

25 February 2011

Mr Andrew McGowan  
Inquiry Secretary  
Standing Committee on Infrastructure and Communications  
PO Box 6021  
Parliament House  
Canberra ACT 2600

Sent by email to: [ic.reps@aph.gov.au](mailto:ic.reps@aph.gov.au)

Dear Mr McGowan

Thank you for the invitation to respond to the Inquiry into the National Broadband Network established by the House of Representatives Standing Committee on Infrastructure and Communications. I am pleased to provide the following feedback in response to the terms of reference.

a. **The delivery of government services and programs**

The NBN is the next logical step in the evolution of the communications fabric in Australia. The NBN however is not an end itself. It is the services that run over the NBN that will have a transformative effect. The NBN provides the potential for delivery of richer media to a much greater range of people over a far wider proportion of the country. Richer media can enhance services and programs, particularly in areas of health services and education.

Government services will need to be developed (or redeveloped) to take full advantage of the NBN. Online services are often fairly primitive at present; in some cases being little more than a way to access printed forms electronically, due to the paucity of bandwidth available to the household or wireless device.

Ubiquity and bi-directionality are just as important as speed. Five equally important factors need to be taken into account when considering the capacity and technological requirement of the National Broadband Network:

- Speed
- Bi-directionality
- Ubiquity
- Regional Backhaul capacity
- Capacity of future growth in bandwidth demand

Although the submission does not explicitly ask for comment, it is vital that cost effectiveness for the end user is a key consideration.

It is also hoped that the NBN will allow improved communication links between the University and relevant government departments. As the number of collaborative research initiatives increase we have many serious technical issues that create difficulties. For example a new research initiative may involve the creation of joint appointments where staff from a

government department are transferred to the University, but actually remain physically located in the government building. Where data requirements are large this requirement is best served by a direct fibre optic link to ensure bandwidth is not an issue and the technical solution can be as simple and as direct as possible. Currently this is cost prohibitive for all but the largest research initiatives.

b. **Achieving health outcomes**

UQ operates Australia's largest Medical School. This school has a large number of arrangements with Queensland Health for student placements and joint medical appointments. Many of these placements are in rural and regional Australia and are managed by the Rural Clinical School. The main teaching sites are in Bundaberg, Hervey Bay, Rockhampton and Toowoomba.

The Rural Clinical School requires high definition videoconferencing and telemedicine both of which require very high speed, low latency network connections. It is hoped that the NBN can provide dedicated fibre or wavelengths to each of these sites as well as allowing/facilitating the sharing of fibre optic cabling into a hospital location. This should improve health outcomes by ensuring the highest quality of training and instruction possible to our next generation of Australian medical practitioners and reduce the divide between rural, regional and city based medical services and training. Currently there are policies within Queensland Health that do not allow the University to share fibre optic services into hospital sites which means twice the cost to the taxpayer as both Queensland Health and UQ need to pay to have fibre optic cabling installed to provide network services for their end users.

The proposed NBN should provide improved options for universities to obtain (at reasonable cost) higher speed network access for students and staff placed at health precincts around Queensland for training and research purposes. At present there are limited, affordable options for such access particularly outside major cities i.e. in regional and remote locations. Such access is a critical component to delivery of high quality training for health professionals and researchers.

The promise of effective tele-medicine services will be a critical factor in the delivery of health services for the entire population in general and for regional and remote Australians in particular.

It is also expected to facilitate the extension of eHealth initiatives to a broader set of communities. One element of this could be to allow ageing members of the community to remain in their homes for longer than might otherwise be the case. If the aging population can continue to access services online, including some health services that are not presently viable. It also permits them to stay in close contact with their family via video conferencing etc and for their family to keep tabs on them from a health and security perspective.

c. **Improving the educational resources and training available for teachers and students**

It is the immersive nature of improved real-time communication and collaboration that will impact on Teaching and Learning.

The accessibility of educational resources and teaching methods increasingly rely on very high-speed networks. Technology allows us to share more effectively finite expert human resources such as language, medical, research, scientific and other specialist staff with other parts of the community even though they may not be local. One of the limiting factors in the ability to share this knowledge and expertise is the broadband network. If high-speed networks are not available (100Mbps or faster) then the collaboration is limited to older technologies (e.g. low speed videoconferencing).

Another emerging issue in this area is the rapidly increasing size of electronic educational

resources. For examples an electronic copy of a journal article, which includes pictures, tables and graphs, may be between 5MB and 50MB in size. In the near future these journals, which are already on-line, will be designed to be read in e-readers such as the ipad and could include high definition video, interactive charts and tables and option for immediate feedback and communication with other subscribers of the article. This means an individual article could be around 500MB in size and the student may be required to read dozens of these articles each week. The main impediment to this happening today is the lack of adequate bandwidth to the majority of homes.

Universities are about more than obtaining a competency. Universities have an ability to transform an individual. This transformation is unlikely via the online delivery of programs unless that delivery is collaborative and engaging. Ubiquitous high speed communications can enable such an environment.

