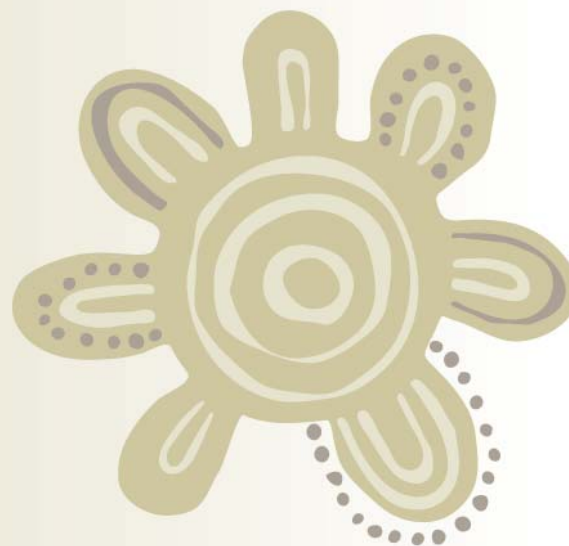


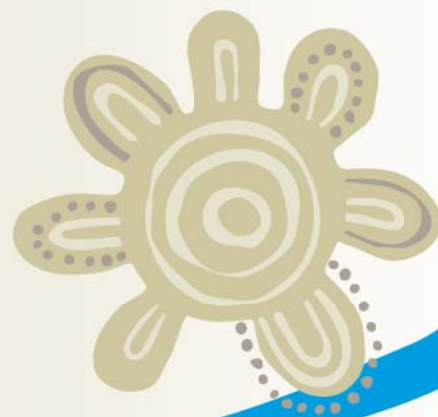


Australian Government
Australian Trade Commission

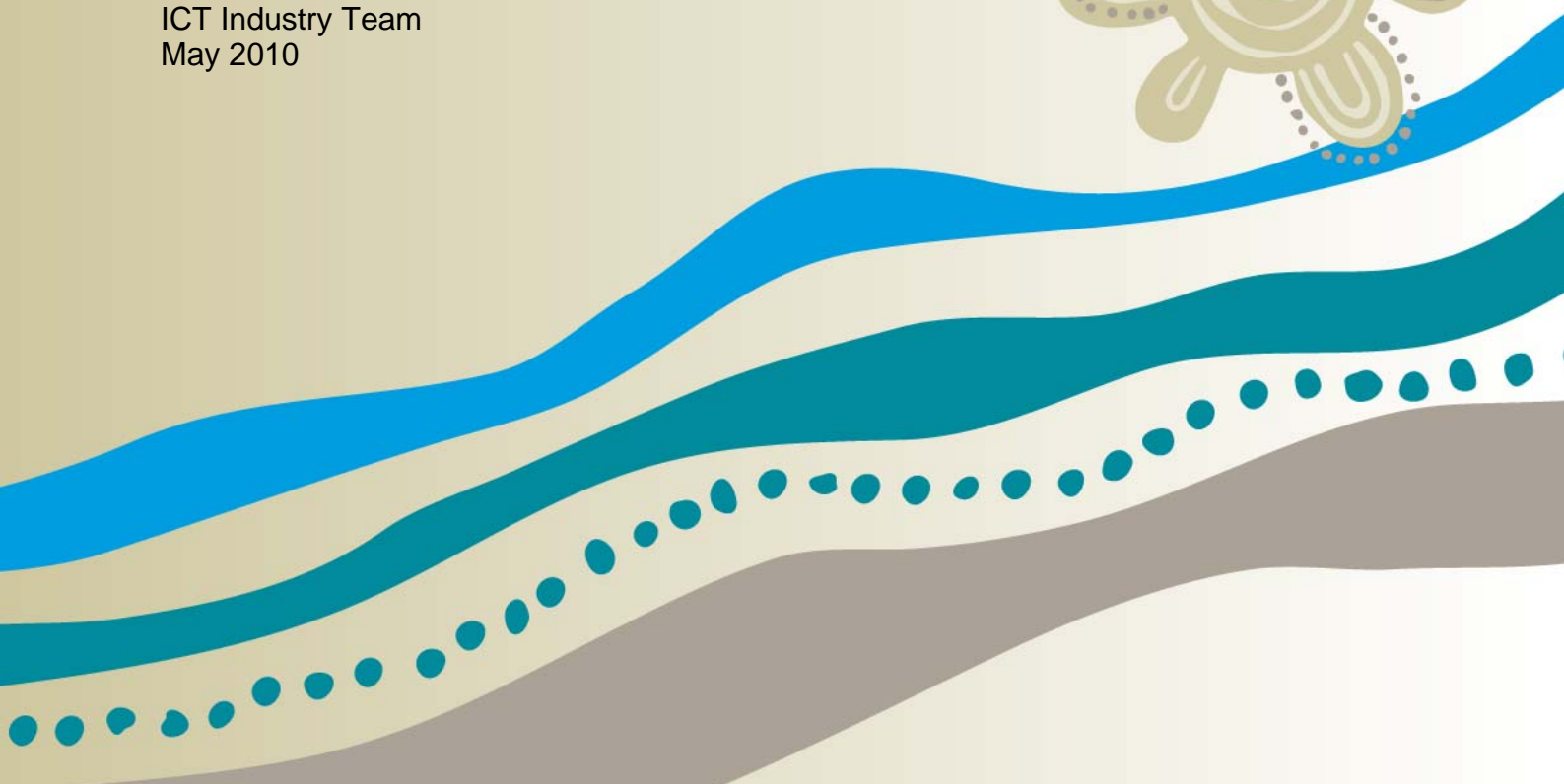


NATIONAL BROADBAND NETWORK

Australia – Your Strategic ICT Investment Location

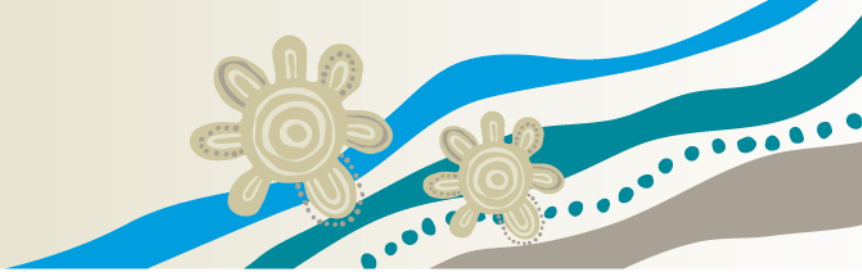


ICT Industry Team
May 2010



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The National Broadband Network Project

The Australian Government announced a new high speed National Broadband Network in April 2009, an eight year project that is the single largest nation-building infrastructure project in Australian history.

With Australia recording the highest number of internet users per 1000 people in the Asia Pacific¹, high speed broadband is increasingly essential to the way Australians communicate, and do business. Access to high speed broadband offers new opportunities for businesses to promote their services and goods to a larger, potentially global audience and for individuals to connect and collaborate efficiently.

The National Broadband Network is expected to underpin future productivity growth and Australia's international competitiveness by stimulating innovation across industries. The NBN is expected to transform service delivery across sectors including education and health.

The National Broadband Network will:

- Connect 90 percent of all Australian homes, schools and workplaces with broadband services with speeds of 100 megabits per second
- Connect all other premises in Australia with next generation wireless and satellite technologies that will deliver broadband speeds of 12 megabits per second or more

The new network will transform the competitive dynamics of the telecommunications sector, by driving fundamental reform in telecommunications.

NBN Policy Overview

The Australian Government announced on 7 April 2009 it would establish a new company to build and operate a new high speed National Broadband Network. The Government has:

- established NBN Co Limited to build and operate the network, with the objective of providing 90 per cent of homes, schools and workplaces with 'fibre to the premise' delivering speeds of 100 megabits per second and connecting all other premises with next generation wireless and satellite technologies, offering speeds of 12 megabits per second or more;
- already invested \$160 million in the company;
- completed a National Broadband Network Implementation Study, prepared by a consortium of McKinsey & Company / KPMG, to examine the Government's coverage, commerciality and competition objectives as well as the detailed operating arrangements of NBN Co Limited, its ownership and structure, ways to attract private sector investment and longer term privatisation. The Government is currently considering the Implementation Study report and its recommendations;
- established NBN Tasmania Limited as a subsidiary of NBN Co to build and operate the NBN in Tasmania—the first three stages, covering 100 000 premises, have been announced as part of the five year fibre rollout to a total of 200 000 Tasmanian premises;

¹ IMD World Competitiveness Database, February 2010



- engaged Nextgen Networks to rollout almost 6000 km of new fibre optic backbone links, as part of the Government's \$250m investment in the Regional Backbone Blackspots Program to connect over 100 regional locations along the routes to the six priority areas of Geraldton, Darwin, Emerald and Longreach, Broken Hill, Victor Harbor and South West Gippsland;
- introduced legislation to improve competition in the telecommunications sector, including during the transition to the full NBN rollout, which was passed by the House of Representatives and is before the Senate for consideration;
- introduced legislation to provide a framework for the installation of fibre and fibre-ready infrastructure in new developments; and
- released exposure drafts of the legislation to ensure NBN Co operates on a wholesale-only, open and equivalent access basis.

