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Ms Sharon Bird MP  
Chair  
Standing Committee on Infrastructure and Communications  
Parliament House  
CANBERRA ACT 2600

Dear Ms Bird

Please find attached the South Australian Government's submission to the inquiry by the Standing Committee on Infrastructure and Communications relating to the role and potential of the National Broadband Network (NBN).

The South Australian Government welcomes the new broadband services that will become available with the NBN and considers them vital to growing our economy and overcoming barriers to regional development.

The submission outlines a range of potential applications of the NBN in each of the areas identified in the terms of reference. It also draws attention to existing digital productivity initiatives already underway in South Australia that could provide the foundation for future initiatives.

Thank you for the opportunity to contribute to this important inquiry.

Yours sincerely

**HON PATRICK CONLON MP  
MINISTER FOR INFRASTRUCTURE**

28 February 2011

# **Submission to House of Representatives Parliamentary Inquiry into the role and potential benefits of the National Broadband Network**

## **Brief Summary**

The South Australian Government not only welcomes the new broadband services that will become available with the National Broadband Network (NBN); it considers them vital to the State and Australia.

High-speed, affordable broadband services are vital to the provision of many government services, vital to maintaining and growing the economy, vital to a modern society, vital to overcoming the barriers of isolation, and vital to our businesses—small and large—operating in a global competitive market.

### **Equity, affordability and priority**

Broadband is telecommunications; telecommunications is communications over distance. The greatest impact of broadband often occurs when distance is large. Hence the value of modern and affordable high-speed broadband is exceptional when it is provided to regional and remote locations.

What is high-speed broadband? Now, at the outset of the NBN, it is at least that currently provided by copper cable technology in metropolitan areas, and needs to be symmetrical (the same speed to communicate in each direction). During the life of the NBN deployment, this minimum will rise significantly.

The Commonwealth Government's commitment to high-speed, affordable broadband in every community in regional Australia enables the achievement of the value of broadband. Providing equity, affordability and priority for regional areas is applauded. The Commonwealth Government's commitment is also important in that it recognises the need for priority in regional areas.

Achieving equity, affordability and priority will also enable considerable social benefits to all communities: citizens, businesses and extending to the vulnerable (disability, ageing, disconnected, etc), remote, rural and remote Aboriginal communities. Connectedness through the NBN will provide potential benefits and will also require the provision of appropriate education and support for these to be fully realised.



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## **Technology and optimising infrastructure**

The choice of passive optical fibre distribution and optical fibre backhaul for the fibre component of the NBN is appropriate. It provides the ability to upscale by changes to active devices as technology and customers' needs advance. This is very important for a 10-year deployment, and for an asset with a depreciation life of around 20 years and a much longer useful operational life. This provides for improved broadband services when going from copper cable to optical fibre and for new developments, a total of 93% premises nationally.

### Wireless technology

Given the eight to ten year timeframe of the NBN deployment, it is important that any services provided using wireless technology can exploit the appropriate prevailing technology. Add to this the many advantages of being able to use a broadband service from different locations (for example home, farmhouse and township in a regional setting), the appropriate technology could be that which complies with the International Telecommunications Union requirements for International Mobile Telecommunication Advanced (IMT-Advanced).

The requirements for IMT-Advanced include:

- peak data rates of 100 Mb/s for high mobility and 1 Gb/s for low mobility/local
- based on all Internet Protocol packet switched network
- supports multimedia application and hence provides a greater degree of equity when compared to a Fibre to the Premises based service.

In his 25 January 2011 State of the Union Address, USA President Obama called for making fast internet access available to 98% of American households. A fundamental difference between the NBN Co approach and the vision for the USA is that the President spoke of high-speed wireless. Specifically he was referring to so-called 4G services that use either WiMAX<sup>1</sup> or LTE technology, which are the two technologies supporting IMT-Advanced and consistent with the suggestion above for future deployment based on IMT-Advanced in Australia.

High-speed mobile wireless deployments could readily be implemented in selected regional areas with optimised use of the fibre backhaul of the NBN.