Research and innovation will benefit from a quantitative increase in the amount of locations that can be connected to via high speed communications. This increases the pool of potential partners that can collaborate in real time. This increase in potential partners could directly correlate with an increase in funding partners and, ultimately, improved research outcomes.

The NBN will provide a platform for schools and TAFEs to gain higher speed network access. This in turn permits richer media and communications to become a feature of education programs.

Videoconferences with museums, art galleries, and other specialist facilities around the country as well as other schools and university specialists all become possible and allow students to experience, from remote locations, much of what students in major cities take for granted.

d. **The management of Australia's built and natural resources and environmental sustainability**

The NBN may be able to help in this area by providing the capacity for additional real-time monitoring of critical nationally significant natural resources.

e. **Impacting regional economic growth and employment opportunities**

With high-speed communications available to regional areas, many activities can be undertaken without travelling to the nearest major city. This can be seen to some extent even with the presently limited ADSL services becoming available to rural producers. These people can access information about local and world demand/pricing of their produce as well as more general online services (health and education). The NBN should provide not just faster and more reliable access but also options that aren't presently viable e.g. Videoconferencing and telemedicine. For example people living in a remote farming community could access home health diagnostic and monitoring services.

Community benefits will be intrinsically linked to the impact of high speed communications on:

- Revival of regional and remote communities.
- Economic Diversification and the resulting impact on a community's skills base.
- The reversal of population drain as more people stay in a region and more people and organisations are attracted to a region.
- The ability of communities to access services whether they be Health, Education or government services on a more equitable basis.
- The ability of communities to access markets as part of the digital economy.

This will lead to stronger and more sustainable regional communities.

f. **Impacting business efficiencies and revenues, particularly for small and medium businesses and Australia's export market**

The NBN will reduce the barriers of entry for small and medium Australian businesses allowing innovation and the creation of new services and service industry that are underpinned by the NBN infrastructure. Presently, the fibre optic infrastructure that the NBN will provide is either not available or too expensive for small business.

g. **Interaction with research and development and related innovation investments**

The present higher education and research institutes are reasonably well served by high speed communications via the Australian Academic & Research Network (AARNet). This is delivered in the main over fibre to university campuses and research institutes at speeds typically of 1Gbps or faster. This is well in advance of the initially planned NBN deployment.

However, universities and research institutes are not only confined to well served city locations; they often have additional sites where staff and students are located. For instance the University of Queensland has over 11,500 staff and student placements at hospitals and health precincts across the state. These people are involved in training health professionals as well as medical research.

These sites do not always have reliable network access. The NBN has the potential to improve the ability of such researchers and students to operate on a par with colleagues at their main sites. Universities (or AARNet on their behalf) may procure fibre services to some of these remote and regional sites. This in turn can enable viable access to the national data storage fabric, the national supercomputing grid as well as videoconferencing and transfer of large data sets. Some of these services are available in a limited fashion through ADSL but to be really viable, symmetric access at speeds of 100Mbps or better are necessary.

The NBN also provides an option for AARNet/universities to introduce redundant paths in their network to improve resilience in times of flood or other natural disasters. This is important given the heavy reliance of researchers and academics on high-speed networks for their work.

h. **Facilitating community and social benefits**

There are many potential benefits of the NBN to the general community and society at large. With the increasing reliance of the community on electronic resources in the provision of basic and essential services, such as payment of bills and electronic banking, people in the community without access to these services are disadvantaged.

As these services become more advanced the divide between the digital "have's" and the digital "have not's" will become more pronounced. The NBN could be an excellent leveler for the Australian community, providing equality of technology and access to electronic/digital services. This has many potential benefits such as fostering a sense of inclusion, improving the ability of families to stay connected and allowing more options for people to remain living in regional and remote parts of the country.

The rise in importance of social networking tools and systems looks set to continue and many of the services that these companies provide are becoming useful and relevant to an increasing number of young Australians. Being able to access these services on a consistent, equal basis no matter where you are in Australia is a positive step.

i. **The optimal capacity and technological requirements of a network to deliver these outcomes**

The cabling infrastructure of most importance, in rank order, is:

- 1) dark "unlit" fibre optic cable pair (facilitates maximum capacity)
- 2) a wavelength on a fibre optic cable (allows 10Gbps today and 100Gbps in the next few years)
- 3) provision of a very high speed service on fibre (1Gbps, 10Gbps, 100Gbps when available)
- 4) provision of high speed services on fibre (100Mbps-1Gbps)

Other important technological requirements:

- ability to monitor and manage connections on the NBN
- collection and access to advanced network performance metrics
- ability to prioritise network traffic and provide QoS
- low latency
- reliability and resiliency
- unlimited data (upload and download)
- no contention or limited contention network
- flexibility to implement new services and technologies as they become available

I hope that this feedback contributes positively to the deliberations of the Standing Committee as it conducts the Inquiry into the National Broadband Network.

Yours sincerely

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**Vice-Chancellor**

*Copy: Director, UQ Information Technology Services*

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