NBN Co Limited

The NBN Co Limited (NBN Co) was established as a Government Business Enterprise in August 2009 to design, build and operate the network.

The company is wholly-owned by the Commonwealth represented by two "Shareholder Ministers" – the Minister for Broadband, Communications and the Digital Economy and the Minister of Finance and Deregulation. The company is headed by Executive Chairman Mr Harrison Young and Chief Executive Officer, Mr Mike Quigley.

NBN Co website: www.nbnco.com.au

NBN Co objectives are coverage, competition and commerciality

- **Coverage:** Broadband coverage with speeds of 100MBps to 90% of the Australian population (through fibre to the premise) and 12MBps or more to the 10% remaining (via wireless broadband or satellite). The company expects it will take approximately eight years to build and operate a National Broadband Network.
- **Competition:** NBN Co will support innovation by retail service providers (RSPs) through the delivery of an open access, wholesale only network providing Layer 2 services. Retail service providers (RSPs) will deliver Australia's end-users with advanced digital services. The company will promote maximum end-user choice in terms of both services and providers and allow secure, simultaneous delivery of multiple applications, potentially by multiple RSPs, with predictable levels of quality.
- **Commerciality** The government expects NBN Co to operate on a commercial basis.

NBN Tasmania Limited

The Australian Government and the Tasmanian Government announced on 8 April, 2009 that Tasmania would be the launch state for the nation's new high speed National Broadband Network. On 11 June 2009 the Australian and Tasmanian Governments and Aurora Energy signed a Memorandum of Understanding to deliver FTTP to 200,000 premises in Tasmania.



On 15 March 2010, the Australian Government opened a Proof-of-Concept Test Centre and announced the first retail service providers to offer highspeed broadband in Tasmania.

NBN Project Opportunities

Infrastructure

The NBN Project offers opportunities in strategic infrastructure investment.

Network Design

- NBN Co is designing high level architecture for the network and released a consultation paper outlining its early thinking on its fibre service offering. Industry feedback was sought on the consultation paper, and industry consultations held in Sydney and Melbourne in January 2010

Industry Consultation Paper

http://nbnco.com.au/content/upload/files/NBN001_concept_paper_final.pdf)

- A video of industry Q&A at the Melbourne consultation is available on the NBN Co website <http://nbnco.com.au/publications-and-announcements/video-podcasts>
- NBN CO Response to industry submissions on its industry consultation paper http://nbnco.com.au/content/upload/files/Response_to_Industry_Submissions/NBN_Co_response_to_consultation_submissions.pdf
- NBN Co Network & Operations Information Sessions were held in Sydney, Melbourne, Brisbane and Adelaide over March and April 2010. The Information Sessions sought to set out the scope and purpose of the industry technical and operational development, and outline how the industry will be involved in its development.
 - Presentations from the Network and Operations Information Sessions are available on the NBN Co website http://nbnco.com.au/content/upload/files/Network_and_Operations_Information_Session_Presentation.pdf

Communications Alliance

Communications Alliance is the peak body for the Australian communications industry and is coordinating industry's response to the National Broadband Network implementation. Communications Alliance has sought public and member comments, on industry papers dedicated to the NBN project design and implementation, including: Draft Overview of Technical Standards; Draft NBN End User Premises Handbook; NBN Reference Architecture – High Level Architecture Options for the NBN; and NBN Wholesale Service Definition Framework – Ethernet. Communications Alliance website:

- <http://commsalliance.com.au/Activities/national-broadband-network>
- <http://www.commsalliance.com.au/Documents/national-broadband-network>

NBN Network Design (NBN Co website, May 2010)

NBN Co will design, build and operate a wholesale-only, superfast broadband network that will provide speeds of 100 [Megabits per second](#) to 90% of Australian premises and 12 Megabits per second to 10%, subject to final design.

For most premises, NBN Co will use either [Gigabit Passive Optical Network](#) (GPON) or Ethernet Point to Point fibre and will link some premises by [wireless](#) or [satellite](#), depending on location and geography.

NBN Co plans to offer a wholesale-only Layer 2 [bitstream](#) product in order to occupy as small a footprint as possible in the overall value chain. This means leaving [retail service providers](#) (RSPs) with significant ability to innovate and develop new services across the higher levels of the value chain.

The location of [Point of Interconnection](#) (Pols) will be optimised to support healthy competition among RSPs and align with contestable [backhaul](#). For more densely populated areas, such as urban and regional centres a “local” [Point of Interconnection](#) (Pol) will be established for each [Fibre Serving Area](#) (FSA).

For less densely populated areas, a “district” Pol (which aggregates two or more FSAs together), will be established. If competitive backhaul is not available from a Pol, supplementary provision of backhaul may be required for a limited period of time to permit the emergence of competitive backhaul on these routes.

NBN Co plans to offer its standard wholesale Layer 2 bitstream service in product bundles:

- [Local Ethernet Bitstream](#) (LEB) will provide our wholesale customers with a Layer-2 access service between the [Optical Network Termination](#) (ONT) at an end-user premises and a “local” Pol, located at the [Fibre Access Node](#) (FAN) for the relevant FSA. The LEB product is likely to be offered in capital cities and regional centres. It is envisaged that the LEB product will be made available in respect of the significant proportion of FSAs in Australia.
- [Aggregated Ethernet Bitstream](#) (AEB) is likely to be offered in rural areas where there are no competitive backhaul services below the Pol. The AEB product enables aggregated access to one or more FSAs via locations where the AEB product is made available.

Both the LEB and AEB products offers will be based on an [Ethernet](#) platform, utilising [Gigabit Passive Optical Network](#) (GPON) as the physical access technology. The technology will deliver a range of active service features including security and [Quality of Service](#) (QoS) as well as IP multicast.

As well as GPON based services NBN Co also plans to provide point to point solutions that will assist RSPs to deliver solutions for the business market.

Our wholesale products will support access by multiple RSPs, a range of [customer premises equipment](#) (CPE) and will include an interface for analogue telephony. The detail of how these elements will be presented to our [wholesale](#) customers will be discussed in later consultation papers.



NBN “first release sites”

NBN Co announced five “first release” sites where it will roll out the high-speed broadband fibre-to-the-premise (FTTP) network as part of live trials of its network design and construction methods on mainland Australia. The selected sites are:

- Victoria - A part of the suburb of Brunswick in Melbourne
- Queensland - An area of Townsville covering parts of the suburbs of Aitkenvale and Mundingburra
- New South Wales - The coastal communities of Minnamurra and Kiama Downs south of Wollongong
- New South Wales - An area of west Armidale, NSW, including the University of New England
- South Australia - The town of Willunga

The sites allow NBN Co to trial its network construction and technology, and the trials will test how NBN Co will interact with retail service providers. Next steps include:

- NBN Co to issue a request for proposal (RFP) seeking suitably qualified companies to participate in the local design development specific to the selected sites
- Detailed design phase of several months duration during which NBN Co will consult with the community
- Construction work to commence on the first release rollout early in FY2010-2011, to be conducted in three stages.
 - Stage one will see the deployment of the passive components of the network including the fibre optic cable.
 - In stage two (to be completed by early 2011) NBN Co will deploy some of the active network equipment in the Fibre Access Nodes.
 - Stage three involves working with retail service providers to give them access to the network and, via the network, to end-users so RSPs can test their retail services.

The NBN Tasmanian roll-out will take place in three stages.

- The first stage will include the communities of Midway Point in the South, Scottsdale in the North and Smithton in the North West of the State. These “smart towns” will have access to the NBN from July 2010.
- Stage two of the Tasmanian roll-out will include the communities of Deloraine and George Town in the North; Kingston Beach, Sorell and South Hobart in the South; and St Helens and Triabunna on the East Coast of Tasmania.
- Stage three of the roll-out will include 52 suburbs in the cities of Hobart, Launceston, Burnie and Devonport who will be linked to optic-fibre cable by late 2012.



Tenders

Interested investors can register to receive tender notifications from the Australian and Tasmanian governments. Government tenders follow a transparent and open tender process

- Commonwealth of Australia www.tenders.gov.au and
- Tasmania <http://www.tenders.tas.gov.au/>

Industry Capability Network (ICN) Portals have also been established for companies that can provide specific capabilities and equipment in mainland Australia and Tasmania, to register their interest in the NBN project. The Industry Capability Network (ICN) works with project proponents to identify and match capable and competitive Australian suppliers with project opportunities. Project proponents can list their project opportunities through ICN who will disseminate this information to Australian suppliers, and Australian manufacturers and service providers can register their products, services and capabilities on ICN's national industry capability database.

