiries that explored the needs of regional Australia. This is followed by a discussion of the approaches to ensuring equitable access to telecommunications services across the country, and then by an overview of the specific initiatives designed to improve broadband services in regional Australia in the years before the National Broadband Network. This information provides context for the discussion of the impact of waiting for the National Broadband Network (NBN).

The NBN was announced in 2009 with an planned completion date of 2017, at which time high quality broadband services were to be available to 100% of premises in the country. As almost 40% of Australians live outside major cities, the promise of better broadband in regional Australia was a welcome one. Close to 15% of the population lives in rural or more remote settings (Budge & Chesterfield, 2011), and this population in particular has had challenges in getting communication services that are equivalent to those available in the larger centres.

## *2.1 Demand for quality telecommunication services in regional Australia*

In launching *Networking Australia's Future*, the final report of the Broadband Services Expert Group (Broadband Services Expert Group, 1994), the then Prime Minister of Australia Paul Keating called on Australians “to decide, as from now, that access to the national information infrastructure will be no less a general right than access to water, or public transport or electricity. It must not and need not be in any way the preserve of business, or the better off, or those who live in the major population centres, or who attend better schools. It has to be a fundamental right of all Australians” (Keating, 1995, p. 4). The report examined demand for ‘new communications services,’ capturing the excitement around the possibilities for new ways of communicating, and arguing for the transformative potential in all sectors of Australian life. Noting that there was still much uncertainty around how broadband technologies would evolve, the report called for a user-oriented focus, recommending that infrastructure be built over time as communication needs required.

Throughout the report, there is an emphasis on access and inclusion, and a recognition that access should be equitable regardless of geographic location. “Access to the network for both users and service providers is fundamental. This access must be equitable if our society is to share the benefits of the emerging communications environment, but our geography means this will be no easy task.” It then asks the question for which now, twenty years later, there is still not a clear answer: “How can we provide for people living in rural and remote areas, or those with special needs, or poorer people, services equivalent to those available to people living in wealthy city areas?”<sup>3</sup> What is evident, based on many studies including those noted briefly below, is that there has always been enormous demand for access to quality communication services across Australia, and that the needs of those outside the five major urban centres (Sydney, Melbourne, Brisbane, Adelaide and Perth) are not always well-served.<sup>4</sup>

The 2000 Telecommunications Service Inquiry was asked to assess “the adequacy of telecommunications services in Australia.” After extensive consultations across the country, the inquiry panel observed “the greater degree of concern expressed by rural and remote

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<sup>3</sup> The electronic version of this report is not paginated. These quotes are from the Summary and Recommendations section of the document.

<sup>4</sup> This paper does not consider the specific needs of Australia's indigenous communities, which face challenges beyond remote location. Abetz (2001), the Australian Communications and Media Authority (2008) and Rennie and colleagues (2010; 2013) offer some insights into these challenges.

Australians about service levels compared with those in metropolitan areas,” and noted “People in regional, rural and remote Australia told the Inquiry they want access to services on an equitable basis compared with their counterparts in metropolitan and large urban centres” (Telecommunications Service Inquiry, 2000, p. 1). In particular, many concerns were expressed about poor mobile phone coverage and slow and unreliable internet connectivity in rural Australia. The inquiry highlighted the importance of resolving the telecommunication disadvantages faced by those in rural and remote Australia.

In 2002, the Minister for Communications, Information Technology and the Arts established a panel of inquiry to look specifically at the adequacy of telecommunications services available in regional, rural and remote areas of the country. This Regional Telecommunications Inquiry consulted widely and found that “Access to higher bandwidth services is becoming vital for the economic and social development of regional, rural and remote Australia.” Further, it noted “a pressing need to assist consumers wanting better performance to migrate to higher bandwidth digital Internet services, whether at the ISDN level (64–128 kbps) or at the higher bandwidth levels that can be provided by ADSL, cable, fibre and satellite technologies” (Regional Telecommunications Inquiry, 2002, p. 205). The inquiry found strong recognition of the value of internet access at higher speeds and noted a “rapidly growing, real level of demand for these services” (p. x), beyond that which had been noted in the 2000 inquiry. It also noted continued strong demand for affordable mobile telephone services. The inquiry recommended that the government create an incentive scheme to encourage investment in broadband outside urban areas.

By 2008, broadband was the preferred mode of internet access across the country. 83% of business and 84% of household internet subscribers had a broadband connection (Australian Bureau of Statistics, 2009). It was in this context that a Regional Telecommunications Review panel investigated whether Australians in regional, rural and remote parts of the country had “equitable access to significant telecommunications services that are also available in urban areas” (Regional Telecommunications Independent Review Committee, 2008, p. vi). The panel noted the importance to access to telecommunications services not just for communication but as “critical enablers in the equitable availability of other services,” thus reinforcing the disadvantage experienced by those without good services. The panel explicitly reported on the significance of mobile telephony and broadband internet services in everyday life, noting their role in enabling social inclusion, delivering

education, supporting delivery of health care and allowing businesses to compete with their urban counterparts. While the panel did note that efforts were underway to improve mobile coverage and increase competitive offerings in regional Australia, it found that there were still many parts of regional Australia in which mobile services were not available on an equitable basis. It also concluded that despite some improvements in broadband availability and affordability, there was “no ongoing assurance of access to broadband services on an equitable basis” (p. vi).

## *2.2 Principles for providing telecommunications services to regional Australia*

The long-standing practice of assessing telecommunications services adequacy in regional Australia demonstrates the recognition of its importance. Indeed, ensuring that all Australians have access to high quality telecommunication services has been a concern of policy makers, service providers and citizens for decades. The country’s “proud history” of equity allowed for cross-subsidization to fund telephone service provision to rural and remote Australia (Barr, 2007; Broadband Services Expert Group, 1994), with the concept of uniform pricing for service “as old as the nation itself” (Corner, 2012). For instance, to bring modern voice and data services to the most remote parts of the country in the 1980s, Telecom Australia, the monopoly phone company, developed and implemented the innovative Digital Radio Concentrator System, part of a \$450 million National Rural and Remote Programme (Bannister & Capewell, 1988).

