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HOUSE STANDING COMMITTEE ON INFRASTRUCTURE AND COMMUNICATIONS

Inquiry into the role and potential of the National Broadband Network

AIIA Response

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"I THINK THERE IS A WORLD MARKET FOR MAYBE FIVE COMPUTERS" – THOMAS WATSON, CHAIRMAN OF IBM 1943

"THERE IS NO REASON ANYONE WOULD WANT A COMPUTER IN THEIR HOME" – KEN OLSON, PRESENT CHAIRMAN AND FOUNDER OF DIGITAL EQUIPMENT CORP, 1977.

"640K [OF RAM] OUGHT TO BE ENOUGH FOR ANYBODY" BILL GATES, CHAIRMAN OF MICROSOFT

INTRODUCTION

The Australian Information Industry Association (AIIA) is the peak national body representing suppliers and providers of a wide range of information technology and communications (ICT) products and services. Its membership comprises approximately 400 of the top international corporations as well as small to medium enterprises currently supplying innovative online applications in the health, education, financial and retail sectors. AIIA members fully support the development of ubiquitous high speed broadband in Australia and this response to the Committee is based on wide input and discussion with organisations across the membership.

AIIA's National Board of Directors includes all the major corporations currently involved in developments of high speed broadband installations across global jurisdictions such as Telstra, Google, IBM, Intel and Fujitsu, as well as small business organisations providing smart and innovative solutions in the online world today (see Appendix I).

AIIA believes the ICT industry has a responsibility to successfully develop and exploit the short and longer term benefits that ubiquitous, affordable, high speed broadband infrastructure can deliver to the whole Australian economy, industry, business and consumers alike. Governments must also commit to this critical infrastructure in circumstances where private investment cannot or will not meet the need for ubiquity. Flexible and business friendly policy frameworks are an essential pre requisite to the success of any national infrastructure, more so in the case of the NBN which aims for 100 percent population coverage. AIIA has developed a Policy and Regulatory Framework which represents the minimum optimal policy environment necessary to ensure the achievement of benefits of high speed broadband accessible by all Australians (see Appendix II).

The benefits available from a ubiquitous high speed broadband will take many forms; new applications and services for consumers, more competitive business models for businesses, improved service delivery for government. In short, these new and even un imagined applications can deliver a 'digital economy' to Australia, driving efficiencies across *all economic sectors*. AIIA also considers that the positive impacts of this digital economy supported by high speed broadband will drive much needed increases in Australia's productivity performance.

Public debate surrounding the Government's decision to invest in the National Broadband Network (NBN) has clouded the real issue of potential economic and productivity benefits that could be made available to all Australians with the NBN. Australia has a unique geography and population density, so whether it is a postal service or broadband, we will likely pay more per capita for ubiquitous national services than any other nation. The essential question to be asked as these services are considered is what value they will deliver us as a nation. Leaders in the wider business sector such as retail have not truly grasped the sea change that is going on in global business. Unless we address our poor broadband position as a priority then we will be relegated to a bystander role in the global economy with much greater long term consequences.

As the voice of the digital economy, AIIA is committed to unleashing the potential of the digital economy. AIIA will facilitate this by advocating for the immediate implementation of an optimal policy environment to enable a successful digital economy and to remove barriers to its effective achievement by focusing on knowledge sharing, education and stimulating innovation.

OVERVIEW

In the last ten years alone the number of internet users world wide has increased some 445% to almost 2 billion[1]. Global internet traffic in 2010 was two thirds higher than it was in 2009 with growth underpinned by a global network of fibre optic cables that is currently doubling every 18 months[2].

According to a US based think tank[3] the global economic benefit of the internet equals some $1.5 trillion a year. What's more, if current trends continue, even if growth is only half as fast as it was between 2005 and 2010, by 2020 global e commerce will add some $3.8 trillion annually to the global economy[4]. Already the UK estimates that its internet economy is valued at some $100 billion per annum – over 7% of its GDP[5].

As internet speeds increase, costs decline, applications become more clever and more diverse

Broadband and Economic Growth

- It is estimated that by 2015 there will be more than 5 billion internet users and 15 trillion connected devices.
- A study of 120 nations found that each 10% increase in broadband penetration adds 1.3% to the annual GDP of high income countries and 1.2% to the GDP of low to middle income nations (Qiang 2009).
- Through deployment of high speed broadband, Korea's ecommerce market more than doubled between 2002 and 2006, from $178 billion to $414 billion (Qiang 2009).
- A study of broadband investment a township of Ontario, Canada found that an investment of $1.3m led over several years to a $25.22 million increase in GDP for the country and a $7.87 million increase for the Province of Ontario (West 2010).

[1] ITIF.,2010. *The Internet Economy 25 Years After.Com*., p.1
[2] Boston Consulting Group. October 2010, *The Connected Kingdom. How the internet is transforming the UK economy*
[3] ITIF.,2010. *The Internet Economy 25 Years After.Com*., p.1
[4] Ibid., p.1
[5] Boston Consulting Group. October 2010, *The Connected Kingdom. How the internet is transforming the UK economy.* P. 5

and new smart devices proliferate, the transformative impacts of high speed broadband are indisputable. High speed broadband is now acknowledged as a necessary pre requisite for productivity growth, economic sustainability and international competitiveness in the 21st century.

In the same way that the industrial revolution transformed the underlying economics of business sectors, stimulated profound social and environmental change and drove innovation and growth in human capital – so too will our current digital revolution. The potential of digital technologies in this context is game changing. It is not simply about doing more of what we do now online. Or of doing it faster. It is about *doing things differently* and doing things we never envisaged. Underpinned by the NBN it is about moving from "e" (electronic) to "u" (ubiquitous) access where ultimately, everyone and everything is connected.

To be a power player in the world's digital economy will require us to lift our sights beyond what we do now on the internet to a new world where innovation and technology converge and existing paradigms – the way we do things – are profoundly changed. To see the return on our national NBN investment, both economically and socially, this is the vision we must have and must enact.

RESPONSE TO THE TERMS OF REFERENCE

(a) Delivery of government services and programs

Key impacts

- The combination of ubiquitous high speed broadband coupled with smart, dynamic applications, tools and service models offer opportunities in four key areas:
  - The ability to use data and analytic capabilities to deliver more 'intelligent' services that are better aligned with policy objectives
  - The ability to use convergent technologies to deliver services more effectively and more efficiently and separately, the ability through the capabilities that the NBN will support, to converge services, including across layers of Government
  - Opportunities for increased user participation and engagement aimed at improving the relationship between citizens and government and enabling innovation of public engagement, policy and service delivery
  - Reduced cost of service delivery and public administration through technologies that support new business and service delivery models, eg cloud computing.