- ICN Portal Mainland NBN <http://www.nbnco.icn.org.au/>
- ICN Portal Tasmanian NBN <http://www.nbn.icn.org.au/>

NBN Co has commenced issuing Requests for Capability (RFC) and Requests for Proposal (RFP) via its website:

- <http://nbnco.com.au/partners-tenders/tenders>

The Request for Capability Statement process is designed to identify preferred suppliers capable of supplying suitable network equipment, supporting network construction and maintenance and also contributing to network testing and development over many years.

- RFC - Equipment suppliers (closed)
- RFC - Wireless Networks and Service (closed)
- RFC - Business and Operational Support Systems and Services (closed)
- RFP - FTTP Passive Network Hardware Services (closed)
- RCS - Design and Construction, Fibre Access Network

Australian Industry Participation Plans

From 1 January 2010 tenderers for large Commonwealth procurements (generally above \$20 million) will be required to prepare and implement AIP Plans. The following User Guide outlines the steps required to be taken by tendering companies.

- <http://www.innovation.gov.au/Section/Industry/Documents/AIP%20Plan%20Tenderer%20User%20Guide.pdf>



Applications and Business Models

The *Australia's Digital Economy: Future Directions* paper provides the vision for government taking strategic and enabling action now to ensure all parts of Australia benefit fully from the digital economy.

These include Australian Government commitments such as:

- the [National Broadband Network](#)
- the [Digital Education Revolution](#)
- the [Digital Regions Initiative](#)
- the [National Energy Efficiency Initiative](#).

The National Broadband Project provides Australian industry an opportunity to develop applications and new business models that leverage high-speed broadband.

The NBN project is expected to enhance export outcomes through facilitating SME access to demonstration projects with an international headturning effect, increasing the recognition of Australia as a source for innovative applications and telecommunications technology solutions

At the *Realising Our Broadband Future Summit* in December 2009 business leaders from a broad range of sectors met to share ideas around the potential of high-speed broadband to transform business models across e-health, smart infrastructure, e-communities, e-business and e-education.

- Presentations and discussions from the Summit are available at <http://www.broadbandfuture.gov.au/conference-program.html>

The Government will now take the next steps to translate forum outcomes into tangible measures through a collaborative framework across all three tiers of government and close consultation with business and the community. This will involve reporting to Government on the ideas raised at the forum and identifying future priorities for action by business, government and the community

Digital Dividend

The 'digital dividend' (the radiofrequency spectrum freed-up as a result of the switchover from analog to digital television transmission) has potential to provide Australians with new and improved communications services. The Government has released a green paper on the digital dividend, and sought submissions to inform the Government's decisions on the final size and location of Australia's digital dividend.

- http://www.dbcde.gov.au/consultation_and_submissions/digital_dividend



Government 2.0 Taskforce

The Government 2.0 Taskforce includes policy and technical experts and entrepreneurs from government, business, academia, and cultural institutions. The work of the Taskforce focuses on: increasing the openness of government through making public sector information more widely available to promote transparency, innovation and value adding to government information; and, encouraging online engagement with the aim of drawing in the information, knowledge, perspectives, resources and, where possible, the active collaboration of anyone wishing to contribute to public life.

- <http://gov2.net.au>

State and Territory - Activities

State governments have already set up, or are in the process of identifying test-bed opportunities. (Please refer to page 6 for details of first release sites in NSW, Victoria, Queensland and South Australia).

New South Wales

The New South Wales (NSW) Government is working closely with NBN Co and the Commonwealth Government to accelerate the network rollout and the development of applications and services which will be supported by the NBN.

The NSW NBN Taskforce is leading the State's response to the NBN and has representatives of government (including Industry and Investment NSW), industry and Australia's top research bodies – National ICT Australia (NICTA) and the CSIRO.

The development of high-bandwidth applications and content is a priority and the Taskforce is exploring opportunities to collaborate with the commercial sector, research and development organisations and within government.

The NSW Government is working to set up 'testbeds' to research, test and demonstrate services and applications for business, home and government service delivery.

These testbeds will be established in a variety of locations to provide NSW Government agencies, business and research organisations with an opportunity to develop and trial 'smart' applications for electricity metering, education, health and entertainment.

Victoria

The State of Victoria, located in the south-east corner of Australia, is seen as a hub within the Asia Pacific region for telecommunications, broadband and wireless development. It is a major force in the Australian research and development arena with a large cluster of research institutes, universities, cooperative research centres and technology parks. It also possesses a strong mix of world leading infrastructure, a highly technical and adaptable workforce, a strong concentration of leading industry players and innovators, and an effective and supportive Government.

Victoria welcomes opportunities to work with new and existing international investors interested in opportunities created by the NBN.



Victoria is set to be deeply involved in the implementation of the NBN. The State Government has been working closely with NBN Co. to ensure that Victoria is the technical hub for key strategic operations..

The State Government has also lead and/or supported various initiatives over the past decade to develop and supply world-leading infrastructure and research centres to further innovation in the State, enhance the State's competitive advantage in telecommunications and support key international investors.

Institute for a Broadband Enabled Society (IBES) - The \$50 million Institute is a unique facility that allows new ideas and applications to be tested in a real broadband environment that will foster innovation across a wide range of disciplines including medicine, engineering, education, social sciences, economics, business and the environmental sciences.

The IBES has attracted the support of leading global and local companies to join its research program including Cisco, Huawei, Hybrid Television Services, Microsoft, Alcatel-Lucent, Telstra, Ericsson, NEC Australia, Haliplex and Optus.

Other examples of world-leading infrastructure and research centres based in Victoria are listed below (with further details in Attachment A):

- GreenTouch
- Bell Labs Centre for Energy-Efficient Telecommunications with the University of Melbourne (CEET)
- Centre for Ultra Broadband Information Networks (CUBIN)
- National ICT Australia Victoria Research Laboratory (NICTA VRL)
- Gigabit Wireless Laboratory
- La Trobe University Centre for Technology Infusion
- The Optiportal Node
- Victorian Education and Research Network
- Victorian Partnership for Advanced Computing (VPAC)
- REDlab
- Victorian Life Sciences Computation Initiative (VLSCI)
- Australian Synchrotron

These initiatives will help international investors by fast-tracking research, fostering innovation, boosting telecommunications supply chain, drive applications development and capitalise upon a sophisticated consumer market within a ubiquitous high-speed broadband environment.



Queensland

Queensland has a young and vibrant population, and economy. In recent years Queensland has benefited from the rising global demand for mineral resources. The Queensland Government has actively sought to redirect much of the wealth generated from the resources sector into 'smart industries' and world-leading technologies. The Queensland Government also has a special interest in creating a diversified and knowledge intensive economy, and in managing high-growth areas and large decentralised populations with intelligent ICT systems.

The Queensland Government has formed the Telecommunications, Broadband and Digital Economy Coordination Office within the Department of Public Works to facilitate and expedite the rollout of the National Broadband Network (NBN) in Queensland. This office deals directly with the NBN Co, and co-ordinates the involvement of Government-owned corporations in the construction of the NBN. In addition, the Broadband and Digital Economy team – within the Department of Employment, Economic Development and Innovation – is advising Queensland ICT firms and other businesses on the progress of the NBN and how Queensland businesses can leverage the new capabilities of high-speed broadband.

The Queensland test site for the NBN is in the North Queensland regional city of Townsville. Townsville is Queensland's second largest city and hosts James Cook University. It is home to a large Australian Army base, and several large industries and government enterprises. Townsville is one of Australia's 'solar' cities, and the presence of NBN test site will assist in the testing of smart energy technologies.

Queensland is renowned for its pool of talented software designers, supported by high-quality education and training institutions. This has enabled the industry to deliver world-first ICT products and services to traditional industries such as mining, agriculture and tourism. Key capabilities are in:

- enterprise software applications
- e-security
- e-health
- games and new media
- Global Navigation Satellite Technologies
- remote sensing
- simulation

The Queensland ICT industry has also developed a number of niche capabilities over the last decade. Of particular significance has been the emergence of a critical mass in games development and animation technologies. The Australian Bureau of Statistics report on Digital Game Development Services for 2006-07 identified Queensland as the dominant hub for games development in Australia. Queensland is also home to a growing number of corporate sector ICT research and development centres.



Queensland is also developing significant, leading edge ICT research and development (R&D) capacity which will flow through to the industry in the form of new technologies and capabilities. The Queensland Government currently supports three major ICT research institutions and these are listed below (with further details in Attachment A):

- The Australian e-Health Research Centre
- The Queensland node of National ICT Australia (NICTA)
- The Queensland Cyber Infrastructure Foundation (QCIF)

The Queensland Government continues to support industry development and research linkages through a range of initiatives:

- *three technology incubators* which provides functional support to early stage ICT companies
- the *Queensland Government Business Information Service* which provides commercialisation advice and support
- the *Queensland-Wide Innovation Network (Q-WIN)*, which optimises outcomes from the existing range of innovation and commercialisation services, providing resources and facilitation linkages for the network across Queensland
 - www.science.qld.gov.au/dsdweb/v4/apps/web/content.cfm?id=13654

Queensland also developed Australia's first and only non-science based Co-operative Research Centre (CRC).