### Optimal transmission use

Transmission infrastructure use is optimised when traffic from a number of sources is combined in a single link. This is particularly true for data traffic such as internet use. Hence, optimal designs avoid multiple links (including long distance and backhaul) other than for diversity. With the NBN providing connectivity, the use of links such as inter- and intra-state connections can be optimised, reduce the requirements for Retail Service Providers (RSPs) to provide similar links and encourage new RSPs to enter the market, then increasing competition and lowering prices.

The preceding key points underpin the delivery of the many benefits of broadband which are discussed in detail in each of the following Terms of Reference items.



## **Terms of Reference Detailed Commentary**

### **(a) The delivery of government services and programs**

Access to public sector services to enable more to be delivered for less

Major savings can be made from providing reliable, local, online access to public sector services using the NBN, for instance via a local community centre or neighbourhood house for those who need a trusted intermediary because they cannot use a screen, keyboard or telephone themselves.

Current Federal and State small and medium enterprise (SME) support programs could use broadband and online applications to scale their services and give small businesses access to a virtual network of experts.

#### **Better access to health and welfare at lower cost**

Reliable broadband access (including mobile) enables doctors, nurses, community workers and carers to spend more time with those who need them, making bookings and updating records while at the medical centre or visiting the patient. Telemedicine and remote monitoring, including systems that enable treatment at home, are critically dependent on the availability of reliable high-speed bandwidth, which the NBN would deliver.

The benefits of taking services into people's homes and enabling people to stay in their homes will help to overcome isolation, loneliness, boredom and depression, particularly for older South Australians. As more people become digitally literate, the number of virtual communities will increase, offering sophisticated online experiences that will support a broad range of personal needs, including friendships and interests groups. They will be able to communicate with family members, community members, service providers and others, who in turn will be able to monitor them and enable early intervention if there are signs that something is wrong.

#### **Better access to health services by regional and remote communities**

The NBN will increase the level of equity of access to health services to regional and remote communities. Today, regional communities do not generate enough demand to justify provision of local specialist medical services. In addition, shortages in the specialist medical workforce result in few doctors willing to travel to remote areas. This results in health system clients having to travel long distances (often unnecessarily) combined with the attendant delays in obtaining a qualified medical opinion.

The ability to conduct a range of consultations over high resolution videoconferencing (both clinician-to-clinician and clinician-to-patient) will enable delivery of specialist health services where currently there are none. For example, a diagnostic image of a hand fracture could be taken at Coober Pedy and transmitted to a hand specialist in Adelaide in near real time for correct diagnosis and treatment recommendations in consultation with local medical staff.

#### **Better connectivity to schools will lead to improved teaching, learning and education outcomes**

Education and children's services are key government services. Over the past decade the use of information and communication technologies (ICT) within schools and preschools has

grown extensively. ICT with broadband is a key enabler that supports the delivery of teaching and learning within schools and preschools.

ICT supports the administrative or business activities of all schools with computerised applications such as school and preschool administration, finance, timetabling and attendance. In the past such applications have been installed at approximately 1,000 individual government schools and preschools in South Australia. Current technologies now enable centralised provisioning of applications and storage of data.

Improved affordable carriage services will lead to improved teaching, learning and education outcomes, and also improved management and administration of schools. Improved bandwidth will support centralised applications and storage of data, and reduce administrative and ICT activities in schools, releasing resources for teaching and learning.

Many remote communities find it difficult to attract high-quality teachers of subjects such as maths, sciences and languages or may not have a critical pool of demand for these services. The NBN will facilitate remote learning experiences that are provided by experts and supported by local staff. The NBN will therefore enable better quality education and a wider choice for regional communities. An example of the importance in attracting staff is that in the APY Lands the latest enterprise bargaining agreement for nursing staff includes the installation of ADSL services in all houses.

## **(b) Achieving health outcomes**

### **Better health outcomes for individuals**

The vast majority of a citizen's interaction with the health system occurs in a General Practice setting, hence the bulk of a person's medical record resides with their GP. It is well documented that the quality of clinical decision making is dramatically improved when timely and accurate health records are available as input for clinical decision makers.