By the early 1990s, the telecom sector had been opened to competition, with the expectation that providers would compete to extend services across the country and develop better offerings for those in rural and regional Australia. Nevertheless, policy makers recognized that even with competition there was still a need to ensure access to basic telephone services at standardized prices and in 1991 enlisted the former monopolist, known today as Telstra, to fulfill the Universal Service Obligation (USO). Funding for the USO came through a levy on all telecommunication carriers. In 1999 a Digital Data Service Obligation (DDSO) was added to the USO, requiring that a 64 kbps data service be available to all Australians. For 96% of the population, the DDSO would be met through an ISDN (Integrated Services Digital Network) service using existing telephone lines, with the remaining 4% to be offered satellite service (Jackson, 2000). Changes were made to the administrative model of the USO in the 2000s, but the focus remained on providing telephone

services.<sup>5</sup>

The question as to whether the USO should be extended to include access to broadband and/or mobile communications was the subject of ongoing debate. The 2000 inquiry called instead for explicit consideration of the needs of regional, rural and remote Australia when designing regulatory policy to encourage market competition, and also acknowledged the need for targeted government assistance to address specific concerns. The 2002 Regional Telecommunications Inquiry concluded that the USO would not be an effective tool to ensure broad access to future services. It recommended that the government develop a specific strategic plan for regional telecommunications, and ensure that government funds would be available to invest in service improvements in cases where such services “will not be delivered commercially within a reasonable timeframe” (p. xxvii). The 2008 inquiry’s recommendations for redesigning the universal service obligation were put on hold by the then pending development of the National Broadband Network (Australian Government, 2009), but the government did agree with recommendations to develop closer relationships with state and local governments to improve service delivery across the country.

Through the 1990s and 2000s, Australian governments stated their commitments to advancing the availability of telecommunications infrastructure across the country. The principle of cross-subsidization was understood and accepted as a means of ensuring equitable access to the telephone system, and it continued through the industry-funded USO. But because broadband (and mobile) service provision was outside the scope of the USO, specific initiatives were needed to encourage universal, equitable access in areas where competition failed to deliver adequate services. Some of these initiatives are noted in the section below, demonstrating that governments were taking action to respond to the needs of citizens in regional Australia.

### *2.3 Encouraging supply of broadband to regional Australia*

A full discussion of the history (and politics) of broadband deployment in Australia is beyond the scope of this paper,<sup>6</sup> but some milestones are noted here. Advisory groups asked

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<sup>5</sup> As part of changes restructuring the Australian telecommunications sector to create the National Broadband Network, a new Telecommunications Universal Services Management Authority became responsible for the USO, with funding still coming from an industry levy. In 2014, the government indicated it would disband the agency but continue to administer the existing USO policy (which remains centred on provision of fixed line telephone services) through the Department of Communications.

to consider the development of broadband services reported in 1994 (Broadband Services Expert Group, 1994) and 2003 (Broadband Advisory Group, 2003), highlighting economic and social benefits to be realized by the development of a robust, Australia-wide broadband infrastructure. A *National Broadband Strategy* was adopted in 2004, and called for Australia to be “a world leader in the availability and effective use of broadband, to deliver enhanced outcomes in health, education, community, commerce, and government and to capture the economic and social benefits of broadband connectivity” (DCITA, 2004, p. 1).

The role of the government in developing broadband infrastructure was clear. In addition to “encouraging the development of content and applications,” it would also “facilitat[e] broadband access in areas where the market may not provide services at fair and reasonable prices within an acceptable timeframe” (DCITA, 2004, p. 3). While the market was to be the primary driver in the development of broadband services, the government would, and did, invest to help extend broadband connectivity outside metropolitan areas. Comprehensive overviews of government investment in broadband are provided by Agius (2013) and Given (2008b), with some of the more significant investments described below.

Funds received from the privatization of the former government owned telephone company Telstra were invested in the *Networking the Nation* scheme, operational between 1997 and 2005. This \$322M scheme focused on supporting community driven initiatives, recognizing the distinct needs of local communities and engaging with state and local governments to deliver programs that extended networks, increased access to and use of telecommunications services, and reduced disparities between urban and regional Australia (Department of Communications Information Technologies and the Arts, 2005, 2006).

The *Higher Bandwidth Incentive Scheme* (HiBIS) was created as a response to the 2002 regional telecommunications inquiry, providing more than \$150 million in incentives to ISPs “to supply higher bandwidth services in regional, rural and remote areas at prices comparable to those available in metropolitan areas” (Australian Communications and Media Authority, 2007, p. 12). In 2005, the federal government announced the *Connect Australia* project to inject a further \$1.1 billion into investment in telecommunications infrastructure. The *Broadband Connect* component of *Connect Australia* included funding to provide “affordable broadband connections to people living in regional, rural and remote areas” (Coonan, 2005), and supplemented investments (including HiBIS) of about \$1B that had

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<sup>6</sup> For discussion of some of the issues in the development of Australia’s broadband infrastructure, see Allen et al. (2014), Ergas (2008), Fletcher (2009), Given (2008a, 2009, 2010) and Middleton, Park and Allen (2013).



been made over the previous decade (Department of Communications Information Technology and the Arts, 2006).

The next significant announcement was an investment of almost \$1B in the OPEL network, as the “centerpiece” of the *Australia Connected* program (Coonan, 2007). OPEL was a joint venture between telco Optus and agribusiness Elders to build a wholesale broadband network that would use a combination of WiMAX (a fixed wireless technology) and ADSL2+ to greatly expand broadband availability (Australian Government, 2007). It intended to upgrade infrastructure to allow for the provision of ADSL2+ to an additional 1.9 million households in regional Australia (allowing faster broadband connectivity, and also enabling choice by making it easier for many ISPs to offer this service). The wireless network would cover almost 9.5 million premises across the country, vastly increasing availability of faster broadband (6 Mbps initially, to be upgraded to 12 Mbps by 2009). In announcing this project, Senator Coonan, the Minister for Communications, Information Technology and the Arts promised that “the Australian Government will ensure 99 per cent of the population has access to fast affordable broadband by June 2009” (Coonan, 2007). In addition to the OPEL network, the Australia Connected program also provided funding for the *Australian Broadband Guarantee*. This guarantee provided households and small businesses in rural and remote areas with access to “metro-comparable” service for a three year period by offering incentive payments to ISPs to make the service available (Australian Broadband Guarantee, 2009).

There is absolutely no doubt that the demand for high quality telecommunications services in regional Australia has been well-understood for many years. The needs of those in rural and remote communities have been carefully assessed through multiple consultative processes. Many recommendations have been developed and implemented, policies changed and investments made. But by the mid-2000s there was a real sense that advancement of broadband infrastructure in urban and regional Australia had stalled (Berg, 2007; Fletcher, 2009; Given, 2008a).

### **3. The National Broadband Network**

#### *3.1 The plan*

The Labor party contested the 2007 Australian federal election with a proposal to invest in a public-private partnership to build a broadband network that would provide improved broadband speeds to 98% of the population within 5 years. After winning the election, the

government issued a Request for Proposals (RFP) to roll out and operate this network, offering speeds of at least 12 Mbps (Department of Broadband Communications and the Digital Economy, 2008). Unsatisfied with the responses received, the government instead decided to take a different approach, announcing in 2009 that the government would create a company to build a National Broadband Network that would offer much faster speeds than envisaged in the RFP (Prime Minister of Australia, 2009). Initially proposed as a public-private partnership, the company, NBN Co Limited (<http://www.nbnco.com.au>), was created as a wholly-owned government business enterprise, and operates as wholesaler-only provider of broadband services. The NBN was to connect 90 per cent of Australian premises with fibre technology offering broadband speeds of up to 100 Mbps, with the remaining premises to have access to speeds of at least 12 Mbps delivered using satellite or fixed wireless technologies. The National Broadband Network was designed to offer fixed broadband services only, it does not offer mobile voice or data services.