- *The Australasian Centre for Interactive Design (ACID)* worked on digital solutions for the health, finance, cultural and entertainment industries. ACID is coming to the end of its funding agreements and ideas for new centres to build on ACID's commercial research strengths, and to incorporate the developments that will be brought about by the operation of the NBN, are currently being explored.

South Australia

Willunga is one of the first release sites of the NBN project. It is the town about 47km south of Adelaide, the capital city of South Australia. Nearby Willunga, it is McLaren Vale, the home to fantastic wine, food and hospitality.

In addition to the first release site, South Australia is highly benefited by the NBN Regional Backbone Blackspots Program. The Victor Harbor link (a loop from Noarlunga – Victor Harbor – Strathalbyn) will cover 129 km and 9 backbone access points. The Broken Hill link (with the South Australian section from Gawler to Renmark) will cover 1,137 km with 35 access points. After the project completion (which is expected within 18 months), it is estimated that 38,000 premises in South Australia will be able to enjoy the new fibre broadband services.

The South Australian Government welcomes new service providers which may offer new customer applications and solutions with the newly available fibre backbone. Examples of new customer solutions may include wireless access services to the fibre backbone and value added network services.



The SA Government provides business investment services including market research on developing an investment business case and introduction to local business partners for market rollout, product development or customer service support.

Tasmania

The Australian Government has selected Tasmania as the first state to commence rolling out the NBN, which will deliver speeds of 100 Megabits per second to 200 000 Tasmanian households and businesses by 2014. The FTTP network will also extend to all hospitals and almost 90 per cent of the state's schools.

Construction of the NBN in Tasmania will initially take place in three stages and has commenced with the first three "smart towns" of Smithton, Scottsdale and Midway Point coming on line from July 2010.

As the lead jurisdiction, Tasmania is attracting attention from organisations looking to proof new digital applications, services and products designed to be delivered over a high-speed network. This is likely to lead to larger scale trials and pilot projects such as:

- digital home applications and service deliver in healthcare
- digital service delivery in education
- digital delivery of government services
- digital office applications such as video conferencing
- digital industry applications such as precision farming
- digital entertainment.

Tasmania's geographic, demographic and economic diversity along with its size means that the State provides a robust, representative and easily accessible sample population for international digital companies and research organisations wanting to test and adapt their products for a western market.



Austrade activities – 2010-2011

- ICT Investment Seminars, held globally
- NBN Investor Visit Program, CeBIT Australia, May 2010 and 2011
- Korea Australia New Zealand Broadband Summit, May 2011
- Regular NBN briefings provided to investors/customers, offshore/onshore
- Tailored inward investment site visits and B2B meetings
- Overseas trade/investment mission programs across five sectors (Digital Content, Sustainable ICT, Telecommunications, Banking and Financial Services IT, and IT Services)

Austrade's ICT sector programs are delivered in consultation with the Committee Marketing ICT for Australia (COMICTA). COMICTA is chaired by the Australian Information Industries Association, and its membership comprises Austrade, State and Territory (ICT) departments, and ICT industry Associations.

Useful NBN Project links

- NBN Company www.nbnco.com.au
- Department of Broadband, Communications and the Digital Economy www.dbcde.gov.au
- Communications Alliance (peak industry body) www.commsalliance.com.au
- Realising Our Broadband Future Summit 2009 <http://www.broadbandfuture.gov.au>



Attachment A - WHY AUSTRALIA FOR ICT

A Proven Testing Ground for Global Projects

A significant research infrastructure, highly skilled and experienced workforce, and technology-hungry, solutions-driven customer base makes Australia a strategic location for a range of ICT activities with a global and regional focus.

There are many examples of world recognised brands taking advantage of what Australia has to offer in ICT. Global names such as Avaya, Canon and IBM have built product development (R&D) facilities in Australia; Google Maps and Warner Bros have used their bases in Australia to develop profitable international digital content for business and entertainment sectors; Alcatel-Lucent, Cisco Systems and CSC run advanced technical assistance centres for operations around the world from Australia; and Logica CMG, Reuters and Infosys have made Australia central to their global risk reduction strategies.

The size of the market, its innovative outlook and a varied and sophisticated customer base combine to make Australia an ideal location to develop and test new ICT products and services. Software and processes that are built and adapted here are often rolled back into the global product development environment and subsequently used by customers worldwide.

Australia's ICT market is worth nearly A\$100 billion.² It is the fifth largest in the Asia-Pacific region, and the 14th largest in the world.³ Between 2001-2008 the rate of growth in Australia's ICT market was expected to be 13.8 per cent – faster than that of Japan, Hong Kong, South Korea and Taiwan'.⁴

In 2008, the EIU ranked Australia's IT industry the second most competitive in the Asia Pacific region after Taiwan and the seventh globally.⁵ It also benchmarked Australia sixth for eReadiness in 2009.⁶

Approximately 400,000 Australians are employed in ICT occupations or specific ICT industry businesses.⁷ There are around 30,300 such businesses⁸ and many industries employ ICT professionals - chiefly: property and business services; finance and insurance; government administration and defence; communication services; and manufacturing.

Australia's ICT workforce offers extensive domain-level knowledge and quality technical expertise - particularly in architecture and integration. The result is targeted, clever and innovative ICT solutions for a range of companies across different industries.

The A\$2.7 billion software industry has benefited from comparatively low development costs and a highly skilled workforce, and has consequently become a target for strategic ICT investment.⁹ Companies such as IBM, Canon, Citrix, EDS, Fujitsu, Google and NEC have built major software development facilities in Australia.

Australia has also proved a particularly fertile domain for creative digital industries which generate in excess of A\$23 billion per year.¹⁰ The digital game development sector alone generated \$136.9 million in 2006-07, with 93 per cent derived from exports.¹¹ Working with the film industry,

² ABS, Cat. No. 8126.0, *Information and Communication Technology Australia, 2006-07*, October 2008.

³ WITSA, *Digital Planet: The Global Information Economy, May 2008*.

⁴ WITSA, *Digital Planet: The Global Information Economy, May 2008*.

⁵ EIU: *How Technology Sectors Grow. Benchmarking IT Industry Competitiveness 2008*.

⁶ EIU, *E-Readiness Report 2009*.

⁷ ABS, *Labour Force Survey*, August 2008.

⁸ ABS, Cat. No. 8126.0, *Information and Communication Technology Australia, 2006-07*, October 2008.

⁹ Microsoft Australia, *Local Software Economy Initiative: Annual Report 2007*.

¹⁰ ARC Centre of Excellence for Creative Industries and Innovation, Queensland University of Technology.

¹¹ ABS, Cat. No. 8515.0, *Digital Game Development Services, Australia, 2006-07*.



Australian digital content expertise has won global acclaim in productions such as the animated feature film *Happy Feet*.

A Strategic Location

Product Development (R&D) Facilities

Avaya, Canon, Computer Associates, Citrix, IBM, NEC, SAP Research, and Unisys all have global research and development labs in Australia. They are productive and integral to the global R&D strategies of the parent company, developing core product offerings, and delivering global sales success.

Content Development

From electronic games to mobile content, from simulation to mobile location tracking, from film production to curriculum development, Australia is the ideal location to develop digital content for both entertainment and business purposes. Andrew Corporation, Google Maps, Warner Bros, Fox studios as well as Australian companies Animal Logic and the ABC all develop profitable international content in Australia.

Technical Assistance Centres

Alcatel-Lucent, Cisco Systems and Sophos all run advanced technical assistance centres for their global customer base from Australia. These centres take advantage of Australian IP, market maturity and high level skills to deliver advanced business functions on a global scale.

Global Sourcing

Australia is central to the global risk reduction strategies of LogicaCMG, Reuters, IBM, Infosys and EMC. With a stable geopolitical environment, highly skilled business analysts, project management and systems architects, a large services sector, supportive regulatory and legal frameworks and reliable infrastructure, Australia delivers high quality service at a good price.



Sophisticated ICT Market

In 2008, total ICT spending in Australia was forecast at just over US\$60 billion, making it the fourteenth largest market in the world, and the fifth largest market in the Asia-Pacific.¹² Increasingly, Australian businesses are looking for new generation IT solutions to maximise productivity and generate revenue – which translates into solutions development and global deployment opportunities for ICT companies.

Proximity to Asia

A strategic geographical position, with close proximity to Asia and an English-language base as well as multi-lingual capability means Australia can cater for multinationals connecting business activities across the globe. Global brands such as Microsoft use Australia as a regional hub to service the Asia-Pacific.