The need for access to a complete electronic health record transcends acute care (SA public hospitals) and general practice. The size of an electronic medical record can be enormous, for example a single diagnostic quality image (such as X-ray or CT-scan) can be several hundred megabytes in size. The NBN will enable exchange of electronic health record data between clinicians—a transaction that is not possible with current internet connections. Better clinical decision-making results in better health outcomes for individuals.

Timely access to expert medical opinion for regional and remote citizens through remote diagnosis/consultation will deliver better health outcomes for individuals.

Patients are better informed today than at any time in the past, and are increasingly taking an active (rather than passive) involvement in treatment and ongoing management of their conditions. Enabling patients to access their own electronic health records, and remote monitoring/consultation (e.g. with the elderly/frail) —even in metropolitan regions—requires the NBN as a key enabling technology.

Application of technology to in-home monitoring such as blood pressure monitoring for stroke recovery or cardiac monitoring, and blood sugar readings for diabetic citizens where the data is transmitted to a supervising health professional can reduce the need for face to face consultations in the ongoing management of chronic conditions.



**Better health outcomes for communities**

Population growth and population ageing place continually increasing demands on the public health system. Preserving and improving health outcomes requires new approaches to the way health services are delivered.

Taking a Population Health approach to health service provision brings efficiencies to health system service delivery by making better use of acute care service capacity and treating more health issues earlier and more quickly in a community setting such as general hospitals, community health centres and General Practice.

The sharing of electronic health record data between service providers in each tier of health service delivery is paramount to enable this model to be effective, particularly as patients move between tiers as their needs change. The NBN is the conduit along which much electronic health record data will flow, with the results that:

- citizens will stay healthier for longer; with their conditions managed by early intervention in the community, the progression to an acute episode requiring hospital treatment will be delayed
- capacity within the acute hospital sector will be freed to deal with the increasing demands of a growing and ageing population.

**Improved education outcomes will contribute to improved health outcomes**

Health care workers will have the opportunity to develop new skills to support and guide patients as a result of the new high-speed broadband delivered via the NBN. They will need to guide patients through the process of becoming well and maintaining wellness. This is likely to be a combination of both offline and online resources.<sup>2</sup>

Technology will be a tool that health care workers will have in their 'bag of tricks'. For example, there are currently at least two smart mobile phone applications that enable health care workers to access a range of pain management assessment tools and information.

A patient living in a regional area may be given a brochure but also referred to an online support group and given an appointment for an online consultation with an Adelaide-based specialist. As the costs of acute healthcare continue to rise, this shift from more costly hospital care to community- and home-based healthcare will be critical and would help alleviate the pressure on the healthcare system.

Access to online health services allows patients to be more active and involved in the management of their own health. The greater the focus on illness prevention, health literacy and health management, the better the opportunity to reduce the need for primary and acute care services. This means that to take full advantage of the new opportunities, patients will need to be digitally literate.

New technologies created and delivered via the NBN will enable individuals and the public health system to find solutions to complex issues associated with well-being rather than just health. New models of practice are likely to be developed alongside new business models. Health care in the 21<sup>st</sup> century is a holistic response to health and well-being problems and requires reliable, high-speed broadband.

## **(c) Improving the educational resources and training available for teachers and students**

### **Enhanced education outcomes for schools and preschools**

The NBN will enhance education outcomes in schools—opportunities around broadening curriculum, professional development for teachers, enhanced resources, more exciting and individualised learning experiences, servicing home schooling communities, regional and remote education. The NBN can also assist in providing for early intervention and assistance in early childhood development prior to preschool.

The NBN, combined with ICT services, is a key enabler that supports the delivery of teaching and learning within schools and preschools. This has been supported by a number of factors including:

- the growth of computer-based learning
- the growth and availability globally of appropriate resources on the world wide web
- the development of open repositories of digital learning objects and resources available to teaching professionals and students
- the improved accessibility to computers
- improved bandwidth in schools will better facilitate the access to remote learning through technologies such as videoconferencing.

Numerous schools are located in rural and remote areas of South Australia, many of which currently have restricted broadband infrastructure. Improved infrastructure at those locations is critical. Remote and rural schools can benefit significantly through improved broadband services that allow for remote learning through technologies such as videoconferencing.