The government's decision to invest directly, and heavily, in a national broadband network and to fundamentally restructure the Australian telecommunications sector by creating a monopoly wholesale operator was both bold and highly controversial. The 2010 federal election was fought in part on differing visions for broadband (Australian Labor Party, 2010; Liberal Party of Australia, 2010), with the opposition Coalition<sup>7</sup> promising to "cancel Labor's reckless and expensive National Broadband Network," and to turn to the private sector to provide Australia with the improved broadband capacity all politicians agreed was needed in Australia. The election resulted in a tie, with Labor and the Coalition then both negotiating with the Members of Parliament who held the balance of power in an effort to secure support to form a government. While there were many factors that influenced these members in their decision, an important issue for the MPs from rural ridings was improved broadband access for their constituents. As part of their agreement to support a Labor minority government, two independent MPs received a written commitment from the government to ensure that regional areas would be given priority in the NBN rollout (Gillard et al., 2010).

With no major changes in the design of the NBN, NBN Co continued to rollout the network to meet the government's objectives "to deliver significant improvement in broadband service quality to all Australians, address the lack of high speed broadband in

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<sup>7</sup> The Coalition is made up of members of the Liberal Party of Australia, the Nationals and the Country Liberal Party and is more conservative than the Labor Party.

Australia, particularly outside of metropolitan areas, and reshape the telecommunications sector” (Wong & Conroy, 2010, p. 1). A fundamental component of the plan was that as a monopoly provider, NBN Co would be able to offer uniform wholesale pricing across the country, through an explicit cross-subsidization mechanism.

NBN Co reported on its progress through annual reports (NBN Co Limited, 2011a, 2012a, 2013, 2014a) and set its objectives through corporate plans (NBN Co Limited, 2010, 2012b). But as the company’s first CEO, Mike Quigley, explained after leaving the company, establishing an entirely new enterprise to design and build a national broadband network was far from easy (Quigley, 2013). There were delays in negotiations between the government and Telstra around access to and reuse of existing infrastructure, difficulties in establishing and maintaining contracts with contractors who would actually build the network and challenges in getting permission to build towers for the fixed wireless component of the network. By 2013 it was evident that the company was falling far behind initial ambitious targets for the rollout, and the opposition Coalition was calling for a radical redesign to meet Australia’s broadband needs more quickly and more affordably.<sup>8</sup> The Coalition would reduce the percentage of households to be served with fibre to the premises connections, choosing instead to build on existing infrastructure (HFC cable and copper) to deliver good quality broadband more quickly. Both approaches would continue the rollout of fixed wireless and satellite services to rural and remote premises according to the original plan.

The Coalition won the 2013 election, and quickly started to review the operations of the National Broadband Network. Despite promising a faster rollout, it has taken over a year to complete the review process,<sup>9</sup> and to determine the principles for the new ‘multi-technology’ mix approach to broadband deployment (NBN Co Limited, 2014e). Additional discussions revolve around changing the business model for the NBN. The 2014-17 corporate plan discusses the changes underway at the company and the inherent challenges such changes bring (NBN Co Limited, 2014b). The competition regulator recently allowed competition to the NBN in urban centres,<sup>10</sup> meaning that the ability to generate revenues in urban centres to support the cross-subsidization that allows for uniform pricing may be under threat.

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<sup>8</sup> See Middleton (2013) for comparison of the Labor and Coalition’s broadband policies in the lead up to the 2013 election.

<sup>9</sup> Details of the review process are online at the Department of Communications website: [http://www.communications.gov.au/broadband/national\\_broadband\\_network#nbnreview](http://www.communications.gov.au/broadband/national_broadband_network#nbnreview) and are discussed in the 2014-17 Corporate Plan (NBN Co Limited, 2014b).

<sup>10</sup> Australian Competition & Consumer Commission (2014)

Returning to earlier discussion about the need for improved broadband connectivity in regional Australia, the question that is addressed in the following section is “what progress has been made in the years since the government first announced that the NBN would be the solution to better broadband across Australia?”

### *3.2 The reality of the NBN for regional Australia*

Prior to releasing the RFP for the National Broadband Network in 2008, the Labor government cancelled the OPEL project. The reason given for the cancellation was that the government had determined that OPEL would only provide broadband coverage to 72% of under-served premises in the country rather than the 90% (900,000 premises) agreed to in the contract (Hutchinson, 2014). At the time of the cancellation, communications analyst Paul Budde said “It would be unacceptable in political terms if the OPEL cancellation were to lead to a waiting time of up to seven years for these 900,000 customers/voters” (quoted in Guan, 2008). Unfortunately for regional Australia, this seems to be exactly what has happened.

While it is impossible to know whether the OPEL project would have delivered what it promised, if it had gone ahead it is likely that by 2011 there would have been a noticeable improvement in the availability and use of broadband in regional Australia. Figure 1 shows broadband and internet subscriptions in 2011, broken down by geographic region.<sup>11</sup> While these data indicate demand for broadband rather than supply, it seems reasonable to assume that if high quality broadband were available across the country with uniform pricing, demand would be similar across regions. This is not the case, with demand decreasing by distance from urban Australia. Further, if broadband was widely available and affordable, the percentage of internet subscribers choosing a broadband service would likely be consistent across the country. Although not shown in the figure, across the nation 91% of internet subscriptions were for broadband services, but the percentages are lower for inner regional (89%), outer regional (88%), remote (85%) and very remote (84%).

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<sup>11</sup> The Southern Inland LGs category represents a group of local governments in the Southern Inland region of NSW, close to the capital city of Canberra. Even within a short drive of the nation’s capital there were many fewer broadband subscribers than in the major cities.