Cultural Affinity

Leading software and technology development companies use Australia's time zone to pursue round-the-sun applications development. Oracle and others have set up facilities in Australia for the productivity benefits offered by the country's cultural and business affinity to Asia, Europe and the US.

Innovative and Sophisticated

The capacity to innovate and adapt is one of the Australia's strongest qualities and has made it an internationally recognised place to invest.

Australia is a nation of sophisticated ICT users who eagerly embrace new technology. The Australian market is used extensively by leading international companies to develop and trial new applications.

The Australian Government has acted to ensure that ICT systems are interoperable, secure, broadly available and contribute to productivity gains. From policies to encourage uptake of new technological solutions, to legislation to protect privacy and prevent spam, Australia is a location where companies can successfully develop solutions with global applicability.

Many international companies deliver solutions from Australia to both the region and the world.

Canon maintains its largest R&D Centre outside Japan in Sydney, employing 330 staff and accounting for more than 30 per cent of Canon's overseas development operations. Known as Canon Information Systems Research Australia (CiSRA), it develops cutting-edge digital imaging and integration technologies and products for Canon's customers worldwide.

EMC, the US information storage and management company, is represented in over 50 countries. Australia hosts one of their four global support centres, offering 24/7 support to EMC customers worldwide and catering to out-of-hours requests from the US and Europe.

Konica Minolta is developing multilingual training and documentation materials at its Asia-Pacific Regional Headquarters in Sydney for distribution to its network of employees, partners and vendors in over a hundred countries.

IBM's Brisbane-based Business Transformation Outsourcing and Asia Pacific Technical Support centres are providing services and support to IBM's customers in the region, including Japan, Korea and China.

Red Hat continues to expand its Regional Engineering and Support Headquarters in Brisbane. As well as core graphics engineering, the centre also hosts Red Hat's main translation team (responsible for making Red Hat products available in 13 languages, including German, French,

¹² WITSA, *Digital Planet 2008: The Global Information Economy*, (Report Tables), May 2008



Italian, Korean, Japanese, Mandarin, Cantonese and Indonesian) and provides services and support to customers around the globe.

Market size

While Australia is ranked 54th¹³ in the world by population – it is the fourteenth largest ICT market in the world and the fifth largest ICT market in the Asia-Pacific region, after Japan, China, India and Korea.¹⁴ Indeed, the industry in Australia continued to enjoy a strong compound annual growth rate of 12.8 per cent between 2003 and 2008 – faster than Japan, Hong Kong, Singapore, South Korea and Taiwan.¹⁵ The 30,300 ICT businesses in Australia generate revenues in excess of A\$120 billion.¹⁶

As a market, Australia has attributes in common with many other countries around the world. With business and government organisations that span across all sectors and range from very large organisations to small and medium-sized businesses, companies can experiment in Australia then use new approaches elsewhere.

There are opportunities from strong demanding vertical markets including transport and communications (23.5 per cent), finance and business services (17.1 per cent), retail and wholesale (4.7 per cent) and the Australian Government (4.6 per cent).¹⁷

The EIU's 2009 *E-Readiness Report* benchmarked Australia sixth for eReadiness globally. The EIU's 2008 *IT Industry Competitiveness Report* also highlighted Australia's high IT intensity, noting Australia had the 9th highest IT spend per population (ie, high density of market), and a very respectable Broadband penetration of population at 33 per cent (compared to Singapore at 20 per cent, the US at 23 per cent and the UK at 26 per cent).

Innovative culture

Australians have been quick to realise that ICT can substantially increase productivity. In fact, Australia led all other OECD countries with the contribution of ICT capital to GDP averaging 0.68 per cent per annum between 2001 and 2006.¹⁸

A dynamic research and development network of government, industry, universities, specialist institutions and private organisations is continuing to drive research into new products and processes.

For the knowledge economy a strong intellectual property framework is critical to business success. In terms of protection of intellectual property rights, Australia's patent and copyright enforcement regime is ranked second best in Asia Pacific and among the best eight in the world – above the UK, Japan and Hong Kong.¹⁹ To assist with intellectual property matters, Australia is home to over 1,100 registered patent and trademark attorneys.²⁰

¹³ US Census Bureau, www.census.gov/cgi-bin/ipc/idbrank.pl, 2008 data

¹⁴ WITSA, *Digital Planet 2008: The Global Information Economy*, Report Tables, May 2008

¹⁵ WITSA, *Digital Planet 2008: The Global Information Economy*, Report Tables, May 2008

¹⁶ ABS, Cat No 8126.0: Information and Communication Technology Australia 2006-07, October 2008

¹⁷ WITSA, *Digital Planet 2008: The Global Information Economy*, Report Tables, May 2008. Percentages refer to vertical segment as proportion of total ICT market. Note: the Government figure refers only to the Australian Government, and does not include State, Territory or Local government expenditure.

¹⁸ OECD, *Compendium of Productivity Indicators*, 2008, Table A6

¹⁹ IMD, *World Competitiveness Yearbook 2008*

²⁰ www.psb.gov.au/registered.htm#dir



Skilled and Experienced ICT Workforce

With some of the most competitive prices for quality IT, project management and business skills among competing locations, Australia is internationally recognised for exceptional productivity, innovative flair and accountability.

Australian ICT skills and education rank highly against other international markets. The nation's educational system is ranked sixth in the world and the university system is ranked third in the region for meeting the needs of a competitive economy.²¹

The solid international ties, language skills, culture of innovation and ICT expertise of the Australian workforce have led multinationals such as EDS, IBM, Microsoft, and NEC to base their regional operations in Australia. These factors, and more, ensure an environment conducive for international firms to conduct business in Australia.

The high standards and reputation of the Australian education system have long been recognised in international markets and have lifted annual enrolment of overseas students to 26.5 per cent of all students studying in Australian universities.²²

Australia offers a deep pool of skilled ICT workers with a tertiary education enrolment rate that is third in the world.²³

Educated ICT graduates

Most of Australia's 39 universities offer undergraduate and graduate courses in core ICT disciplines such as information systems, computer systems engineering and computer science.

The widespread experience of teaching core ICT disciplines has allowed the Australian education system to develop specialised study programs for leading-edge and highly specialised and targeted IT disciplines.

The quality of Australia's education and training sector is internationally recognised. In 2008, Australia was ranked as having:

- 6 of the top fifty universities in the world,
- 3 of the top ten and 7 of the top twenty universities in the Asia Pacific;
- 5 of the top fifty universities in technology in the world, and
- 4 of the top fifty universities in natural science in the world.²⁴

Specialist workers in leading ICT fields

Australia is ranked highly for the availability of IT skills, qualified engineers, and research and development personnel.²⁵

Australian labour is highly productive with a well-demonstrated ability to adapt to new challenges. The *World Competitiveness Yearbook* ranked Australia's workforce seventh in the world for flexibility and adaptation to change.²⁶

The country is home to one of the most multilingual workforces in the Asia Pacific region, with citizens from over 200 countries. About 3 million of Australia's population of 20 million speak a language other than English at home.²⁷

²¹ IMD, *World Competitiveness Yearbook 2008*

²² DEEWR, 2007 Selected Higher Education Statistics, Summary Analyses

²³ UNESCO Institute for Statistics, *Global Education Digest 2007*

²⁴ The Times Higher Education, *QS World University Rankings 2008*, October 2008

²⁵ IMD, *World Competitiveness Yearbook 2008*; EIU, *IT Competitiveness Index 2008*

²⁶ IMD, *World Competitiveness Yearbook 2008*

²⁷ ABS, Cat. No 2068.0, *2006 Census Tables*, 2006 Census of Population and Housing, Austrade