### **Optimised opportunities in tertiary-level education**

The NBN in the context of vocational education offers the following opportunities:

- enhance the capacity of TAFEs to meet the skills needs of the future by being able to provide efficient and effective learning and assessment to an increased population supported by the network
- encourage the development and use of media rich interactive e-learning materials and virtual classrooms
- improve the experience of learners in a digital world
- provide a framework for efficient, high-speed access to content collections no matter where they are located in Australia or internationally. Enormous collections of media rich, educationally sound material are already available and reduce the need for the development of one-off resources and avoid the duplication of effort in the production of educational materials
- facilitate mutual recognition, credit transfer and cross-jurisdictional and cross-sectoral portability. The NBN will facilitate partnerships across schools, the Vocational Education and Training (VET) and university sectors to become more widespread
- expand access to the number and quality of course offerings for learners in regional, remote and indigenous communities. This applies in both homes and workplaces.



- Workplaces are in need of the NBN as much for the development of staff as for improved business functions. Regional TAFE is not sustainable without broadband technology and services as a communication medium. Without the NBN, current practice is a compromise between what is possible and what is practical given existing telecommunications facilities
- reduced time-frames for completion of courses of study by increased connectivity and utilising more sophisticated learning and assessment strategies. Students need to be able to do more study on their own, at home and in the workplace
- assist in the expansion of TAFEs by allowing them access to markets across Australia and possibly internationally
- influence future funding directions to ensure effective use of public funds to reduce duplication of teaching effort and resources across the nation
- provide teacher-to-teacher professional development opportunities via high definition videoconference and online
- ensure TAFE is part of a cross-sectoral education network.

For example, the Adelaide-based Royal Institution of Australia (RiAus)—with a focus on 'bringing science to people and people to science'—promotes public awareness and understanding of science, and provides continuing professional development opportunities for education professionals in science-related subjects, as well as outreach to youth.<sup>3</sup>

For those who can't easily participate, RiAus offers its programs and lectures digitally on RiAusOnDemand <<http://www.riausondemand.org.au>> These serve as educational resources for real-world examples of Australian research. RiAus is scoping offering professional development for teachers digitally. The NBN will ensure that these valuable resources, programs and lectures can be accessed.

The NBN is purely infrastructure and will realise its potential when it provides additional value to the user rather than the need of the provider.

There are some challenges that must be considered:

- The existing network is asymmetric in terms of its download and upload speeds. Download speed is much faster. This can reduce the experience of the user and produces a 'push' experience, which is not a modern, truly interactive educational model.'
- Online education works most effectively with person-to-person interactivity—hence the need for symmetric speeds.
- The Vocational Education & Training (VET) sector currently uses the model of lecturer as a facilitator very effectively. This model is another reason for needing symmetric services.
- End user equipment must be adequate to make full use of the network.
- Cost could see a broadband divide, especially if pricing continues to be variable depending on the volume of data transmitted. Volume pricing will inhibit new and innovative uses of rich media interactivity between teacher and student, and between students.
- Cross-jurisdictional security (public sector).



The NBN will assist in addressing the overlapping boundaries in the education sector. This has implications for high school students who would be able to access programs in the TAFE and higher education system and would enable a more student-centred, demand-driven approach instead of the current silo supply-driven approach.

**More effective medical professional development**

A highly mobile clinical workforce requires ongoing professional development. Educational resources accessed remotely are an important tool for clinicians to keep up to date. To be effective, multimedia resources must be of high quality. This requires the NBN in order to make access effective. Such resources may include:

- high-quality diagnostic images (e.g. magnetic resonance imaging)
- high definition video (e.g. surgical procedures)
- high fidelity audio (e.g. cardiac rhythms).

**Specialised, 'on-the-job' remote learning enabled**

The NBN will provide an opportunity for exploring the value of simulations for learning. For example, some high-risk or specialised industries such as mining and defence that are in remote locations may need to, or benefit from, being able to offer such on-the-job learning to their personnel. This would ensure that personnel in remote regions have as much access to appropriate training material as those in urban areas.

**(d) The management of Australia's built and natural resources and environmental sustainability****Better understanding by students of environmental responsibility**

Improved delivery of teaching, learning and education outcomes has the potential to improve student understanding and environmental responsibility.