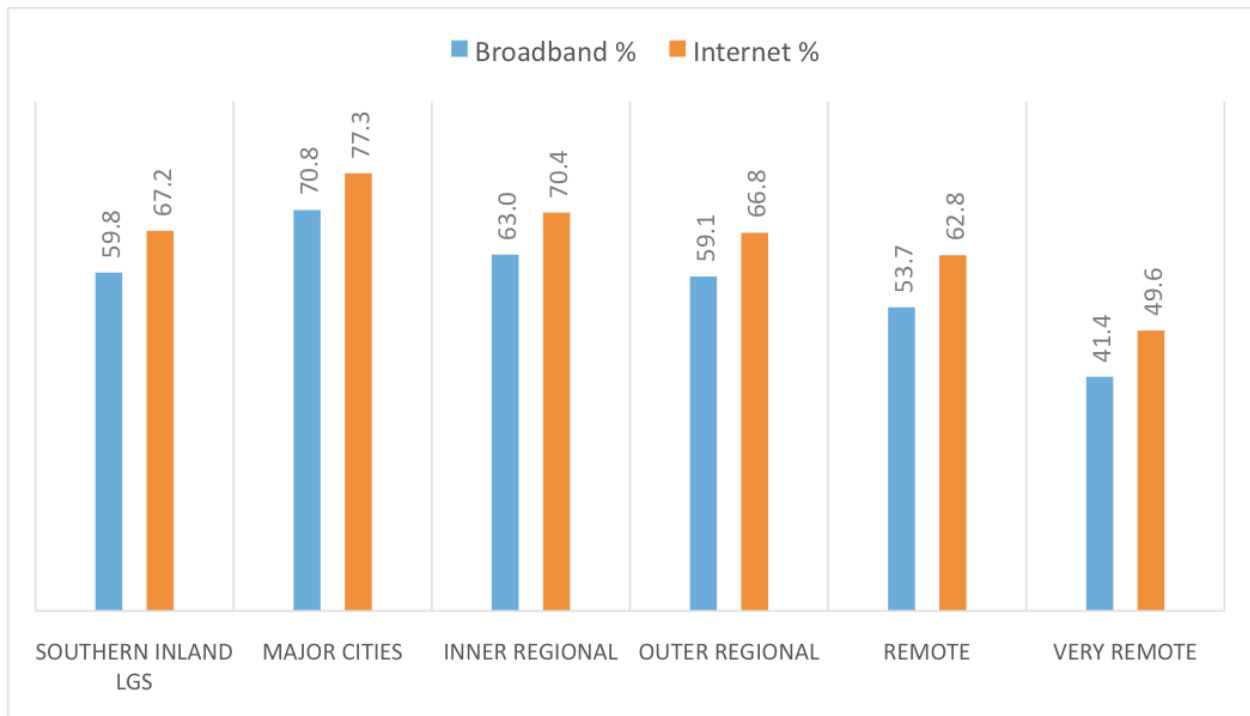


Figure 1: Internet and broadband subscriptions by location, 2011.  
Source: Australian Bureau of Statistics

When the Coalition government took office in 2013 it indicated that it would prioritize the NBN rollout in regional Australia. To assist in identifying areas most in need of improved broadband, the Department of Communications conducted an analysis of broadband quality and availability across Australia as at the end of 2013 (Australian Government, 2014). It is difficult to extract the precise number or location of premises that are not adequately served from this report but NBN Co reports that there 1.6 million households in this category (NBN Co Limited, 2014b). The analysis concluded that only 28% of premises, primarily in urban Australia, had access to high speed broadband, a figure that excluded services provided by ADSL or mobile broadband providers. About 60% of premises across the country had access to a 4G mobile broadband connection. The analysis did not report on the cost or affordability of services, but a quick check of mobile and fixed broadband offerings from any Australian provider shows that mobile broadband is much more expensive to use than is fixed line. For instance, in November 2014, Telstra (the company with the broadest coverage across the country) was recommending a fixed line package with a 50 gigabyte per month download cap as being “ideal for regular use including some video and gaming.”<sup>12</sup> But the same download cap is simply not available for a mobile broadband user, and a package offering less than a

<sup>12</sup> <https://www.telstra.com.au/broadband/home-broadband/#plans>

third of the cap (15 gigabytes<sup>13</sup>) is more than 40% more expensive. Mobile broadband is simply not a substitute for fixed line broadband for “regular use,” as further reflected in statistics that show that only 3% of data downloads are done on mobile broadband services although almost 50% of broadband subscriptions in Australia are now for mobile services (Australian Bureau of Statistics, 2014a, 2014b).

As a 2014 NBN Co review of fixed wireless and satellite services notes, the non-fixed line network footprint does not cover a clearly demarcated geographic area (NBN Co Limited, 2014c). While most fixed-line connections will serve those who already have reasonable options for broadband, there are existing premises in regional Australia that will get a fixed-line NBN connection. As this connection will use fibre to the node technology (NBN Co Limited, 2014e), these premises will have to be relatively close to a local telephone exchange (e.g. in regional centres and small towns). There are premises at the edges of major cities that will not be served by a fixed line NBN connection, but will be provided with fixed wireless or satellite connectivity. As such, looking at the delivery technology alone does not provide an indication as to where the service is being provided. But as a means of understanding the availability of improved broadband connectivity in regional Australia five years after the NBN started, it is instructive to consider the progress of the fixed wireless and satellite services. Premises that will use this technology to connect to the NBN are unlikely to have a good fixed line alternative at present, so would be relying on limited commercial fixed wireless or satellite options to provide broadband before the NBN is available. As 10% of premises are currently not served by ADSL, (Australian Government, 2014), (and it is highly unlikely these would have cable or fibre service), it is these premises that are most in need of a fixed wireless or satellite solution. There are more than one million households in this category at present.<sup>14</sup>

Other than for a few small-scale pilot projects started in 2009 and 2010, detailed planning for NBN construction was not completed until 2011. NBN Co signed an agreement with Ericsson to manage the fixed wireless network in mid-2011, and the first customers were connected in April 2012 (NBN Co Limited, 2012b). NBN Co expected to complete the fixed wireless component of the NBN by 2015 (NBN Co Limited, 2011b). As specified in 2009, the initial speed for the wireless network would be 12 Mbps download, 1 Mbps upload. In 2013, NBN Co increased the fixed wireless speed offering to 25 Mbps down, 5 Mbps up.

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<sup>13</sup> <http://www.telstra.com.au/broadband/mobile-broadband/plans/index.htm#plans>

<sup>14</sup> Australian Government (2014) included 10.9 million premises in the analysis of broadband availability and quality.

Increasing the service speed has been easier than speeding up the rollout. As shown in Figure 2, as of June 2014, 5 years after the NBN plan was announced, just over 150,000 premises could access the fixed wireless network or satellite network (NBN Co Limited, 2014d). Even if NBN had met its 2012 forecast of providing service to 374,000 premises with fixed wireless or satellite connectivity by 2014(NBN Co Limited, 2012b), this level of coverage would still be much lower than projected for the 2007 OPEL plan. However, the 2014 actual take up rate (premises activated) is very close to the forecast, indicating that demand for NBN connectivity is higher than forecast.