First generation e government – the use of ICTs to improve access to public services, improve and increase transaction flows and interactions with citizens, has enabled government agencies to deliver better services and achieve a range of efficiencies. But despite over 15 years of intense investment and effort, with few exceptions, the way in which government services are delivered has not fundamentally changed. Citizens are still filling in forms, attending offices, receiving letters in the mail, compiling documents to prove who they are, liaising with multiple agencies, presenting the same information multiple times, and so on.

The NBN provides the opportunity to make the step change to the next generation of service delivery where the ubiquity of high speed broadband coupled with smart, dynamic applications and tools facilitate more intelligent solutions to the economic, health, social policy and environmental challenges that lie ahead. In this new generation of government service delivery, services can be joined up, customized and accessed from a variety of devices at anytime from anywhere.

The extension to frictionless government is now critical, as it goes beyond the data sharing, etc and places much greater emphasis on customer needs and customer experience. It also helps provide a dynamic feel to the model as customer needs change with time. *A dynamic model demands not only bandwidth but the confidence of inclusivity and always being connected that the ubiquitous nature of NBN also delivers.*

With demands for improved transparency and accountability of public administration, increased pressure for community involvement in decision making processes, and heightened citizen expectations of service quality and convenience, nothing short of transformational change is required. The NBN provides exactly what is needed to achieve this. Not only does it provide the underpinning infrastructure but also a platform for the convergence of technologies, applications and innovation necessary to change existing service paradigms.

Opportunities lie in four key areas:

- use of data and analytic capabilities to enable service delivery to be more 'íntelligent' and better aligned with policy objectives;
- the use of convergent technologies to deliver services more effectively and more efficiently, so online users of government services, can interact with government via online conferencing as well as portals for example;
- increased user participation and engagement aimed at improving the relationship between citizens and government and enabling innovation of public engagement, policy and service delivery; and
- reduced cost of service delivery and public administration.

Use of Public Sector Information

Examples of mashups using public sector information:

Which Bin? iPhone app which used iPhone to scan over the barcode of an item, eg food packet or carton, which is then matched against a database. The app responds by displaying a picture of the correct bin used in that council area and a message explaining whether it can be recycled or not. (Apps My State, Victoria).

Transportal: Gives users suggestions for possible transport routes based on carbon, financial and health costs. (Apps My State, Victoria).

Firemash: Real time service that analyses notices from the NSW Rural Fire Service and the community for warnings and sightings. Combines and analyses information to determine the location and proximity to person's house (Mashup Australia).

If you are at risk, it instantly sends you a specific tweet, giving you the crucial early warning needed to stay safe.

Data and Analytics

The internet has brought to the fore the intrinsic value of information: the ability to access it, use it and disseminate it. Some even argue that there is

now too much information available and that the quality of what there is, is increasingly variable. The NBN offers powerful new ways to manage the diversity and accelerating volume of information, use it in more meaningful and customized ways and as a catalyst for innovation.

The Government invests heavily in collecting, analyzing and transforming vast amounts of data, information and content.[6] In a world where information is so highly valued, coupled with new technology tools that enable us to rapidly aggregate, manipulate, analyse and disseminate it, the NBN provides a means to leverage national information assets in ways that were never imagined possible. With access to high speed broadband for collecting, analyzing and disseminating information, the NBN will enable the Government to use information analytics to gain better insights to business and social problems, make better decisions and create better outcomes.

Mashup Australia[7] for example, demonstrated not only the feasibility of bringing together different public service data sets using these new tools and bandwidth capabilities, but more powerfully, the innovation that results. The opportunity is not limited to mashing up public sector data. Making the data available in the public space means it can be mashed with external data sets to generate broader and whole of economy business innovation and community and national benefits.

Access to and analysis of vast volumes of data also has public and social policy implications. Information modelling and geospatial tools are already used to drive policy and service reform. In the ubiquitous NBN enabled world this can be done more rapidly and with more contemporary data, ensuring programs are relevant and targeted. The combination of always available high volumes of bandwidth and smart analytic tools means otherwise unmanageable volumes of data can be aggregated, analysed and shared in ways that are fit for purpose. Using smart web based analytic tools, national and global service trends and behaviours can be monitored and analysed and the implications extrapolated for customised service settings.

At a service level access to real time information enables more informed and risk managed decision making related to individual entitlements to government programs. Supported by appropriate privacy and consent frameworks ubiquitous availability of high performance bandwidth will support:

- the capture of customer information directly and dynamically from relevant third parties;
- customer self service and online triage. Support needs can be identified and appropriate levels of intervention applied without the need for a customer to attend an office. Where appropriate, intervention can be applied online and even online case management approaches adopted;
- determination of service entitlements based on a richer range of personal, demographic, socio economic and location specific criteria;

[6] Government 2.0 Taskforce. 2009. *Engage. Getting on with Government 2.0*. p.22

[7] Launched by the Government 2.0 Taskforce, Mashup Australia invited proposals for clever ways to take public sector information and mash it up to create new data sets.

- customer to communicate with and receive personalised information from multiple agencies in a single transaction and the ability for customers to access services from a wide range of smart mobile and home based devices and platforms;
- the ability for customers to use home based equipment such as IP TV and PCs to link with service providers remotely as an alternative to face to face interviews and meetings; and
- based on service profiles and circumstances, the ability to automate and dynamically 'serve' up information and services to customers. Dynamic search frameworks/tools (such as the semantic web) will make it easier and more intuitive for customers to find the services that are relevant to them – across all levels of government.

Using the capabilities of NBN infrastructure and services, information can be drawn together dynamically, used intelligently and shared appropriately. From a customer perspective the online relationship with service agencies will be much richer and dynamic and as a result, the value proposition for them to do their business electronically stronger. The web becomes a truly viable alternative service delivery and access channel.

Convergence

Convergence of media mediums, the interlinking of computer and other information technologies, media content and communication networks, provides opportunities for information to be shared in more personal and impactful ways. Powered by the NBN infrastructure, government information and services (health, education, social services etc) can be delivered via a range of digital media (text, audio, video), can be ubiquitously available and accessed through a growing network of information and communication devices.

As evidenced by the take up of smart phones, a single device is now capable of supporting a multitude of media formats, making it increasingly easy and convenient for citizens to access and provide information (including in multiple formats) online. This opens new opportunities for government to also deliver services; maintain relationships with customers; and assist, monitor and measure customer progress through service systems.

Opportunities exist too for service convergence horizontally and vertically across layers of government. The ability to rapidly access and share information holds potential to remove existing boundaries between service layers, thus enabling a more coordinated and coherent targeting of services.