**Reduced ICT equipment will lead to reduced power requirements**

Improved bandwidth into schools and government locations will support centralised provisioning of applications and storage of data. This will result in a significant reduction in ICT equipment and lead to associated reduction in the use of power for the equipment and necessary cooling.

**More competitive mining and energy industries**

Given the geographic dispersion of resources, administration and markets, and a high-capex industry characterised by multi-project businesses, connectivity between locations across local, regional and global boundaries is critical (and increasingly so) to mining and energy industry operations. The capture of efficiencies (and thus competitiveness) through early uptake of emerging technologies will rely heavily on access to higher-speed networks possibly using contemporary satellite technology.

An important example is the shift toward Remote Mining Operations, including vehicle and plant operation. High-speed broadband will enable effective, real-time remote management. This will lead to more efficient operations across the resource-to-market value chain (particularly in relation to transport).

Remote real-time information may also be utilised by companies and the government to enhance existing environmental monitoring programs.

**More reliable connectivity will offset rural and remote isolation, attracting quality workers**

Improved connectivity—in particular, reliable access to contemporary telecommunications including video links—will serve to offset the isolation impacts of rural and remote locations, and improve the capacity to attract and retain a quality workforce.

**(e) Impacting regional economic growth and employment opportunities**

**Global research shows that broadband access fuels economic growth and job creation**

Broadband creates jobs and fuels economic growth. The World Bank estimates that every 10 per cent increase in broadband penetration results in a per capita increase in GDP of over one per cent.<sup>4</sup> Additional research by Booz & Company suggests that countries in the top tier of broadband penetration have exhibited two per cent higher GDP growth than countries in the bottom.<sup>5</sup>

Small firms need access if they are to be part of the supply chains for big business or the public sector. Agri-businesses need access if they are to sell to supermarkets. Home-workers need access to work. Broadband access is a pre-condition for encouraging new investment to regional areas.

Along with its direct and positive impact on GDP, research has repeatedly shown that increased broadband penetration leads to significant job growth. It is conservatively estimated that increasing broadband penetration in Latin America from 5.5 per cent to 7.7 per cent would generate 378,000 new jobs. In the United States, the Information Technology and Innovation Foundation estimates that a stimulus package spurring or supporting \$10 billion of investment in broadband networks would support nearly 500,000 new or retained jobs.<sup>6</sup>

Other proven economic effects of broadband include trade creation and facilitation, lower costs for international communications and greater access to foreign markets. Broadband can also help regions attract, train and retain a valuable 'creative class of workers', and the presence of broadband will lead to new business models and new business opportunities to employ those and other workers.<sup>7</sup>

Mobile communications in general—and broadband in particular—have an especially strong impact on the economies of rural areas. Expanding broadband (including mobile) networks to rural areas leads to new opportunities for non-agricultural employment, better-paying agricultural jobs and greater overall productivity. Access to broadband also fosters small-business growth, allows citizens in remote areas to work from home, provides greater access to crop market prices and enables rural businesses to compete more effectively in world markets.<sup>8</sup>



Other benefits for regional areas are likely to include:

- Increased economic opportunities in rural areas. Broadband gives citizens in rural and remote areas new job opportunities, including the ability to work from home, which reduces travel time, traffic congestion and air pollution
- Reduced urban desire. Affordable broadband access can improve the economies of rural areas, driving up incomes, improving lifestyles, and thereby reducing the need and desire to move to cities
- Improved skills and education. Broadband access increases educational opportunities in rural areas and supports development of ICT skills. This preparation enables rural citizens to work from home or find better employment in urban areas, reducing the strain on social services
- Improved urban life. In conjunction with other technologies, broadband can facilitate decentralised work environments that improve productivity while also reducing energy demands, noise pollution, vehicle emissions and other forms of pollution
- More sustainable, self-sufficient communities. Businesses that do not depend on their geographical location and/or infrastructure (other than the NBN itself) for their success will have access to critical knowledge resources such as know-how and expertise
- Improved employment opportunities for people with disabilities. For example, home support and home-based employment could lead to a reduction in dependence on the Disability Support Pension.