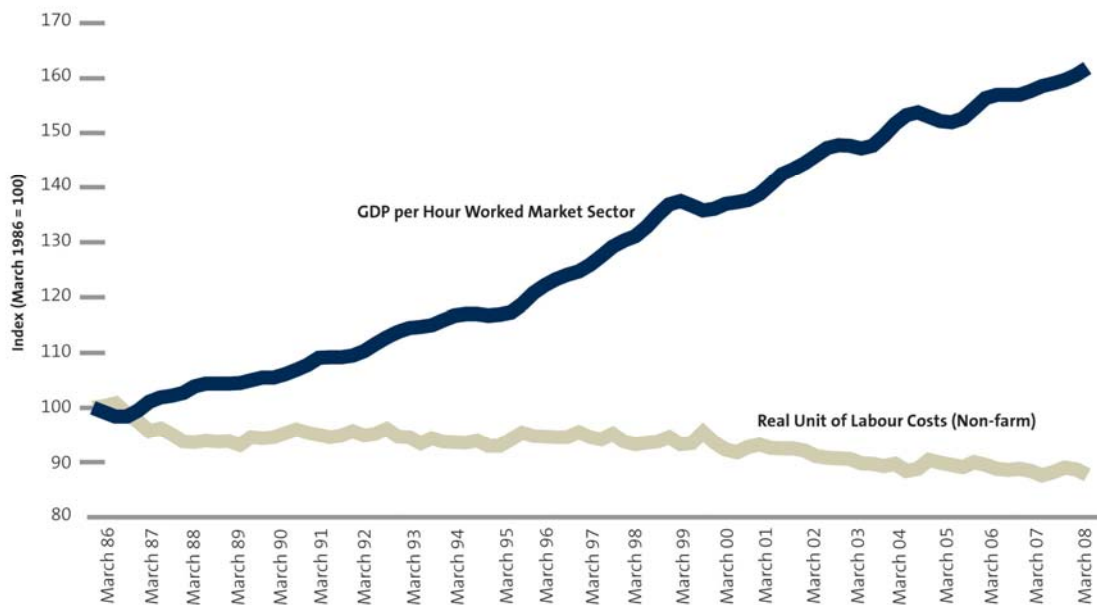
Approximately 400,000 Australians are employed in ICT occupations or specific ICT industry businesses.²⁸ There are around 30,300 such businesses²⁹ and many industries employ ICT professionals - chiefly: property and business services; finance and insurance; government administration and defence; communication services; manufacturing; retail trade; and education.³⁰

In November 2008 there were 179,800 Computing Professionals, 45,200 Computing Support Technicians and 43,900 IT Managers working in Australia.³¹

Competitive labour costs

Australia value adds to its labour costs with a highly skilled, multi-lingual work force which has a great depth of domain expertise, a sophisticated financial services sector, highly regarded legal systems and regulatory frameworks, and world-class corporate governance systems.

Rising Productivity and Falling Labour Costs in Australia – 1986 to 2008



Sources: Australian Bureau of Statistics, cat. no. 5206.0, Australian National Accounts: National Income, Expenditure and Product, Table 1. Key National Accounts Aggregates, Time Series Workbook; Austrade

²⁸ DEEWR, *ICT Labour Market Indicators*, February 2009

²⁹ ABS, Cat. No. 8126.0, *Information and Communication Technology Australia, 2006-07*, October 2008

³⁰ DEEWR, *ICT Labour Market Indicators*, February 2009. Note: property and business services includes the IT industry.

³¹ DEEWR, *ICT Labour Market Indicators*, February 2009



Research and Development that delivers

Australia offers a network of advanced facilities that can assist in lowering the cost of research. The country also has a dynamic research community with strong linkages between business and the universities.

The 2009 EIU *E-Readiness Report* benchmarked Australia sixth for eReadiness globally.³² The 2008 EIU *IT Industry Competitiveness Report* also rated Australia highly as the:

- Second most competitive location in the Asia Pacific region after Taiwan (seventh globally):
- First in Asia Pacific (second globally) for Legal Environment
- First in Asia Pacific (eighth globally) for IT Infrastructure
- Third in Asia Pacific (sixth globally) for Human Capital
- Second in Asia Pacific (sixth globally) for Support for IT Industry Development

The 2008 IMD *World Competitiveness Yearbook* also ranks Australia third in the world for countries with population above 20 million, for the development and application of technology (above USA, Japan and Germany). Australia also figures 7th in the world for R&D expenditure per capita for countries with a population over 20 million.³³

Quality ICT Research

Australian computer science and engineering academics and researchers are highly regarded by the international community. They have contributed to many leading milestone scientific discoveries and commercial developments. Examples include:

- EFTPOS (Electronic Funds Transfer at Point Of Sale);
- The Black Box Flight Recorder;
- Wireless Local Area Network (WLAN) technology
- The silicon on sapphire semiconductor; and
- The world's first Mobile Location Centre (MLC) capable of pinpointing a mobile subscriber's geographical location in real time to assist emergency services teams.

Australian researchers³⁴ are the first in the world to have developed an integrated transceiver, a complete transmitter and receiver, on a single chip at 60GHz on CMOS. This enables the wireless transfer of audio and video data at up to 5 gigabits per second, ten times the current maximum wireless transfer rate, at one-tenth the cost. In addition, Australian researchers³⁵ have developed a unique open-source microkernel solution for embedded systems in mobile phones and broadband internet devices which offers performance combined with strong protection and security features.

³² EIU, *E-readiness Rankings 2008, Maintaining Momentum*. E-readiness is a measure of the quality of a country's information and communications technology (ICT) infrastructure and the ability of its consumers, businesses and governments to use ICT to their economic and social benefit.

³³ IMD, *World Competitiveness Yearbook 2010*

³⁴ NICTA's Gigabit Wireless Project - http://nicta.com.au/research/projects/60ghz_wireless

³⁵ OK Labs - www.ok-labs.com



Collaborative ICT Research and Development

Industry plays a leading role in developing business solutions through applied ICT technology. Accordingly, the private sector takes a leadership role in ICT R&D in Australia, which is enhanced through the strong support of and collaboration with Australia's world-class universities and government facilities.

Total R&D expenditure by the ICT industry in Australia is around A\$5 billion per annum – accounting for approximately 23 per cent of gross expenditure on R&D (GERD).³⁶

By field of research, Engineering and ICT receives more than 50 per cent of all GERD in Australia.³⁷

Business Expenditure on R&D (BERD) increased for the eighth consecutive year in 2006-07 to total A\$12 billion – effectively doubling over the past five years.³⁸

The majority of Business Expenditure on R&D is conducted in the fields of engineering and technology (A\$6.9 billion or 57 per cent) and information, computing and communication sciences (A\$3.2 billion or 26.3 per cent).³⁹

Within information, computing and computer sciences, key areas of R&D expenditure include information systems (45 per cent or \$1,424m) and computer software (38.8 per cent or A\$1,227m).⁴⁰

Businesses in the category 'information media and telecommunications industries' reported the second largest growth in R&D expenditure, increasing by A\$341 million, while the category 'professional scientific and technical service industries' was also one of the major contributors to R&D expenditure, spending A\$2 billion (or 17 per cent of total BERD).⁴¹

Intellectual Property

Australia is ranked one of the leading nations in the world for political stability and regulatory transparency, including recognition as one of the most effective and advanced legal systems in the world for the protection of intellectual property.⁴² The 2008 EIU IT Industry Competitiveness report ranked Australia second only after the US in terms of 'legal foundations for technology development'. Australia also ranked highly for the comprehensiveness, transparency and relatively strong enforcement of intellectual property rights. This provides certainty and security for multinational firms developing new technologies here.

Government Support

The R&D Tax Concession is the principal Government initiative to enhance and increase the amount of R&D being conducted in Australia. It is broad-based, not industry specific, and market-driven, with each company controlling the direction and thrust of their R&D.

The Concession enables Australian companies to deduct up to 125 per cent of eligible expenditure incurred on R&D activities from assessable income when lodging their tax returns. A 175 per cent Incremental (Premium) Tax Concession and R&D Tax Offset is also available in certain

³⁶ ABS, Cat No 8112.0 Research and Experimental Development, All Sector Summary 2006-07. Figure includes the sum of private and public expenditure in the Information Media and Telecommunications and Professional, Scientific and Technical Services sectors.

³⁷ ABS, Cat No 8104.0: Research and Experimental Development, Businesses, Australia, 2006-07, October 2008; ABS, Cat No 8112.0: Gross expenditure on R&D, by sector—by research field 2006-07

³⁸ ABS, Cat No 8104.0: Research and Experimental Development, Businesses, Australia, 2006-07, October 2008

³⁹ ABS, Cat No 8104.0: Research and Experimental Development, Businesses, Australia, 2006-07, October 2008; ABS 8112.0, Gross expenditure on R&D, by sector—by research field 2006-07

⁴⁰ ABS, Cat No 8104.0: Research and Experimental Development, Businesses, Australia, 2006-07, October 2008

⁴¹ ABS, 'Business Spending on research and development reaches \$12 billion: ABS', 14 October 2008

⁴² EIU *IT Industry Competitiveness Report*, 2008; World Competitiveness Yearbook 2008



circumstances. For instance, multinationals in Australia are eligible to access the 175 per cent Premium Tax Concession on incremental spending on R&D where the intellectual property is not held in Australia.

An R&D Tax Credit has been proposed for introduction in July 2010, to replace the Tax Concession. The Tax Credit will provide companies with less than \$20m in turnover pa, a 45% refundable tax credit. Other companies will receive a 40% tax credit.

In January 2008, the Australian Government commissioned a Review of the National Innovation System. The recommendations were presented in August 2008:

http://www.innovation.gov.au/innovationreview/Documents/NIS_summary_web3.pdf

The review ranged across a number of key themes including innovation in business, fostering Australia's talent pool, excellence in national research, information and market design, and taxation.