Government Accountability

www.recovery.gov/:

US government's official website to 'track the money'. The site enables citizens to track the allocation and progress of recovery funds – to see what was spent, where and how. Information is shown in the form of charts, graphs, and maps, which offer both telescopic and microscopic views of Recovery projects across the country, from the national overview down to specific post codes. The site also provides a mechanism to report suspected fraud, waste or abuse related to Recovery funding and projects.

eDemocracy

www.fixmystreet.com:

Allows people to report, view or discuss local problems, eg graffiti, broken paving stones, street lighting etc. Users can pinpoint location of an issue on a map along with a description of the problem. The problem is then forwarded to the relevant local council with updates provided on responses and progress in resolving the issue.

Augmented reality tools (a live, direct or indirect view of a physical, real world environment augmented by computer generated sensory input such as sound or graphics) open the potential for new and innovative ways to deliver training, provide customer intervention and support emergency and outreach activities remotely. Without an NBN infrastructure the scope of application and benefits that can be achieved using these smart applications will be limited.

User Participation and Engagement

The NBN provides the opportunity to actively engage all citizens in open government. As evidenced by US President Obama's efforts[8], the concept of open government is more than a political stunt. It is about the genuine engagement of citizens in political, social and economic processes aimed to work for the collective good. This is what the 21st century citizenry expects and is demanding. Without a supporting NBN infrastructure, universal engagement is impossible.

Reducing Cost and Red Tape

The European Commission recently reported a significant increase in the availability of government services online to citizens in Europe. According to the Commission's 9th e-Government benchmarking report, the average availability of online public services in the European Union (EU) went up from 69 percent in 2009 to 82 percent in 2010. The report notes that making more government services available online helps cut public administration costs and reduces red tape for citizens and business

Digitizing Public Services in Europe: Putting ambition into action, European Commission, December 2010. http://ec.europa.eu/information_society/newsroom/cf/item-detail-dae.cfm?item_id=6537

Reduced cost of service delivery and public administration

Expansive cloud computing capabilities, only possible with NBN infrastructure, can be used to enable rapid service development and deployment at a fraction of current costs. As previously stated by AIIA, "*the funding models in the Cloud can flatten the investment cycle for Government by transitioning the need for irregular capital expenditure into more consistent operating expenditure*"[9]. The UK Government, for example, as part of its recent ICT strategy has estimated that moving into the cloud could shave some £3.2 billion from the nation's £16 billion annual IT budget[10].

[8] On his first day in office in January 2009, President Obama issued a call for increased open government. Later that year in December 2009, the White House issued the federal government's Open Government Directive that emphasized the principles of open government: Transparency, Participation and Collaboration. The directive required each federal agency to formulate a plan for how it would increase openness and public engagement in its programs and broader operations.

[9] AIIA . 2011. *Cloud Computing Strategic Direction Paper: Opportunities and applicability for use by the Australian Government,* AIIA Response, 4 February 2011.

[10] www.cabinetoffice.gov.uk

(b) Achieving health outcomes

Key impacts

To manage the issues facing the health sect such as affordability and demand requires a step change in health service delivery models. The capabilities available through the NBN are critical to achieving such change and necessary if we are to keep pace with healthcare developments around the world. The NBN will impact health outcomes is two key areas. It will:

- facilitate new healthcare service models, ie through telemedicine, remote and home based care approaches ; and
- support the rapid retrieval, sharing and exchange of health information, through
  - the management and sharing of large files and content, eg X-rays, scans etc;
  - the reliable passage of health information such as prescriptions, discharge summaries, medical reports, health records etc;
  - the ability to access information remotely and instantaneously to inform health decision making;
  - development of smart applications that support online availability of clinical pathways, research developments, treatment tools etc;
  - the collection of important health information that can be aggregated to inform public health policy

Australia spends $94b annually on healthcare, representing around 9% of total GDP. The contribution made by the Federal Government alone is 4% (or 15% of total Federal Government spending)[11]. As the population ages and demand for health services increases, it is projected that Government spending on healthcare will grow from the current 4% to over 7% of GDP by 2049 50. Further it is projected that over the same period real health spending on those aged over 65 years will increase around seven fold, and over twelve fold for those aged over 85 years[12].

This scale of growth coupled with increased complexity of health demands and expectations of citizens will put unprecedented pressure on Australia's health system. With this in mind it will be increasingly important that our health systems demonstrate value for money as well as excellence in service delivery. Looking to the future it can be anticipated that key areas of focus will be improving the overall efficiency of the health system without any diminution of quality and managing more people with more complex health needs.

Over the last 15 or so years the internet and the ability to transact online has been identified as a vehicle for

Telehealth Case Study

The Victorian Virtual Trauma and Critical Care Unit provides support for regional doctors in smaller towns, dealing with trauma or specialist cases, by linking them (via video conferencing and high-speed broadband equipment) with trauma and critical care specialists at major Melbourne hospitals. This allows quicker decisions on the right treatment for the patient, and also helps to determine if they can stay in their local hospital or need to be sent on to a larger hospital.

[11] The Department of Treasury., 2010, *The Intergenerational Report 2010*., p. 49
[12] Ibid p.53

improving health service delivery through improving access to information for health providers and citizens. However, to manage the issues facing the health sector such as affordability and demand, will require a step change in health service delivery models. The capabilities available through the NBN are critical to achieving such change and necessary if we are to keep pace with healthcare developments around the world. The NBN will impact health outcomes is two key areas. It will:

- facilitate different and new healthcare service models; and
- support the rapid retrieval, sharing and exchange of relevant health information.

New healthcare service models

The NBN will facilitate new models to deliver and access health services and improve the capability of existing service approaches that relieve pressure on primary healthcare facilities.

High performance broadband will enable telehealth/telemedicine models of treatment and care. This has a direct impact on the quality and accessibility of health services available to regional, rural and remote communities where it is both logistically and financially more difficult to offer the full gambit of health and specialist services. Using ubiquitous high speed broadband, services that patients would otherwise need to travel considerable distance to access will be accessible locally and potentially, even from within their own homes.

More generally telehealth capability will help manage scarce and disparate medical expertise and specialization. It means the knowledge and skills of particular specialist streams can be provided more broadly with little if any inconvenience to patients or providers. This requires high performance data capacity, particularly where video and real time remote consultation occurs. It also improves the ability to provide support and training to healthcare professionals that do practice in rural and remote areas.

Access Economics estimates that the ongoing financial benefits to Australia from wide scale implementation of telehealth would be between $2 billion to $4 billion per year[13]. If this is the case, savings from health care alone will quickly deliver a return on the investment.