The South Australian Economic Development Board considered future labour demand in its 2008 Review of Skills and Workforce Development. The Board developed an alternative scenario for the demand outlook, which included an assumption that South Australia's underlying labour demand (i.e. the baseline) would shift to a higher growth path as a consequence of the major projects boom, coupled with the roll out of a high-speed NBN by the Australian Government, which was expected to stimulate the growth of small and medium sized business (SMEs). This was incorporated in the alternative scenario by adding 0.33 per cent to baseline growth rates, phased in from 2012–13 and taking full effect from 2015–16 (an approximate completion date for the NBN at the time of the report).

An initiative in the rural South Australian town of Willunga (a first NBN rollout location) will demonstrate the methodologies to create a permanent fundamental increase in online business. This will be achieved through the delivery of education incorporating new innovative online business methodologies and models through the application, practical utilisation and awareness of the NBN.

### **Increased household and business productivity**

Various international and Australian studies support the notion that broadband increases household and business productivity. One of these studies has attempted to analyse and quantify the economic benefits to SA regional businesses.<sup>9</sup> This study found that the benefits are generated in two ways:

- The household real income effect (i.e. '... households will experience cost savings and enhanced income earning opportunities as a result of adopting broadband and these will grow over time. We have estimated the household real income effect at 20 per cent of the value of consumer surplus').

- The business effect (i.e. 'Adoption of broadband by business users generates cost reductions which are manifested in their output markets').

Broadband speeds equivalent to those in the capital cities are an added incentive to attract businesses seeking to take advantage of lower costs and improved lifestyles to relocate to regional areas.

#### **Will underpin the uptake of technology and support competitiveness of remote mining and energy industries**

Evidence highlights the significant positive impact from remote mining and energy industry operations on the sustainability and prosperity of rural and remote communities. The industry provides metrics indicating the high levels of local employment and local industry contracts. The ability of the NBN to underpin the uptake of emerging technology, and thus support the competitiveness of the mining and energy industry, will have a significant impact on the continued expansion of the sector in SA.

The potential for the NBN to offset the effects of distance and isolation further supports the attraction of families to relocate to towns near mining and energy industry operations (particularly social media, health and education benefits).

### **(f) Impacting business efficiencies and revenues, particularly for small and medium business, and Australia's export market**

#### **Will reduce costs, increase revenues for SMEs**

The UK initiative 'onlincolnshire' caters for residents and businesses in Lincolnshire to address physical remoteness of working and living in rural areas. A case study of this initiative suggests that the majority of businesses reported improvements in efficiency, productivity, and profitability as a result of using broadband technology.

The NBN will enable small- and medium-sized enterprises (SMEs) to be online, opening the door to new services, new applications and new business models. This results in productivity growth and revenue, and a decrease in costs. Costs will be reduced through better knowledge sharing, online collaboration, videoconferencing; improvements for accuracy, quality and time required for updating and delivering information about products and/or services; new distribution channels via the electronic delivery of products and services, for example translation services and banking; and reducing routine administrative tasks, freeing staff to focus on more strategic activities.

At the same time, revenues may be increased through faster access to customers and suppliers; improved speed for customer ordering; access for customers to catalogues and prices at any time; quicker responses to new business opportunities; enhanced market, industry or competitor intelligence through information gathering and research activities; and expansion of customer base and growth in export opportunities.

In the past, the benefits mentioned above have been available only to those with the revenue, technical skills, technology and know-how to implement them. The NBN will make them accessible to a far wider range of SMEs.



**Will contribute directly to local and regional small businesses and exports**

The sustainability of remote mining and energy industry operations and existing communities will be directly impacted by efficiencies driven by the continued uptake of new technology. Evidence supports that remote mining and energy industry operations actively seek to engage local and regional contractors<sup>10</sup>, thus the NBN will contribute directly to small business and exports.

The mining and energy industry sector is fundamental to SA and Australian exports, therefore competitiveness and the ability to establish and retain a workforce and community around operations is vital.

**(g) Interaction with research and development and related innovation investments****Improved public engagement with science**

For example, the Adelaide-based Royal Institution of Australia (RiAus)—with a focus on 'bringing science to people and people to science'—promotes public awareness and understanding of science. RiAus has invested in developing the website <<http://www.riausondemand.org.au>> so that those who cannot visit the Science Exchange building in Adelaide can still participate online in its programs and lectures.