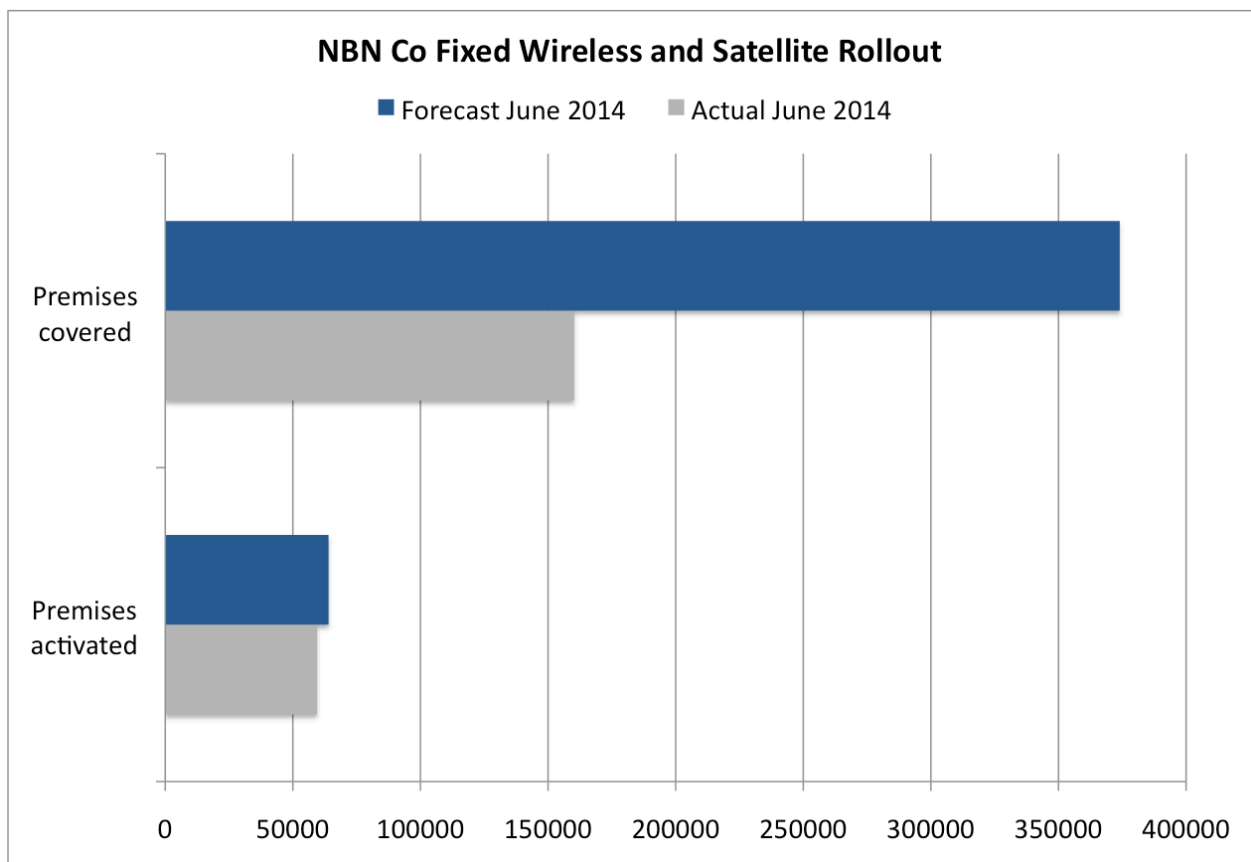


Figure 2: Forecast vs. Actual Coverage and Activation of Fixed Wireless and Satellite Connectivity. Source: Forecasts from NBN Co Limited(2012b), actuals from NBN Co Limited (2014d).

Figure 3 highlights the particularly strong demand for satellite service, which provides connectivity to premises where there are no other available technologies, and also shows there are many premises with access to a fixed wireless service whose residents have not yet chosen to get broadband service through the NBN.

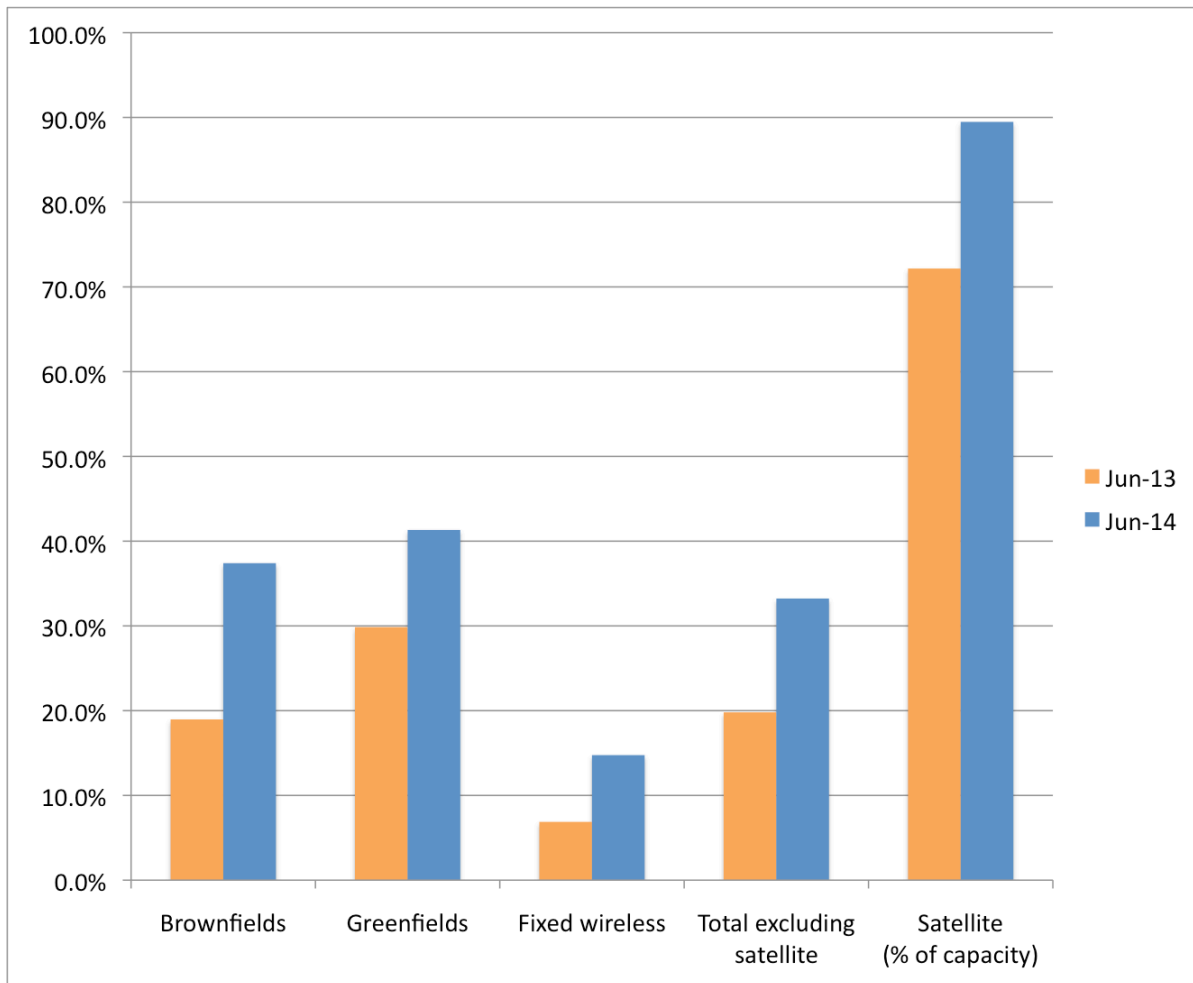


Figure 3: NBN Take up rate, by technology. Source: NBN Co Limited, (2014d).