[13] *Financial and externality impacts of high-speed broadband for telehealth*, Access Economics, 2010 http://www.dbcde.gov.au/digital_economy/benefits_of_digital_economy_from_nbn

Fibre to the premises coupled with smart monitoring and sensor tools will provide a viable alternative to institutional or hospital based care for patients who are unable to live independently. This includes people at different phases of care including the chronically ill, people undertaking rehabilitation, people recovering from illness/hospitalization and outpatients who need to retain regular contact with healthcare professionals. This directly impacts the cost of care by preserving costly hospital facilities for patients with the highest needs. This can be achieved without compromising the frequency and quality of intervention patients need. It also provides critical medical and peer support to home based carers who play a vital role in relieving cost pressure on the system.

A 2007 US study (by the Centre for Information Technology Leadership at Harvard) estimated that if the necessary broadband was in place, the following could be avoided:

- 850,000 patients transports between emergency departments.
- 40,000 transfers from prisons to medical centres.
- 387,000 transfers from nursing homes to health facilities
- 19.7% reduction in unnecessary tests and trials using real-time video consulting and a 21.8% reduction using store and forward image transfer.

After recouping installation costs (5 years) net savings of approximately $US4.28 billion per year could be realised. This equates to around $296 million per year in Australia.

Nooriafshar, M. and Maraseni T. (2007) ***Telehealth system in Queensland*** IN Andrew Burge (Ed.), Proceedings of the 6th Annual Hawaii International Conference on Statistics, Mathematics and Related Fields, Hawaii International Conference 956-958

Rapid retrieval, sharing and exchange of health information

Healthcare decisions and service delivery depends on the ability to access the right information when and where it is needed. Access to information reduces over servicing, informs healthcare decision making, reduces the incidence of medical misadventure, enables preventative healthcare strategies and ensures citizens are empowered in the healthcare delivery process. The bandwidth capabilities of the NBN will enable:

- the management and sharing of large files and content, eg X rays, scans, 3D images, video etc. High speed download and upload services are necessary for bandwidth hungry data transfer in both directions;
- the reliable passage of health information such as prescriptions, discharge summaries, medical reports, health records etc. High levels of network stability and reliability are fundamental to building citizen confidence in Australia's ehealth capability and in particular, their confidence in a robust and reliable electronic health records system;
- the ability to access information remotely and instantaneously to inform health decision making;
- smart applications that support online availability of clinical pathways, research developments, treatment tools etc;

- the collection of important health data that can be aggregated to inform public health policy.

Booz & Co estimated that rollout and adoption of core e health capabilities in Australia are expected to be worth an estimated $7.6 billion annually by 2020, with the primary benefits stemming from reduced errors, enhanced adherence to best practice, and enhanced workforce productivity[14].

While not all these activities necessarily require high speed broadband, the health system is exactly that – a system. An online health system requires uniform capability to enable all parts. Ubiquity is essential to ensure all Australians can benefit from all these (and more) services.

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

Key impacts

Education plays a critical role in the economic performance of countries. Quality education is associated with higher productivity at a country level and increased salaries for individuals in the labour market. The NBN will contribute to Australia's education and training capabilities by:

- providing the platform to support diverse teaching and learning techniques and access to an increasingly rich pool of educational resources (eg video streaming, interactive teaching methods, specialist training options, customized educational and training programs)
- enhancing the quality of our educators by providing access to quality resources and professional development activities (eg peer networks)
- fostering collaboration, particularly in tertiary and research institutions where collaboration is essential to our ability to innovate (using real time social media tools and networks, enabling sharing of data)
- underpinning and enabling stronger communities - ie through the ability to tailor and target education and teaching methods to disadvantaged localities/demographics/students

Research shows that education plays a critical role in the economic performance of countries. Quality education is associated with higher productivity at a country level and increased salaries for individuals in the labour market. Quality educational resources contribute to the quality of education and educators which in turn raises the performance of students which ultimately contributes to improved productivity at both the individual and aggregate levels[15].

The NBN offers opportunities to all levels and types of education – primary, secondary, tertiary, vocational training, adult education, training services, self directed learning etc irrespective of

[14] Booz & Co, 'Optimising E-Health Value', May 2010 <www.booz.com/media/file/Optimising_e-Health_Value.pdf>
[15] http://cemapre.iseg.utl.pt/events/1e3/papers/Rodrigo%20Belo.pdf

location or size. Bearing in mind the relationship between quality education and country prosperity, the NBN will impact Australia's education infrastructure in four key areas.

In terms of teaching and learning capabilities, the NBN provides the platform to support a diversity of teaching and learning techniques and the ability to access an increasingly rich pool of educational resources. It will enable widespread accessibility to interactive learning models and video streaming of content otherwise inaccessible to some schools, locations and students. What's more it makes these same resources available to students in the home and in non contact school hours where learnings can be reinforced. In an environment where the focus is increasingly on personalization of services and messages, education can be tailored to the needs of individuals. Work in the UK which turned a school with low attaining students into high attaining students simply by replacing pen and paper with Web 2.0 infrastructure, demonstrates the transformational impact of customized education using new technology tools powered by always on broadband[16].

The ability to facilitate virtual classrooms and even virtual schools provides unimaginable opportunities for students otherwise excluded from the physical school community. This includes those in isolated geographic locations but also those otherwise socially isolated by way of disability or circumstance (eg carers of people with disability, seniors, mature aged workers, migrants, stay at home parents etc). For some of these groups the ability to participate in education and training has not been an option. For others their specialist teaching needs have simply not been able to be met. Access to ubiquitous high speed broadband not only opens new educational opportunities but enables education to be structured and channeled to the needs of individuals and their circumstances. Opportunities for lifelong learning are also enhanced through easier, more convenient, flexible and more stimulating educational options. Ultimately the payoff is improved workforce opportunities and participation – and in turn increased productivity.

The quality of educators and the opportunities available for them to access and share resources and participate in professional development activities (which ultimately make their jobs more interesting and fulfilling) are enhanced. This is particularly critical to schools and teachers that are geographically isolated who have limited access to, or flexibility to access, peer support and professional development networks. Access to such networks and to rich educational resources also provides an important incentive for teachers otherwise disinclined to seek out rural and even some regional teaching positions.

The ability to foster collaboration, particularly in tertiary and research institutions is essential to our ability to innovate. The rise of new social media and collaborative communication mediums coupled with the desire to share data, information and knowledge in real time necessarily requires a robust, reliable and ubiquitous telecommunications infrastructure.

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[16] Williams, T. *Connecting Communities. The impact of broadband on communities in the UK and its implications for Australia*, commissioned by Huawei Australia, author, Dr Tim Williams, February. p.46

Communities benefit from better educated, trained and satisfied citizens and in the case of more remote and isolated communities distance need no longer be a disadvantage to educational opportunities and access to quality knowledge based resources.