Video content such as that at RiAusOnDemand can only be accessed with a fast internet connection. The NBN will ensure that such opportunities to engage with Australian science are available in population centres domestically, even overseas, as well as in more remote Australian communities. CSIRO and universities also offer digital content for similar purposes.

**(h) Facilitating community and social benefits****Community benefits**

The role and potential of the NBN, with particular reference to remote Aboriginal communities, is crucial.

- A COAG Agreement is providing \$7 million to support digital engagement in remote Aboriginal communities through public internet access and training, and access to quality broadband is critical to continued development of digital literacy and participation in contemporary Australian life for disadvantaged groups.
- For success of this and other programs, on-line interaction needs to be quick, efficient and accessible to all at low cost.
- Significant social inclusion benefits for Aboriginal communities are provided through good communications infrastructure and the areas of greatest need should provide the opportunity to demonstrate social return on investment in the NBN.
- NBN rollout in remote areas will support Government service delivery, health and education and regional development strategies.
- Opportunity to consolidate previous funding commitments towards education, work readiness and community development and deliver a way forward for better participation outcomes for Aboriginal communities.

The NBN is likely to have a large impact on what we consider to be a 'community' as a wide range of communities will be created online connecting people who are around the corner from each other or around the world. Communities will not only be people who live near each other but also those who have interests in common that connect online. Communities will use a range of online tools which are free to access and often free to use (other than the cost of the internet connection) such as:

- Voice over Internet Protocol
- video chat and conferencing
- free and open source software such as web-based applications, for example Google Apps, Yahoo Mail and MSN Messenger
- social networking to connect, share information, organise events and create communities.

### **Enriched, more accessible arts/culture**

Regional communities do not have access to the same arts/cultural experiences as those in Adelaide do, but have many grass-roots interests and capabilities. Local arts interests are the life blood for most regional communities. An enhanced digital environment provided by the NBN will offer the following benefits:

- a new, accessible medium for creating arts
- a new medium for people to connect and contribute (for example, the success of Eric Whitacre's virtual choir, viewable on YouTube; virtual orchestras, bands and other virtual productions; or uploading photographs to Google Maps or Photosynth)
- access to special arts experiences (for example, virtual tours of galleries and digital recordings of events).

This will enhance the quality of life and richness of local communities, as well as enabling connections around specific interests.

### **More efficient and effective not-for-profits**

All not-for-profit organisations will need to 'do more with less' by running more effectively and efficiently and spend as little as possible on administration to be able to spend as much as possible on service delivery. A vast majority of community services are delivered by not-for-profit organisations. The NBN is likely to have a profound impact on models of service delivery and the 'business' of running a not-for-profit organisation.

The NBN will give not-for-profits a much larger reach for service provision, fundraising, promotion, and communication of their message such as health promotion messages.

- Volunteer management—the development of online community for volunteers, online management of and communication with volunteers, through groups, Facebook groups/pages and other online tools.
- In-home service provision to client and communications with clients—both service delivery and safety services (such as in-home video link to connect with service providers).
- Telecommuting for staff and consultants—enabling not-for-profits to access staff and expertise from around Australia and the world.



- Social networking for promotion, connecting with members, clients and potential donors and also for the delivery of services.

**Social benefits**

Grass roots advocacy and activism using a range of online tools and websites to connect people locally and globally to communicate and organise has become the norm. Small organisation can have a large impact—often global—with the use of online tools and applications. People are sharing information via Twitter, setting up online tools such as <<http://qldfloods.org>> or organising protests or organising support all online.

The reality is the full potential of the NBN and the opportunities for facilitating communities and the subsequent social benefits are yet to be fully understood. People using the NBN and its connected technologies will find uses and create applications that have yet to be considered.

A significant benefit is improving equity of access to specialist medical services in regional and remote populations. Also, social networking, web-based telephony and videoconferencing (e.g. via Skype and equivalents) will help to reduce social isolation which promotes better mental health outcomes in isolated communities.