To meet the target 12 Mbps download/1 Mbps upload speeds on the satellite service, NBN Co plans to launch two satellites in 2015 (Long Term Satellite Service). An Interim Satellite Solution is in place now, offering 6 Mbps downloads and 1 Mbps uploads. This service was intended in part to provide a transition between services provided under the Australian Broadband Guarantee, which was ended in 2011, and the long term service. However, the interim service has reached capacity, and in fact the number of users has declined in the past year (NBN Co Limited, 2014d), as shown in Figure 4. The decline is likely due to customers abandoning the service as quality degraded as the subscriber numbers increased (NBN Co Limited, 2014c).



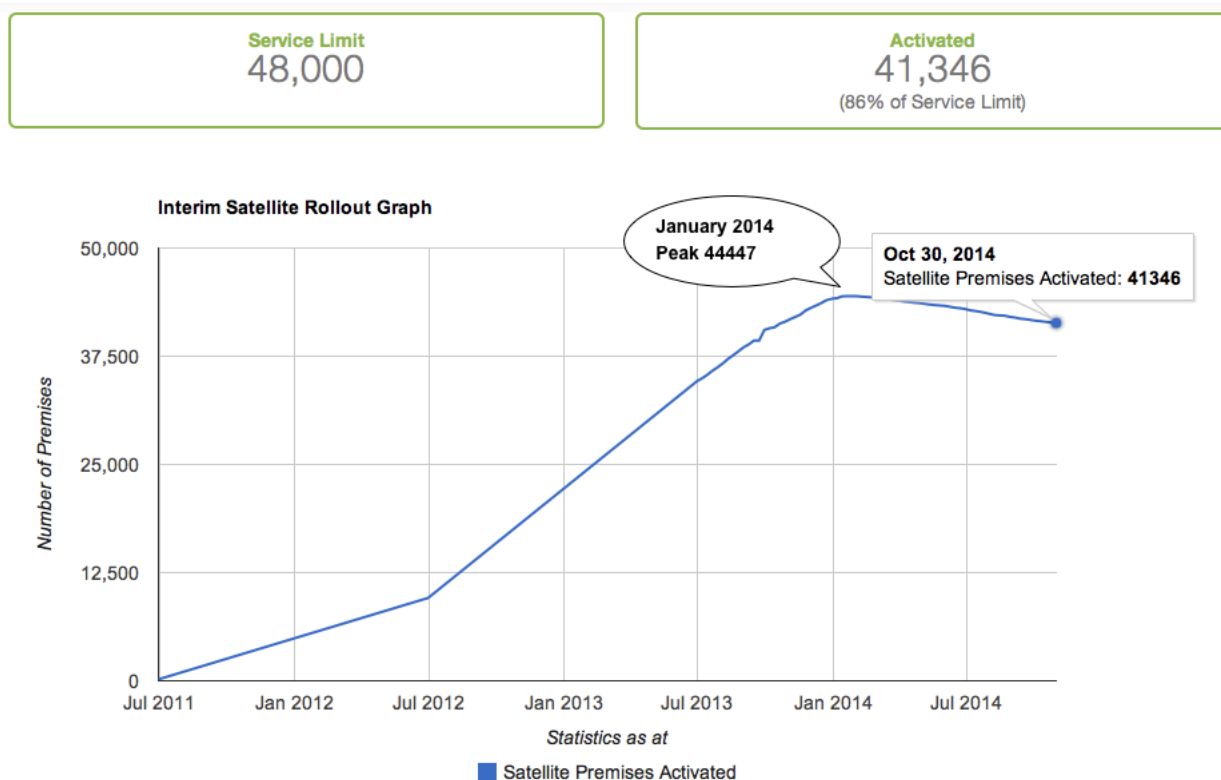


Figure 4: NBN Co Interim Satellite Solution subscriptions.  
 Source: <http://www.mynbn.info/stats>

In summary, it is evident that regional Australia still does not have the level of broadband availability that was promised with the 2007 OPEL project, or with the NBN. Of the approximately one million households without access to a fixed broadband service (of any quality) at the end of 2013, fewer than 200,000 now have an alternative fixed line broadband offering from the NBN. Thus, six years after the OPEL project was cancelled in favour of some form of NBN, 80% of the premises that were most in need of better broadband options still have no high quality fixed line alternative. Indeed the observation of the 2000 Telecommunications Service inquiry, that “Many consumers, again with a greater concentration in rural and remote Australia, experience slow data speeds when accessing the Internet” (Telecommunications Service Inquiry, 2000, p. 2) still rings true, almost 15 years later.

### 3.3 Prospects for improving broadband in regional Australia

NBN Co estimates that there will be about 1 million Australian premises outside the fixed line footprint by 2021. These premises will make up about 8% of the total premises covered by the National Broadband Network and will connect to the network using satellite

or fixed wireless technology. However, the review of fixed wireless and satellite services concluded that earlier NBN Co plans underestimated demand for these services, stating that approximately 200,000 premises could not be served by 2021 if following the 2012 – 2015 Corporate Plan (NBN Co Limited, 2012b). The review also found that the Long Term Satellite Solution, which involves the launch of two satellites is likely to be delayed from 2015 to 2016, and noted that NBN Co does not currently hold all the spectrum it requires to offer fixed wireless services in urban fringe areas.

The government has stated repeatedly that it intends to prioritize the NBN rollout to address the needs of underserved areas first. But NBN Co's 2014-2017 corporate plan, released in November 2014, offers little in the way of concrete information as to how such prioritization will actually be realized (NBN Co Limited, 2014b). Further, the plan cautions that there is a high level of uncertainty around NBN Co's ability to "quickly ramp up the level of deployment, serviceable premises and activations activities in the Fibre-to-the-Premises (FTTP) and Fixed Wireless footprints" (p. 5) and notes that the company is "not yet in a position to generate projections with a reasonable level of confidence for FY2016 and FY2017" (p. 4).

The NBN was designed as a monopoly, allowing NBN Co "to cross subsidise from its national revenue flows and offer a common entry level broadband price structure for all Australian premises across all technologies used in the rollout" (Wong & Conroy, 2010, p. 4). But among the reviews of the NBN conducted for the government in the past year was a review of regulation that recommended allowing more competition to the NBN (NBN Panel of Experts, 2014a). This approach would change the economics of the NBN, and potentially reduce or destroy the company's ability to cross-subsidize the provision of broadband in regional Australia through funds generated serving urban Australia. It is not yet clear how or whether this recommendation will be taken up, but the potential of introducing competition to the NBN, as well as a recommendation to reconsider the commitment to uniform pricing adds further uncertainty as to how affordable broadband will be provided to regional Australia where there are unlikely to be many competing service providers.