(d) The management of Australia's built and natural resources and environmental sustainability

Key impacts

- Reduced carbon footprint
- Increased efficiency in power distribution and consumption
- Increased demand, lower costs and better risk management in resource ventures

With the support of a world class national broadband network, Australia's ICT industry has the potential to enable initiatives that would cut Australia's carbon emissions by 21 per cent (116 Mt of CO_2e) on today's levels by 2020 (IDC, 2009). An important and effective range of measures to address the effects of climate change can be implemented today, despite the delay in the implementation of a CPRS. These measures and initiatives cover the following areas:

- Energy Production and Distribution Smart Grid/Smart Meters
- Transport and Logistics
- Building Management Systems
- Industrial Processes

Additional environmental and economic benefits are also possible in health and education through embracing the digital economy, increasing productivity and lowering costs through mobility, real time communication and dematerialisation.

Latest technology advancements also provide the ICT industry with the ability to reduce environmental impacts through increased computing power, more energy efficient equipment, and the establishment of cloud environments, providing ICT as a service for leveraging the benefits of shared environments that have been optimised for maximum efficiency gains.

The key technology in achieving many of these benefits is the establishment of a world class national broadband network. The National Broadband Network (NBN) is a fundamental infrastructure priority – building the network will help improve Australia's ICT performance to the extent that we will be in the top five ICT enabled countries globally by the time of the network's completion.

However, much more needs to be done. AIIA believes the Australian government needs to implement a number of initiatives to more quickly advance the development of the digital economy and to realise ICT's potential in building a more sustainable Australia. Currently Australian businesses lag their international peers in the effective use of ICT as a business output. Australia is ranked 24th out of 29 for businesses that have a website (54 per cent) and 11th out of 29 in businesses that generate any revenue at all from e commerce (10 per cent).

ICT enabled technologies and initiatives have the potential to significantly mitigate the increasing cost of power, reduce the effects of population growth, help in the development of a coherent transport policy, and to overcome many infrastructure limitations.

(e) Regional economic growth and employment opportunities

Key impacts

- Teleworking and online services slow down out-migration and attract in-migration to regional areas
- Increased opportunity for regional businesses to tap into the worldwide markets
- Stimulation of new employment and income opportunities
- Opportunity to improve income from existing/traditional industries
- Regional growth means local services are retained and combined with improved telecommunications and media tools regions have access to a range of health, education, social services etc. Effectively, ensuring that regional areas have access to the same quality services as their city counterparts

Dr Tim Williams' White Paper commissioned by Huawei Australia looks at the impact of high speed broadband in the UK. Discussing regional and rural areas, the Paper focuses on impacts in terms of reigniting the 'vitality' of communities[17]. As a direct result of broadband connectivity

- business owners have relocated . . . from urban areas . . . to enjoy a better quality of life
- home working and online services have slowed down out migration and attracted in migration
- businesses now tap into the worldwide markets
- rural services are retained.

[17] Williams, T. *Connecting Communities. The impact of broadband on communities in the UK and its implications for Australia*, commissioned by Huawei Australia, author, Dr Tim Williams, February. p.31

> ***"The fastest-growing online communities in the UK live in some of the more remote areas, typically receiving lower than average public and private services at higher than average cost. Fast broadband has real traction in such communities . . . ."***
> (Williams.T p31)

Regions report activity flowing from the investment in broadband infrastructure that is not just about making regions viable but commercially and socially prosperous. It provides evidence of a regional town transitioning from an economy and society dependent on agriculture, seasonal tourism and rust belt industries to a fast growing new economy with a revitalized community[18].

In her 2009 report on South Australia's digital future[19], Genevieve Bell makes the point that broadband infrastructure is just about the only way communities in regional and remote areas can hope to have access to the same quality of services as their city counterparts. Currently the inconsistency of connectivity, particularly in rural and regional areas limits access to essential quality service infrastructures. She believes that the NBN will support the development and viability of regional hubs that will attract and co ordinate all levels of government activity in an area. As a result, communities will be provided with improved service options across a range of areas including health, education, social services, industry development etc.

At both the community and individual level, broadband enables regional and rural areas to be connected internally and with the broader market. It provides regions with the equal opportunity to benefit from the innovations offered by technology and to produce content, goods and services that have a much broader appeal and reach. Analysis undertaken by the South Australian Government into the impact of broadband in the Yorke Peninsula showed that broadband deployment would provide, over a period of 5 years, an economic benefit of some $21.4m to that region alone[20].

In a study comparing the impact of broadband in developed and developing countries, it was observed that "*even in rural areas of developing countries, broadband diffusion is making existing markets function better by reducing information asymmetry and creating a range of economic opportunities for communities contributing to income diversification and rural nonagricultural employment as well as increasing income from agricultural jobs*."[21]

Williams' White Paper highlights much the same, ie that broadband reduces both the perception and reality of remoteness and aids the revitalization of communities. The ubiquitous availability of high speed

In the US from 1998-2002, employment in communities with broadband was found to grow 1-1.4% faster than communities without it. For a rural town with a population of 10,000, broadband would yield an additional 100-140 jobs. Broadband communities also showed increases in the number of businesses overall and in the number of businesses in IT-intensive sectors.

Gillett, S.E. et al., (2006) Measuring the Economic Impact of Broadband Deployment, U.S. Department of Commerce, Economic Development Administration. http://www.eda.gov/ImageCache/EDAPublic/documents/pdfdocs2006/mitcmubbimpactreport_2pdf/v1/mitcmubbimpactreport.pdf

[18] Ibid. p.32
[19] Bell, G. 2009. *Getting connected, staying connected: Exploring South Australia's Digital futures.*
[20] http://www.dbcde.gov.au/digital_economy/future_directions_of_the_digital_economy/australias_digital_economy_future_directions/final_report/benchmarking_australias_future_digital_economy
[21] Qiang 2009, Information and Communications for Development 2009: Extending Reach and Increasing Impact, World Bank.p.39

broadband is effectively dissolving the tyranny of distance by reducing the need for the ambitious and skilled to move from an otherwise idyllic lifestyle and by attracting entrepreneurial migrants from outside[22].

Broadband access is stimulating new employment opportunities and assisting the sustainability and profitability of traditional industries in these regions. For a country such as Australia with a deep export history in agriculture and resource extraction, access to high speed broadband through the NBN has the potential to both open new business and investment opportunities as well as build on our traditional strengths.