## **(i) The optimal capacity and technological requirements of a network to deliver these outcomes**

### **Better performance**

To effectively deliver better service and achieve the valuable outcomes, the network shall provide better performance than current services. This is particularly important in terms of broadband speed, symmetry and latency.

Many of the proposed applications for the NBN are contingent on highly interactive exchanges between individuals. Telehealth and e-education examples are frequently described as media-rich, high-resolution environments. Online education works most effectively with true, real-time, person-to-person interactivity.

The use of video to deliver health outcomes is an example. In the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands the Nganampa Health Council currently use videoconferencing to assist in mental health services. This uses ADSL2+ services—copper cable to the exchange and optical fibre backhaul to Adelaide. The Health Council also uses the ADSL2+ services extensively for other services such as patient information (Sydney data centre and Alice Springs archiving), providing medical policies and for training. The NBN will provide a better service than the existing ADSL2+ and these current applications could be improved and others implemented with higher speed symmetrical services.

### **Wireless technology**

Given the eight to ten year timeframe of the NBN deployment, it is important that any services provided using wireless technology can exploit the appropriate prevailing technology. Add to this the many advantages of being able to use a broadband service from different locations (for example home, farm house and township in a regional setting), the appropriate technology could be that which complies with the International Telecommunications Union requirements for International Mobile Telecommunication Advanced (IMT-Advanced).

### **Optimal transmission use**

Transmission infrastructure use is optimised when traffic from a number of sources is combined in a single link. This is particularly true for data traffic such as internet use. Hence, optimal designs avoid multiple links (including long distance and backhaul) other than for diversity. With the NBN providing connectivity, the use of links such as inter- and intra-state connections can be optimised, reduce requirements for Retail Service Providers (RSPs) to provide similar links and encourage new RSPs to enter the market, then increasing competition and lowering prices.



## ENDNOTES

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- <sup>1</sup> Wireless broadband standards by the Institute of Electrical and Electronics Engineers.
- <sup>2</sup> G Bell, C Anderson & A Kershaw, From Tree Change to e-Change—Willunga becomes a Digital Village, in press.
- <sup>3</sup> The Royal Institution of Australia, 'About RiAus', RiAus, Adelaide, viewed February 2011, <<http://www.riAus.org.au>> under a Creative Commons Attribution Non Commercial No Derivatives 3.0 Unported licence <http://creativecommons.org/licenses/by-nc-nd/3.0/>.
- <sup>4</sup> The World Bank, *Information and Communications for Development 2009: Extending Reach and Increasing Impact*, The World Bank, Washington, DC, USA, 2009, viewed February 2011, <<http://issuu.com/world.bank.publications/docs/9780821376058>>.
- <sup>5</sup> R Friedrich, K Sabbagh, B El-Darwiche & M Singh, *Digital Highways: The Role of Government In 21st-Century Infrastructure*, Booz & Company, USA, 2009, p. 5.
- <sup>6</sup> R D Atkinson, D Castro & S J Ezell, *The Digital Road to Recovery: A Stimulus Plan to Create Jobs, Boost Productivity and Revitalize America*, The Information Technology & Innovation Foundation, Washington, DC, USA, 2009, viewed February 2011, <<http://www.itif.org/files/roadtorecovery.pdf>> under a Creative Commons Attribution Non-Commercial 3.0 United States licence <http://creativecommons.org/licenses/by-nc/3.0/us/>.
- <sup>7</sup> D Soumitra & I Mia, *The Global Information Technology Report 2006–2007: Connecting to the Networked Economy*, Palgrave Macmillan, Basingstoke, UK, 2008.
- <sup>8</sup> The World Bank, *Information and Communications for Development 2009: Extending Reach and Increasing Impact*, The World Bank, Washington, DC, USA, 2009, viewed February 2011, <<http://issuu.com/world.bank.publications/docs/9780821376058>>.
- <sup>9</sup> Department of Further Education, Employment, Science and Technology, *Creating new markets: broadband adoption and economic benefits on the Yorke Peninsula*, DFEEST, Adelaide, 2008.
- <sup>10</sup> South Australian Social Inclusion Board, Department of the Premier and Cabinet, *Social Benefits of Mining in South Australia, Digging Deep*, Government of South Australia, Adelaide, 2010.

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