NBN Co has a short-term target for improved connectivity in regional Australia, intending to reach 278,000 premises with fixed wireless or satellite NBN service by 2015 (NBN Co Limited, 2014b). Additionally, the decision to develop fibre to the node as the dominant NBN fixed-line technology does mean that more premises in small towns will get access to a wired broadband solution, rather than being served by fixed wireless (Fletcher, 2013). However, it is likely to be some time before a large scale rollout plan is determined as

design for the fibre to the node service is not yet complete. One other change to the NBN plan may facilitate improved mobile broadband coverage in years to come. Fletcher (2014) notes the possibilities of allowing mobile operators to share NBN Co fixed wireless towers. But the 2014-17 corporate plan does not make reference to this option, referring only to a trial to allow mobile operators to connect cell-sites to the urban FTTP network and suggesting that it will be some time before mobile operators can make use of NBN infrastructure to improve service in regional Australia.

#### **4. Discussion and Conclusions**

Section 2 of this paper makes the case that Australian governments have been proactive in assessing demand for broadband, have supported programs and policies that allow for equitable access to new communication technologies in all parts of the country, and have directly invested in programs to improve the availability of broadband services in locations that have not been well-served by private sector investment. The importance of broadband to the economy and for the citizens of Australia is well-understood, and by the mid-2000s politicians were considering large scale initiatives to address geographic inequities in broadband availability and to improve the quality of service for all Australians.

Section 3 describes the development of the National Broadband Network. It notes the commitments to prioritize the rollout of better broadband infrastructure to underserved areas and the failure, five years after the start of the project, to actually deliver much in the way of improved services in regional Australia. The change in government and subsequent actions to review and redesign the NBN business model has created much uncertainty about the future of the project, and distracted NBN Co from its core business of building broadband infrastructure. Recommended changes to the NBN model will require a rethinking of policy options that would ensure equitable access across the country, and this will take time.

Twenty years after the Broadband Services Expert Group articulated the importance of broadband access for all Australians (Broadband Services Expert Group, 1994), almost seven years after the cancellation of a funded plan (OPEL, see Australian Government, 2007) designed to bring good quality broadband to 99% of the population, and despite the great promise and clear vision offered by then Prime Minister Kevin Rudd in announcing the NBN as the solution to Australia's broadband woes (Prime Minister of Australia, 2009), the NBN has failed to deliver. In this final section, reasons for this failure are identified and specific

challenges and opportunities that can be addressed to improve broadband in regional Australia are discussed.

#### *4.1 The perils of pressing reset*

Telecommunications policy in Australia has been reset repeatedly in the past decade and regional Australia has suffered. There is a great deal of uncertainty as to the future of the NBN deployment. Although NBN Co appears to be doing the best it can to develop a viable strategic plan for the new multi-technology mix model, the redesign is very complex and makes it difficult for the company to just get on with building the wholesale broadband network it is expected to deliver. The need to redesign the core of the network (the 93% of premises anticipated to be served by the fixed-line option) detracts from a focus on prioritizing the rollout to the underserved 7% in the fixed wireless and satellite footprint, those who either have very poor quality broadband at present, or none at all. The impact of improving broadband connectivity to these 7% is likely to be much larger than offering what many observers suggest will simply be marginal improvements on the fixed line offerings in urban Australia, but the prospects of these improvements being made soon are diminished by the state of flux surrounding the project.

Commercial deployments of telecommunications infrastructure do not typically face the same levels of uncertainty. There is a case for public sector investment to extend broadband connectivity to regional Australia where the possibilities of competitive private sector offerings are slim, but in urban Australia allowing competition with the NBN may be viable as a means of driving investment (NBN Panel of Experts, 2014a). If competition is allowed, it will cause further disruption in the sector, and weaken the financial model on which the NBN is based.<sup>15</sup> Until the broader regulatory and competitive environment is stabilized (assuming this is in fact possible), uncertainty will prevail. This uncertainty also impacts decisions of private sector investors with respect to upgrading their existing services. Not knowing when the NBN will be rolled out in a particular location makes it impossible to determine the length of time a company can generate revenue from its own infrastructure assets before they are superseded by the NBN. In regional Australia, where existing broadband providers plan to transition customers to the NBN rather than replace, extend or upgrade aging equipment, delays to the rollout mean that customers must make do with poor

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<sup>15</sup> The impact of potential competition to the NBN was discussed by NBN Co executives at the Senate National Broadband Select Committee hearing in September 2014 (National Broadband Network Select Committee, 2014).

quality, or no broadband for longer periods. As communications technologies become more embedded in everyday life, the negative consequences of having poor access increase, and are more severe for those who do not have alternatives.

Broadband policy in Australia is set by the government, and governments have three year terms. But development of infrastructure requires long term vision. Return on investment is not realized in the short term, making the development process incompatible with political life cycles. There is a possibility that the government will change in 2016, and the opposition is already considering approaches that would allow for a greater percentage of FTTP connections to be restored to the NBN rollout (Spencer, 2014). Much energy has been wasted by the current government in dismissing the previous government's approach, while the now-opposition architects of the original plan try to score points by criticizing the slow progress. This politicization of infrastructure development is highly disruptive. Government and opposition would be well advised to heed Budde's (2014) call to abandon political roadblocks and foster strong bipartisan support to advance the national interest.

#### *4.2 Ensuring access for all*

Despite the Australian government being “committed to completing the National Broadband Network ('NBN') and ensuring all Australians have access to very fast broadband as soon as possible, at affordable prices, and at least cost to taxpayers” (Turnbull & Cormann, 2014, p. 1) there is currently no obligation in place on any provider to ensure that broadband services are available to all at a reasonable price, nor is there any indication that the government is considering amendments to extend the “last century” universal service obligation (Darling, 2012, p. 23.4) to broadband or mobile technologies. Given (2008b) argued that the pre-NBN industry-supported USO model was never a likely policy mechanism to support a national broadband network but as the certainty of the cross-subsidization provisions built into the NBN design is challenged questions of ensuring access should be revisited. Goggin calls for a reframing of universal service around the universality of communications, enabling “universal availability, accessibility, affordability, access to new technologies and participation in society — as well as new principles such as mobility, and access to content, applications and ideas” (Goggin, 2010, p. 4). Corner (2012) notes that opportunities for change identified in the 2007 review of the USO (curtailed by a federal election) and by the 2008 Regional Telecommunications Review (Regional Telecommunications Independent Review Committee, 2008) were not addressed when the

Telecommunications Universal Service Management Agency was established as part of the creation of the National Broadband Network. The recent regulatory review advises that service obligations should be legislated (NBN Panel of Experts, 2014a), but doing this will take time.