> "Within this range of appropriation bills there is also increased funding support for regional development. This is something that, since its election in 2007, this government has put a great deal of focus on, and it is particularly important for regions and their wellbeing both economic and social. Over the long term, regions are the drivers of growth in the Australian economy. So whilst the cities are, if you like, the headline growth drivers of the wellbeing of the nation, if they are doing well but the regions are dying on the vine then overall we are not doing well. So it is important that regional development policy addresses linking regions into growth opportunities and encouraging them beyond that to actually become drivers of innovation, productivity and national growth themselves. The regions are the place where those great opportunities for the nation actually are." (Sharon Bird MP, Member for Cunningham, House Debates, 23 February 2011)

[22] Williams, T. *Connecting Communities. The impact of broadband on communities in the UK and its implications for Australia*, commissioned by Huawei Australia, author, Dr Tim Williams, February 2011, p 33

(f) Business efficiencies and revenues, particularly for the small and medium business, and Australia's export market

Key impacts

- Reduced costs for business through:
  - lower telecommunication and transaction costs
  - lower ICT infrastructure costs leveraging shared services and new business models such as cloud computing
- Increased efficiencies and productivity through automation, workflow management systems that manage risk and dynamically report the health of the business, improved information flows and communication
- Increased revenue opportunities through extended market reach and increased networking opportunities
- Ability to attract investment from anywhere around the world
- Increased opportunity for business innovation
- Improved export markets
  - Ability to export to markets previously unknown or unreachable physically
  - Opportunity to innovate and develop new product, services and applications relevant to the broader digital economy.

High speed broadband has a positive impact on the overall profitability of business, including small and medium sized businesses. Broadband underpins business growth by reducing costs, raising productivity and increasing revenues. The focus is not limited to cost savings. Significant business growth is achievable through expanded market reach and business innovation.

> Internet business solutions have enabled companies to cut costs – by $155b in the US and a collective $8.3b in France, Germany, and the UK and increase revenues – by a collective $79b in France, Germany and UK.
> Qiang 2009

High speed broadband delivered by the NBN will enable businesses of all sizes to reduce costs by lowering telecommunications and transaction costs and improve business efficiencies using online applications and services that make it possible to improve processes and introduce new business models and structures.[23] US based research shows that businesses that have achieved the highest productivity increases are those that have integrated broadband capability with new business processes.[24] Business and workflow systems can be automated and coordinated across sites, and relationships with suppliers and customers can be dynamic and responsive. Businesses can benchmark performance against competitors and share in and contribute to, the collective body of business knowledge and experience available online.

The NBN will provide a platform for business innovation to flourish. Over the last 9 years Australia has slipped from 5th to 18th in the World Economic Forum's Global Competiveness Index. In terms of multi factor productivity Australia's performance has declined from an average growth rate of 1.4% from 1982 to 1996 to an average of only 0.9% since. On this measure Australia's productivity

[23] Qiang 2009, Information and Communications for Development 2009: Extending Reach and Increasing Impact, World Bank.p.37
[24] Ibid.

has actually declined since 2003 4[25]. Australia needs to be more competitive if it is to sustain the current standards of living we have come to expect. The NBN offers all levels of business the opportunity to innovate. Through access to information, opportunities for collaboration, the availability of smart tools and access to new markets, businesses are enabled and incentivised to innovate and do things differently and more efficiently to remain competitive.

Models such as cloud computing, only made possible through high speed broadband, have the potential to impact both the economies and business models of companies. Cloud services will facilitate new ways of working and collaborating and more flexible options for businesses through the ability to obtain the information and communication capacity they need, when they need it. It provides a viable and affordable alternative to expensive and resource intensive in house IT solutions and hardware and software investments, particularly where this is not core to the business. These gains hold enormous potential for small businesses otherwise burdened by IT overheads which, in many cases, they find difficult to maintain and costly to keep up to date. Similar benefits flow to business start ups, giving them much greater opportunity to tap into more sophisticated and flexible IT solutions than they could otherwise not afford.

A key observation of the Government's Enterprise Connect program is the extent to which small and medium sized businesses are lagging behind in ICT capability[26]. Opportunities for efficiency savings are, as a result limited and businesses poorly positioned, and in some instances hindered, from growing. The NBN will go some way to leveling the playing field so that small and medium sized businesses can be more competitive and better equipped to compete in the digital marketplace.

Broadband connectivity and speed also remove the need for proximity to customers through improved and automated processes. The NBN will facilitate business/customer transactions irrespective of location and in ways that are comparable to in person communications (eg skype, video streaming etc). Through ubiquitous access, smart social media tools and the convergence of technologies/devices, there need be no degradation to the customer experience. Broadband provides new ways to improve the customer experience by enabling customers to track the progress of their product or enquiry through the supply chain; through the background use of data and analytic systems that can tailor and personalize services and anticipate their requirements and package products/solutions in response; and by providing service continuity and responsiveness because they are not bound by conventional working hours and structures. NBN capabilities make it possible to participate in any market, in real time at any time of the day or night. Time zones become irrelevant where business is open 24 hours a day.

The NBN will open commercial opportunities and markets to everyone equally. Businesses need not be limited by their geographic location. Much like what is already happening, the NBN will on an

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[25] Department of Innovation, Industry, Science and Research. 2009. *Powering ideas. An innovation agenda for the 21st century*.p.2.

[26] Observation by Suzanne Roche (Director, Smartnet) working in the context of the Technology Knowledge Connect initiative under the broader Enterprise connect Program.

even greater scale enable businesses to extend their reach to national and international markets that they would otherwise be unaware of or unable to physically access.

Export markets will benefit. In expanding market reach Australian businesses, software developers, service providers, educational organisations etc can rapidly transmit their offerings to the rest of the world. The combination of lower communication costs and increased availability of information enables companies to access foreign markets more easily and cost effectively and hence make them more competitive.

The NBN offers increased export potential in new and emerging markets. By leveraging the NBN Australia has a perfect opportunity to take the lead and develop new smart digital applications, products and services attractive to the global market place.

Teleworking opportunities offer financial and corporate benefits for businesses of all sizes. In an exercise involving 8,500 employees that worked from home using broadband, British Telecommunications (BT) reported a range of significant benefits including:

- a reduction of (on average) GBP6,000 per employee on accommodation costs
- an increase in the productivity rate of employees of between 15% and 31% (average 20%)
- a 75% decrease in the number of sick days
- a total annual savings of more than GBP60 million for the company[27].

Though noting the challenges to be managed, a 2006 internal IBM study assessing their own workforce mobility policy reported similar benefits. Over 70% of employees felt that working remotely positively enhanced their work/life balance, improving productivity, morale and motivation. In terms of retention, the flexibility of working from home resulted in a 96% return rate from parental leave[28]. In light of Australia's emerging demographic issues, strategies that enable, encourage and even incentivise people to remain in the workforce will prove critical.