National ICT Research Infrastructure

Australia is home to high quality research infrastructure and facilities. Many Multinational Enterprises (MNEs) already have established facilities in Australia for R&D including, NEC, Novell, Alcatel, Honeywell and Toshiba.

To foster an innovative culture and enrich Australia's competitiveness, the Australian Government has assisted in the creation of major national research centres. The most significant centres for ICT research are:

CSIRO – ICT Centre

www3.ict.csiro.au

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is Australia's largest publicly funded research agency and one of the largest and most diverse research organisations in the world. The CSIRO ICT Centre is the hub for ICT research at the CSIRO. Australian industries are enthusiastic adopters of ICT solutions so the Centre focuses its ICT research in areas where its work has the potential to create competitive advantage for Australia, as well as leading to globally adopted solutions. The Centre actively develops partnerships with businesses and governments to create paths to market for their research results.

National ICT Australia (NICTA)

www.nicta.com.au

Australia's ICT Centre of Excellence, NICTA is Australia's premier ICT specific research body, employing 300 researchers and almost 300 PhD students in strategically important areas of ICT. NICTA works in close collaboration with industry and other research institutions to solve problems and make breakthroughs in ICT which can be put to use for public good.

National ICT Australia Victoria Research Laboratory (NICTA VRL) (VIC)

The VRL provides the state with world leading, commercially focused research across a range of ICT sectors including telecommunications, software engineering, optical networks, wireless broadband networks and sensor networks. VRL's research has also expanded into ICT as enabling technology for life sciences, including vital research to revolutionise the identification and treatment of brain conditions and the development of a bionic eye.

- Gigabit Wireless Laboratory (VIC) As part of NICTA VRL, the Laboratory has successfully developed the world's smallest two-way gigabit wireless chip to



encompass digital, analog and radio frequency circuitry and an antenna all on the one CMOS technology chip. The successful research at the Laboratory is a result of collaboration with IBM, Synopsys, Cadence, Anritsu, Agilent, Ansoft and Suss MicroTech.

The Queensland node of National ICT Australia (NICTA) (QLD)

NICTA (Qld) focuses on research in the national safety and security arena through its Safe [software] Applications for Emergencies (SAFE) program as well as the complexities arising from the human/computer interface through its Cognitive Organisational Systems Engineering (COSE) program (NICTA | Queensland Research Lab)

The Defence Science and Technology Organisation (DSTO)

www.dsto.defence.gov.au

DSTO is responsible for ensuring expert, impartial and innovative application of science and technology to meet national security needs.

Centre for UltraHigh Bandwidth Devices for Optical Communications , Australian Research Council

(NSW)

The CUDOS research program has two central themes: micro-photonics and nonlinear photonics. The goal of achieving ultrahigh-speed all-optical signal processing on a single photonic chip is addressed by combining these two themes to develop micron-scale photonic components incorporating nonlinear photonics processes. These all-optical signal processors will be the key enabling technology for the next generation of ultrahigh bandwidth optical communication systems.

GreenTouch

(VIC)

An Initiative, established by Alcatel-Lucent. Its foundation partners include the University of Melbourne, The Massachusetts Institute of Technology (MIT) and Stanford University and industry leaders. It has been established to define the challenge, identify solutions and develop solutions with the goal to deliver the architecture, specifications, roadmap, and demonstrations of key components needed to reduce ICT energy consumption per user by a factor of 1,000 from current levels within five years.

Other key partners include AT&T, China Mobile, Telefonica, IMEC, Freescale Semiconductor, Portugal Telecom, Samsung Advanced Institute of Technology The French National Institute for Research Computer Science and Control (INRIA) and CEA-LETI Applied Research Institute for Microelectronics.



Bell Labs Centre for Energy-Efficient Telecommunications with the University of Melbourne (CEET)

(VIC)

The \$10 million Centre has recently been established in collaboration with Alcatel-Lucent. The new facility will focus on reducing the energy consumption of telecommunications networks and build on the State's focus on green technologies.

Centre for Ultra Broadband Information Networks (CUBIN)

(VIC)

CUBIN is a Special Research Centre established by the Australian Research Council with the aim to be a national and international focus for research into future generations of telecommunications. CUBIN focuses on research in ultra-broadband information networks, with a focus on advancing theory, and developing analysis and design methodologies for future generations of networks and interdisciplinary research activities with leading telecommunications research laboratories in Australia, and with major international laboratories that underpin the new generation of ultra-broadband information networks and break down barriers between hardware and software developments.

La Trobe University Centre for Technology Infusion

(VIC)

The Centre is a research and product realisation centre with core research activities in micro-technology, nanoelectronics, wireless systems and sensors, RF/analogue/ASIC, embedded systems, SoC design and testing. The centre has established industry standard design and test facilities like the Microsoft Centre, Home Automation Innovation Centre and Hardware Product Realisation Centre and is also partner in the National Networked TeleTest Facility for Integrated Systems (MNRF) and the Melbourne Centre for Nanofabrication (NCRIS).

The Optiportal Node

(VIC)

The Optiportal Node is a \$120 million investment gives Victorian researchers access to super-fast "ultra" broadband connectivity via a one Gigabit AARNet link across the Pacific, linking Victoria with the United States. This gives researchers access to highly complex instruments, databases, libraries, supercomputers and colleagues, not only around the corner, but across the globe.

Victorian Education and Research Network (VERNet)

(VIC)

VERNet is a \$21.5 million investment to establish a super broadband network connecting almost 120 sites across metropolitan and regional Victoria that will help Victoria's researchers and educators to deliver tomorrow's ideas faster.



Victorian Partnership for Advanced Computing (VPAC)

(VIC)

VPAC is a leading, independent eResearch and Advanced Computing R&D service provider established in 2000 by a consortium of Victorian Universities. Key partners and clients include: [Distributed European Infrastructure for Supercomputing Applications \(DEISA\)](#), [Argonne National Laboratory](#), [California Institute of Technology](#), Exxon, GM Holden Innovation, [Hewlett Packard](#), [Red Hat](#), [The University of Texas](#), [Xenon Computers](#), [Caterpillar](#), [GKN Aerospace](#), and Robert Bosch.

REDlab

(VIC)

REDlab is a world class test facility for the research and development of broadband communications, photonics and microelectronics products and technologies. Foundation Members of REDlab including [CEOS](#), [Redcentre](#), [Nokia Australia](#), [Pacific Broadband Networks](#) and the [Australian Photonics CRC](#).

Victorian Life Sciences Computation Initiative (VLSCI)

(VIC)

The VLSCI is a \$50 million 800 Teralop super computer and with the IBM Co-Laboratory are using ICT as an enabling technology for life sciences. It is the world's most powerful supercomputer dedicated to life sciences research. Under current standards, the VLSCI supercomputer will be more powerful than the supercomputer for NASA in California.

Australian Synchrotron

(VIC)

Australia's first Synchrotron is the largest stand-alone piece of scientific infrastructure in the southern hemisphere. The Synchrotron is used to perform high level research across many fields with incredible accuracy. Some of its uses include producing new medicines and more powerful computer chips, conducting more accurate forensic examinations, making stronger building materials and monitoring pollution.

The Australian e-Health Research Centre

(QLD)

(AeHRC) – a joint venture between the Queensland Government and the CSIRO ICT Centre ([www.http://aehrc.com](http://www.aehrc.com))

The Queensland Cyber Infrastructure Foundation (QCIF)

(QLD)

QCIF is a high performance computing network comprised of six of the State's universities which is used to underpin much of the cutting-edge research conducted within the tertiary sector (<http://www.qcif.edu.au/>).



ICT Cooperative Research Centres (CRCs)

The Cooperative Research Centres (CRC) program focuses on collaborative links between industry, research and educational organisations.

Australasian CRC for Interaction Design (ACID)

(QLD) www.interactiondesign.com.au

ACID conducts research in interaction design and user experience design. It focuses on suburban communities, creative communities, virtual communities, indigenous communities and new models of television advertising including digital solutions for the health, finance, cultural and entertainment industries. Audience research is the core activity of the program which is then translated into other initiatives, including content production, application development and hardware solutions.

Capital Markets CRC

(NSW) www.cmcrc.com

The Capital Markets CRC brings together 23 domestic and international Partners including four Sydney-based universities and has established a range of companies offering market integrity and efficiency enhancing solutions. With a focus on the design and operation of cross market, real-time fraud detection services in the securities markets, the CRC examines security market design/microstructure, compliance systems, experimental markets, corporate governance and securities legislation. Research covers data mining, data management, data visualisation and language technology with the disciplines of finance, accounting and the law.

CRC for Spatial Information

(VIC) www.crcsi.com.au

Focused on spatial information applications, the CRC SI is actively involved in IP generation and driving the utilisation of spatial solutions across sectors, including utilities/ infrastructure, health, agriculture, insurance, banking, finance, entertainment and retail. Based in Victoria, with nodes in WA and QLD, the CRC has many industry partners and helped establish the Australian Spatial Consortium (<http://spatialconsortium.org.au>).