The cost-benefit analysis conducted as part of the NBN reviews concluded that the benefits of broadband are largely private rather than public (NBN Panel of Experts, 2014b). While there is evidence to demonstrate real public benefits from broadband deployment<sup>16</sup> the analysis concludes that “Providing fixed wireless and satellite services costs nearly \$5 billion but the benefits are only just above 10 per cent of that” (p. 11). The 1994 Broadband Services Expert Group report noted “the Australian sense of social equity” as an enabler of equitable access to services across the country, observing that “the return to the service may be in the form of benefits that cannot be captured by the service provider” (Broadband Services Expert Group, 1994). The question in 2014 is whether this sense of social equity still prevails, and whether there is support for government intervention to ensure that rural and remote parts of the country will get access to high quality broadband. Regional Australia needs a strong guarantee that high quality, affordable broadband will be available as soon as possible. Experience with the NBN to date shows that instructions to NBN Co to prioritize rollout to regional Australia have not been sufficient to make this happen, and additional government action(s), whether through legislation and/or further instruction to NBN Co or other mechanisms (e.g. direct subsidies to providers other than NBN Co), is needed urgently.

#### *4.3 Alternative models for regional Broadband*

In the original NBN model, communities with more than 1000 premises would have been within the fibre footprint, meaning they would have connected to the NBN with fibre to the premises (FTTP) technology. Communities with 500 premises or more that were on a backhaul fibre route would also have been connected with FTTP (NBN Co Limited, 2010). Additionally, towns that were close to the fibre network could request NBN Co to bring a connection into the town, at the town’s expense (NBN Co Limited, 2014f). For small rural communities, getting fibre into the community was an exciting prospect, offering real possibilities for enabling telework, allowing local residents to develop businesses that could take advantage of very high speed connectivity, and making it more feasible for people to

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<sup>16</sup> See for example the work of the International Telecommunication Union (2012) and the Broadband Commission for Digital Development (2011).

move to smaller communities without concerns of being isolated due to poor connectivity.<sup>17</sup> In the new multi-technology mix (MTM) model, these communities will be served by fibre to the node, which does not offer the same speeds or the transformative potential of FTTP. NBN Co has not yet indicated when it will provide the rollout schedule for the MTM model, and it is reviewing the network extension program. It is not clear how long it will take to develop the FTTN service in a community, but given the pace of the network design and rollout thus far it is possible that it will be still be several years before small towns are connected to the NBN.

Australians outside urban centres are becoming increasingly frustrated about their poor connectivity, especially as they are aware that NBN Co is already activating FTTP services in the major cities. The Mayor of Quilpie Shire, in rural Queensland, sums up this frustration in telling ABC radio “It's like giving the fat person who's not hungry the rump steak and the starving bloke who's busting his backside trying to make a go of it a corn chip. I mean that's the situation we've got with our telecommunications: there is no plan and we don't know what's happening” (Mackenzie, 2014). In this context, it is likely that some towns may consider building their own infrastructure rather than continuing to wait for the NBN. There are many precedents for this around the world, including the B4RN project in rural northern England,<sup>18</sup> the community of Olds, in Alberta, Canada (Olds Institute for Community & Regional Development Technology Committee & Olds Connected Community Committee, 2011), and many communities in the United States (Mitchell, 2010, 2012). This ‘do it yourself’ opportunity may be the best approach for communities in regional Australia to ensure that their needs are met in a timely, locally specific manner. Fortunato and colleagues (2013) offer insights from the United States for local communities looking to build their own networks, and a toolkit is available from the Fiber to the Home Council (<http://toolkit.ftthcouncil.org>).

#### *4.4 What about mobile?*

The National Broadband Network was designed and has been built as a fixed broadband network. But if the objective of the NBN is to improve broadband availability across Australia, there is no reason to focus solely on fixed broadband. The nature of broadband connectivity in Australia has changed in the five years since the network was proposed, with

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<sup>17</sup> Gregg and Wilson (2011) document some of these benefits in their study of Willunga, South Australia, a small town that was one of the first connected to the NBN.

<sup>18</sup> <http://b4rn.org.uk/about-b4rn>

an enormous increase in the use of mobile broadband services (Australian Bureau of Statistics, 2014a). The 2011–12 review of the adequacy of telecommunication services in regional Australia emphasized the great demand for improved mobile voice and broadband services across the country and lack of coverage to meet this demand (2011–12 Regional Telecommunications Independent Review Committee, 2012). In designing the NBN, mobile services were explicitly left to the private sector, which has done an excellent job of building high quality mobile networks in Australia’s urban regions. But as with fixed line infrastructure, in regional Australia, there is often insufficient demand to warrant extensive investment in mobile infrastructure. With no specific national policy to improve mobile access across rural and remote Australia<sup>19</sup> it is not clear how (or whether) this increasingly essential service will be made available to all. However, even if there is no political appetite to take on the mobile industry by competing with it through provision of wholesale mobile broadband services, there are possibilities to leverage the public investment in NBN infrastructure to improve mobile coverage, for instance through sharing access to towers and allowing access to the NBN to backhaul traffic from mobile sites. These options have been recognized in the NBN review process, but have yet to be fully incorporated into future NBN Co planning.

#### *4.5 Closing comments – Where’s the urgency?*

Communications Minister Malcolm Turnbull promised that the Coalition’s plan for an NBN would be “Fast. Affordable. Sooner.”<sup>20</sup> But after a year in power, NBN Co has yet to produce a rollout plan for the new approach, and has offered no concrete information as to how it is going to prioritize the rollout for those living in underserved areas. It is difficult to redesign a broadband rollout on the scale of the NBN, and it may be that the process has happened as quickly as possible. But for those waiting for broadband, it isn’t fast enough.

This paper has highlighted some of the challenges inherent in building broadband infrastructure on a national scale. Many of the issues are not unique to Australia, and the insights offered here on remedies and opportunities for improving the outcomes should be of value beyond Australia. The Australian case shows the perils of developing broadband infrastructure in a partisan environment where policies and approaches are subject to frequent

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<sup>19</sup> The government will invest \$100 Million AUD to reduce ‘black spots’ in mobile coverage ([http://www.communications.gov.au/mobile\\_services/mobile\\_black\\_spot\\_programme](http://www.communications.gov.au/mobile_services/mobile_black_spot_programme)), but it is recognized that this will not be sufficient to meet the demand for improved coverage across the country.

<sup>20</sup> <http://www.liberal.org.au/fast-affordable-sooner-coalitions-plan-better-nbn>



change. It highlights the need to consider what types of communications services are essential in the 21st century, and to take steps to ensure that access to these services is available on an affordable and equitable basis. Opportunities for more regional and local involvement in determining broadband infrastructure needs and investment priorities are likely to be beneficial, and the inclusion of mobile broadband as a central delivery technology will also provide value to communities. The Australian case illustrated here demonstrates that designing appropriate models for public investment in broadband infrastructure is complex, that uncertainty in deployment plans creates delays and frustrates those waiting for improved access, and that the process of building a new broadband infrastructure to serve an entire population is slow and challenging.

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