[27] Qiang 2009, Information and Communications for Development 2009: Extending Reach and Increasing Impact, World Bank.p.37
[28] IBM, 2006. Work Force Mobility. Presentation

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(g) Interaction with research and development and related innovation investments

Key impacts

- Piggybacking the high speed, high performance capabilities of the NBN government, R&D and innovation opportunities rest in four key areas.
  - NBN infrastructure provides the platform for technology innovation using high performance computing capabilities - essential for virtually all modern day, sophisticated research activities.
  - The NBN will attract international investment in Australia's R&D and innovation capabilities – already evidenced by IBM's investment in an Australia based R&D Laboratory.
  - The NBN provides a critical platform to facilitate increased collaboration between business, government, education and R&D institutions.
  - The NBN will fuel innovation across industries and business. Some of this will be in the area of new technological innovations, but more importantly, in spawning new and innovative approaches to how services are delivered, businesses operated, education undertaken, the quality and accessibility of health services etc.

Australia spends some 2.01% of GDP on research and development (R&D) compared to the OECD average of 2.26%. Countries such as Austria, Denmark, Germany, Iceland, Switzerland, Taiwan and the US spend more than 2.5%. Finland, Japan, South Korea and Sweden spend more than 3% and Israel spends some 4% of its GDP on R&D[29]. In 2007 08 Australian Government expenditure on science and innovation was 22% lower as a share of GDP than it was in 1993 94[30]. By any measure, Australia is lagging behind the key developed economies against whom we benchmark ourselves.

With a national investment of some $43b over the next 10 years, the NBN offers a unique opportunity for resurgence in public and private sector R&D and innovation. Piggybacking the high speed, high performance capabilities of the NBN government, R&D and innovation opportunities rest in four key areas.

Firstly, the NBN infrastructure provides the platform for technology innovation using high performance computing capabilities – essential for virtually all modern day, sophisticated research activities. As we transition to a more advanced, complex knowledge society, access to information is not enough. Increasingly the ability to filter, manipulate, retrieve, model and share information in real time is the norm – not the exception. If Australia is to compete effectively in the international R&D environment, we must have the capability to handle, filter and make sense of large, complex volumes of data. Only a high speed fibre broadband network provides this – reliably and with the ability to scale as research activities become increasingly data and knowledge intensive.

Secondly, Australia's commitment to the NBN is already attracting innovation investment. IBM's commitment to their Global Research and Development Laboratory in Australia is a recent case in point. The laboratory, which will support IBM's smarter world agenda, will align with Australia's

[29] Commonwealth of Australia, 2009. Powering Ideas. An innovation agenda for the 21st century.p20

[30] Ibid., p20

national research priorities (an environmentally sustainable Australia; promoting and maintaining good health; frontier technologies for building and transforming Australian industries; and safeguarding Australia). In launching the laboratory, Glen Boreham[31], made specific reference to Australia's roll out of a ubiquitous high speed broadband network, noting that it will significantly enhance research activities – real solutions under their smarter planet initiative[32]. IBM's investment reflects more than their recognition of Australia's research and innovation capabilities. It reflects the fact that we will have the infrastructure they need to support the high speed manipulation and management of data that their smarter systems development requires. The NBN provides a clear competitive advantage in attracting R&D and innovation investment at a time where the international focus is on developing smarter, digitally enabled solutions.

Thirdly the NBN provides a critical platform to facilitate increased collaboration between business, government, educational and R&D institutions. Australia ranks last in the OECD on collaboration for innovation between business and higher education institutions[33]. This is notwithstanding that collaboration is regarded as one of the single most important contributors to innovation development – "*As the volume of knowledge grows, complex technologies proliferate, and supply chains become more specialized, it is getting harder and harder to innovate in isolation. Networking and collaboration are essential.*"[34] Relative to other major economies, Australia is small and isolated. While Australia has punched well beyond its weight in terms of innovation efforts, our distance from the major knowledge intensive economies, particularly in the northern hemisphere, will become an increasing disadvantage.

The NBN provides the opportunity to address this weakness. Not only does it provide the infrastructure required to tap into national and international knowledge networks, more importantly it facilitates real time sharing of vast quantities of data and information and shared online research and collaboration spaces to enable virtual research teams, laboratories and forums. This is necessary at both a national and international level – at a national level to avoid fragmentation and lack of coordination of national research efforts and at an international level to ensure we are linked into relevant knowledge networks and are able to contribute on equal footing with more connected economies.

Finally, as has been highlighted in this submission already, the NBN will fuel innovation across industries and business. Some of this will be in the area of new technological innovations, but more importantly, in spawning new and innovative approaches to how services are delivered, businesses operated, education undertaken, the quality and accessibility of health services etc. This includes new trans sector activities where research and development for one sector can be used by others –

[31] Glen Boreham is IBM's former Australian Managing Director

[32] IBM Press Release, 14 October 2010., New IBM R&D Lab to Open in Australia

[33] Commonwealth of Australia, 2009. Powering Ideas. An innovation agenda for the 21st century.p20

[34] Ibid., p91

with the NBN providing the infrastructure required to facilitate increased and more effective coordination and cooperation[35].

(h) Facilitating community and social benefits

Key impacts

- Reduced social isolation and increased social cohesion
- Increased involvement in online communities generally translates to increased civic engagement
- Broader base of community activism – those otherwise unable to participate now can via a range of new, interactive and dynamic online mediums
- Increased levels of social responsibility
- Offers increased opportunities for skill development, improving the marketability of individuals and ultimately the prosperity of communities.

The history of the internet is evidence of the impact that better and more diverse access to information has on improving social capital.

We know from experience that online access to information and services plays a vital role in reducing social isolation and increasing social cohesion. The last 20 or so years of the internet is evidence of how disenfranchised and isolated individuals and communities have been reconnected through the internet and virtual communities of interest. While our traditional concept of a community a group of people in a shared geographical space with common interests and values – has been challenged by the emergence of new virtual communities, research indicates that participation in online communities generally point to real ones and reflect increased civic engagement.[36] Work done in the UK suggests that some two thirds of members of online communities have also initiated involvement in civic activities since connecting to the internet. Almost half report increased involvement in civic activism since becoming active in online communities. [37]

[35] http://www.businessspectator.com.au/bs.nsf/Article/RD-missing-out-on-the-economic-and-social-benefits-pd20100204-2BTT4?OpenDocument&src=is&is=Non-Industry&blog=Communication%20Breakdown Business Spectators, 5 February 2010. NBN at the heart of our digital economy.

[36] Williams, T. *Connecting Communities. The impact of broadband on communities in the UK and its implications for Australia*, commissioned by Huawei Australia, author, Dr Tim Williams, February 2011, p 11

[37] Ibid.