Smart Services CRC

(NSW) www.smartservicescrc.com.au

Smart Services CRC is focused on addressing challenges across services including customer service needs, ecosystems for service delivery and services of the future. Covering services in areas such as media, finance and government (including health), initial projects are undertaking R&D in Audience and Market Foresight, Social Media: tools for User-Generated Content, Personalisation, Multi-channel Content Distribution & Mobile Personalisation, Immersive Multi-media Services, Common Business and Service Frameworks, Service Aggregation, Service Delivery Framework, One-Stop Personalised Financial Services, Education and New Media, and Services 2020. Based in NSW and with research nodes in Melbourne, Sydney and Brisbane, the CRC partners include 6 universities (NSW, QUT, RMIT, Swinburne, Sydney, Wollongong) and industry participants such as Infosys, RACQ, SAP and Telstra.



Advanced Infrastructure

Australia's telecommunications infrastructure is extensive, advanced and is well suited to serving the needs of modern, international businesses. BMI ranked Australia's telecommunications business environment as third in the Asia Pacific region in 2008, up from ninth in 2007.⁴³

The latest in 3G solutions are being commercially proven in Australia. While solutions to extend the life of existing technology have been developed in Australia and exported worldwide. State-of-the-art technology, linking Australia to the rest of the world, is available at a competitively low cost.

Information and communications infrastructure

Australia's extensive and advanced telecommunications infrastructure is well placed to meet the needs of modern businesses. The liberalisation of the industry in 1997 brought in competition, extensive investment in new technology infrastructure and enhanced services. The new regime removed limits on the number of carriers. Telstra and Optus were the only two national carriers prior to 1 July 1997, but as of June 2008 there were 175 licensed carriers operating in Australia.⁴⁴ Healthy competition has, in turn, lowered prices for long distance and international calls, mobile (cell or handi) services and broadband Internet access.⁴⁵

Australia has the 5th largest ICT market in the Asia Pacific and the 14th largest in the world.⁴⁶ The Australian Telecommunication Services sector posted revenues of A\$37 billion in 2007-08.⁴⁷ While revenue between wired and mobile telecommunications is mostly even, revenue growth is the fastest in the sub-sectors of mobiles (cell or handi) and the Internet.⁴⁸

Australia is well connected internationally by fibre-optic cables and satellites, with high potential transmission capacity provided by multiple access points to the national and international network.

Domestically, Australia benefits from a modern optical fibre backbone, an extensive mobile network and complete satellite coverage.

Backbone and broadband access

A large landmass and dispersed population have made the domestic telecommunications network a high priority for Australian governments and industry.

Years of development have produced a highly sophisticated telecommunications infrastructure and ongoing investment continues to increase bandwidth and the capacity to support new applications. Telstra is currently upgrading its' coaxial cable to 100Mbps and anticipates further upgrades could achieve speeds of up to 200Mbps.⁴⁹ Recently, NBN Co committed to investing \$43bn in a high-speed broadband network delivering 100mbps through FTTP to 90 percent of the population and at least 12 mbps through wireless and satellite technology to the remainder of the population. It is also considering legislative changes necessary to facilitate the deployment of a National Broadband Network. A \$250m investment program to upgrade regional backbone blackspots – a total of 6000km – has commenced.

Considerable investment in backbone infrastructure has added to the bandwidth capacity between major routes. Extensive fibre optic transmission networks operate between Australia's capital cities

⁴³ BMI, Australian Telecommunications Report Q4 2008, p.9.

⁴⁴ Australian Communication and Media Authority (ACMA) *Communications Report 2007-08*, Nov 2008;.

⁴⁵ IBISWORLD, *Communication Services in Australia*, February 2007, p. 46.

⁴⁶ WITSA, *Digital Planet 2008, The Global Information Economy*, May 2008.

⁴⁷ IBISWorld, *Mobile Telecommunications Carriers in Australia*, Feb 2008

⁴⁸ IBISWorld, *Communication Services in Australia*, April 2008, pp.4-7.

⁴⁹ ZDNet, '100Mbps upgrades for Telstra HFC cable', Suzanne Tindal, 10 March 2009



and within metropolitan areas. The fibre backbone is supported by a comprehensive carrier-operated microwave network.

Broadband has been enthusiastically adopted by business and consumers in Australia. Of the 95 per cent of Australian small and medium businesses connected to the internet, over 96 per cent access broadband services.⁵⁰ Broadband internet services continued to grow during 2008–09, with 87 per cent of internet subscribers now using a broadband service.⁵¹

This infrastructure is also used by the more than 287 service providers offering VoIP services in Australia.⁵²

Wireless

Australians have also embraced wireless or mobile technology enthusiastically. Approximately 287 companies supply wireless broadband services, the majority via a fixed line wireless connection such as WiMAX.

High demand for wireless services has driven the industry to harness new technologies and develop an advanced and competitive wireless infrastructure. NICTA, Australia's national ICT research centre, has developed and demonstrated use of a 60GHz Gigabit wireless (GiFi) chipset technology able to provide very fast content downloads.⁵³

The number of mobile phone services has exceeded fixed-line connections since late 2002⁵⁴ and 3G network coverage is available for 99.06 per cent of the population.⁵⁵ The level of mobile phone penetration reached an estimated 109.3 per cent (22.9 million services) in 2008 and continues to grow.⁵⁶ With 58 per cent of subscribers using 3G services, the market is characterised by a high take-up of mobile value-added services across enterprise mobility and consumer segments.⁵⁷

Wireless users are served by a number of terrestrial mobile networks operated by four mobile carriers. In addition to three GSM 2G networks operated by Optus, Telstra and Vodafone Hutchison, there are three HSPA 3G networks operated by Telstra, Vodafone Hutchison and Telstra, and Optus and Vodafone. Plans to extend and upgrade these networks continue to be announced. This investment in new technology in Australia also saw Telstra and Ericsson claim a worldwide industry first in December 2008 with a commercial network 'data call' using HSPA technology capable of download speeds of up to 21Mbps.⁵⁸ Telstra and its competitors are planning to introduce increasingly faster services throughout 2009 and 2010.⁵⁹

4G wireless services were launched in March 2010 by Seven Network subsidiary, vividwireless. The network was built using WiMAX and LTE hardware from Huawei. The 4G network is expected to expand to Sydney and Melbourne in August 2010, followed by Brisbane, Canberra and Adelaide.

⁵⁰ ACMA, *Communications Report 2008-09*, Nov 2009.

⁵¹ ACMA, *Communications Report 2008-09*, Nov 2009.

⁵² Market Clarity, Aussie VoIP List, www.marketclarity.com.au/voip/, as at Oct 2008.

⁵³ IT Wire, Stan Beer 'World-first Gigabit wireless chip technology demonstrated', 19 Feb 2009, www.itwire.com/content/view/23362/127/

⁵⁴ ACMA, *Telecommunications Performance Report 2004-05*, Nov 2005, p. 3.

⁵⁵ ACMA, *Communications Report 2008-09*, Nov 2009.

⁵⁶ BMI, *Australian Telecommunications Report Q4*, 2008. BMI forecasts mobile phone subscribers will reach 24.9 million or 116.7 per cent penetration in 2010.

⁵⁷ BMI, *Australian Telecommunications Report Q4*, 2008.

⁵⁸ www.ericsson.com/ericsson/press/releases/20081205-1275382.shtml

⁵⁹ ACMA, *Communications Report 2008-09*, Nov 2009.



Satellite coverage

Satellite technology is used as an alternative to terrestrial and mobile networks in remote areas of Australia.

As well as providing backbone and customer access networks, particularly for rural and remote Australia, the satellite network provides additional bandwidth to connect Australia to international destinations. Satellite broadband services provide 100 per cent coverage of Australia's land area. In July 2009, approximately 47 satellite broadband service providers were operating in Australia, most of which were regional ISPs reselling satellite broadband to regional, rural and remote customers.⁶⁰ Satellite coverage of the Australian continent is provided by Orbcomm, Iridium, New ICO, Globalstar, Inmarsat, Intelsat, SES Global, NewSat, Optus, and iPStar. Satellite phones are used in remote Australia using local carriers Telstra and Vodafone, and satellite operators including GlobalStar, New ICO and Inmarsat.

Government Support for ICT

The Australian Government has responded to the opportunities offered by information and communications technology by establishing the environment to encourage uptake across the consumer and business markets and providing support for the development of new technologies.

The Australian Government is responsive and open to the development of the ICT industry. It oversees a strong and expanding economy and a thriving business environment that provides a solid platform for direct investment.

To foster an innovative culture, the Australian Government has put in place a number of policy initiatives that contribute to a strong ICT sector, including the Government's approach to the procurement of ICT.

⁶⁰ ACMA, *Communications Report 2008-09*, Nov 2009.