A recent survey conducted by the Pew Research Centre has found that 56% of non-internet using American adults are involved in some kind of voluntary group or organisation. This figure increased to 80% for those who are users of the internet. Those participating in social media were found to be even more active, with 82% of social network users and 85% of Twitter users being group participants. Questioning the activities that people are involved in showed that the internet is having a significant impact on community engagement with civic, social and religious groups.

Those who used the Internet had higher rates of charitable donations, volunteering, meeting and event attendance, and were more likely to have taken a leadership role. Daily internet use, being a user of a social networking site and having a Twitter account were found to be more powerful indicators of people's ability to find new groups online than factors such as age, income, education and efficacy. http://pewresearch.org/pubs/1861/impact-internet-social-media-facebook-twitter-group-activities-participation

The combination of fast broadband and new social media and smart analytic tools is driving an unprecedented level of local community activism and broadening the base of those who can and do participate. Using modern interactive web tools, citizens are making a contribution to managing local crime rates, reducing instances of graffiti, participating in local and national politics and policy issues, campaigning for local causes, promoting local tourism, lobbying to preserve local cultural icons, addressing environmental issues – the list goes on. Using dynamic social media tools, communities are actively engaged in solving the problems that matter to them and at an individual level, connecting with peers to solve common problems. The ability to connect and contribute whoever and wherever you are is empowering individuals and communities to take on a level of social responsibility that challenges traditional top down models of governance.

A US based analysis comparing two groups of internet users, one using dial up and the other broadband, showed that content intensive and socially interactive web sites were used more often by those with broadband.[38] In other words, the more opportunity there is to engage in a dynamic online environment, the more people are likely to do so.

High speed broadband also provides a platform to acquire new skills, new connections and knowledge that ultimately contribute to their marketability as workers and ultimately to the prosperity of their community. Research done by the UK Online Centre estimates the value of digital inclusion for individuals improves salary prospects by some 10%. The same study estimates that digital inclusion impacts grade achievement per subject some 25%. This translates across the board to higher standards of living, reduced crime rates, less social disconnection and more ambitious and prosperous communities.

We are increasingly moving to a culture where the written word is not as effective as it used to be for interacting with citizens. We have many citizens effectively disenfranchised through the government interactions with forms and PDFs online. Aboriginal and other language cultures

[38] Qiang 2009, Information and Communications for Development 2009: Extending Reach and Increasing Impact, World Bank. p.36

increasingly demonstrate that they cannot participate in the economy unless there is a way to get their engagement.

High speed NBN offers at least one assist: the means by which video avatars and YouTube like agents can be used to directly communicate with and engage with citizens in their own language. This is future thinking for sure, and would require innovations in expert system capabilities but we have seen the start of such things already. It will not be possible to reach out and interact with citizens in highly effective agent enabled video formats without NBN.

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

Key impacts

- Universal access for all Australians including those living in remote areas
- Ubiquity, so that similar levels of service are available to all
- Future-proof technology ensures capacity for applications yet to be developed
- Sustainable
- Scalable

AIIA is supportive of any **proven approach that delivers sustainable high speed broadband**, including fibre, wireless and satellite technology approaches; using this combination of technologies is the right approach to maximize available broadband speeds and ensure access is ubiquitous.

The NBN plan delivers on all these criteria. It provides **the best possible opportunity for Australia to participate and compete in the global digital economy. This is imperative to long-term economic growth and our ability to sustain national prosperity.** Other approaches to broadband currently put forward do NOT guarantee ubiquity of access and service quality and reliability. The NBN Business Plan is conservative and therefore robust: the 7% IRR represents a good balance between return on investment and appropriate business stance by a monopoly. The business return is forward looking since substantial upgrades and infrastructure upgrades have already been factored in over the next 50 years to the NBN network (and the return may be better if all of the upgrades and satellite replacements are not required).

AIIA believes that the NBN approach will be easily enhanced over many decades, providing a long term sound economic investment at a time when the country can afford the *investment due to the short term benefit of the resources boom.*

NBN is using the best available combination of technologies. It has not chosen one type of technology, recognising that different population densities dictate the economics of particular technologies. A simplistic comparison to the US 4G initiative is highly inappropriate because the US already has a very high penetration of high speed cable (which we do not) plus a geography with many closely spaced cities. Our geography is very different and requires a technology solution designed for us fibre optic, PLUS wireless PLUS satellite will all be required to achieve 100% coverage. It is important to understand that fifty percent (50%) of Australia's population live in only five cities, and 75% live in twenty five cities (beyond which it is not commercially viable to deliver broadband). So this broadband infrastructure must utilise all appropriate technologies suited to Australia's unique geography, including appropriate international capacity. Satellite is and will be the most suitable for delivering broadband to remote communities, and wireless to more densely populated rural communities, and broadband to urban centres and towns. Arguments in support of one technology over another have ignored these demographic considerations.

The fibre optic will be capable of scaling up to higher speeds. Moving to higher bandwidth requires upgrading the technology at the ends of the fibre. Fibre cabling is unmatched for both speed and bandwidth. Inside one cable there are about 12 mini cables, and inside each of those there are 12 'mini cables within cables'. To use 100 megabytes per second requires using only two of the 12 within the 12 inside the cable. There is enormous opportunity for scaling up, providing almost limitless capacity and technological improvement of speed. The current NBN model balances the competing challenges of geography, affordability and ubiquity.

Thinking in terms of what can be done with today's applications is unsound. And trying to predict what people will demand in terms of speed and capacity in the future is dangerous. History has

shown us repeatedly that new ideas, new applications and new capabilities will rapidly emerge to take advantage of the high bandwidth and low latency that only high speed ubiquitous broadband can provide.

By way of example, for technology adoption the number of years it took to reach 50 million users:

- Radio: 38 years
- TV: 13 years
- Internet :4 years
- iPod :3 years
- Facebook added 100 million users in less than 9 months
- iPod applications downloaded hit 1 billion in 9 months

SOURCE: http://www.youtube.com/watch?v=sIFYPQjYhv8

Applications will soon go well beyond simply providing higher download speeds and such applications are expected once innovation is unleashed to make use of the infrastructure. We have all seen what happens when an innovation like the AppStore phenomenon occurs on the iphone. There will be revolutionary capabilities for education, health, business and most importantly social connectivity. This will help drive productivity gains and reduce isolation of the many separated parts of our important rural community. Costs will be reduced. In effect, friction losses in doing B2B and Government to Citizen will be greatly reduced or eliminated.

Laurie Wilson speaking with would be journalists from Swifts Creek, SA, Wellington Girls College, NZ and Orbost Secondary College, VIC

Dentist teaching oral examination


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