

BROADBAND BLUEPRINT



Australian Government

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MINISTER'S FOREWORD

The story of broadband in Australia is evolving as increasingly sophisticated consumers are demanding always-on, anywhere access to the Internet, online businesses and entertainment tools.

Broadband is critical for both the private and public sectors to compete in a modern global economy. It will underpin Australia's productivity gains and lock-in Australia's continuing economic prosperity and social well-being. It is for these reasons that Australian consumers are demanding access to next generation broadband networks.

Australia has an opportunity to get the settings right for the next phase of broadband development. In looking to the future, it is essential for all levels of government and industry to adopt a strategic and coordinated approach to the development of this scalable next generation infrastructure. All levels of government, as well as industry, have a role to play in facilitating the roll out of next generation services that Australian consumers want and need.

With a number of commercial infrastructure rollouts underway and several more proposed, and with the Australian Government poised to make its largest ever investment in broadband infrastructure, it is timely that Australia adopts a clearly-defined national approach to broadband development.

The impetus for this Blueprint arose from the need to articulate a strategic and coordinated national approach to the development of scalable next generation broadband infrastructure to underpin a prosperous, knowledge-based information economy.

Instead of imitating countries that do not resemble Australia socially, economically or geographically, the Blueprint aspires to carve out Australia's own broadband story. It will help coordinate efforts across jurisdictions, with clearly defined roles for Australian, state, territory and local governments.

The Blueprint will build on the work of the National Broadband Strategy Implementation Group and ensure that Australia avoids unnecessary duplication of infrastructure rollouts by all tiers of government and industry and will foster greater collaboration.

I acknowledge there is an inherent interest from consumers in accessing faster broadband speeds facilitated by Australian Government investment. And we are making that investment. But we can and will do more.

For the Australian Government's part, our broadband policy is not one dimensional nor is it static. We recognise that the challenge of providing broadband services right across Australia is a priority. While I understand the individual concerns of being able to access very fast broadband where you live, the Government is concerned to ensure all Australians can access broadband, regardless of where they live.

In August last year, the Australian Government announced the \$1.1 billion *Connect Australia* package and the \$2 billion Communications Fund to provide the platform for investment in next generation broadband infrastructure, improved mobile phone coverage and the rollout of high speed backbones to support the health and education sectors. This historic investment will help secure Australia's communications needs both now and into the future to ensure that Australians can access multi-megabit broadband services irrespective of where they live.

The Broadband Blueprint has been developed with input from state, territory and local governments as well as advice from an expert industry reference group I appointed to provide an additional source of advice to government to better inform the Blueprint. I thank them all for their respective contributions. Together we can ensure Australia becomes a world leader in the effective use of broadband.



SENATOR THE HON HELEN COONAN
Minister for Communications, Information Technology and the Arts
Deputy Leader of the Government in the Senate



1

BROADBAND AS CRITICAL INFRASTRUCTURE



Technology has had a significant and profound influence on Australian society. Technology has provided access to information, automation of processes, and organisation of business and social activities. An associated trend is new knowledge creation and its exploitation to drive value creation, productivity, and economic growth.

Broadband is an enabling technology that fulfils a key role in connecting consumers and business to the online economy. As a result, broadband is fast becoming a key element of critical national infrastructure. In fact, it is argued that broadband will very soon become the 'next great utility'¹ after roads, water, electricity and gas.

The Australian Government recognises that ubiquitous, multi-megabit broadband will underpin Australia's future economic and social prosperity. In 2001 Accenture estimated that next generation broadband could produce economic benefits of \$12–30 billion per annum to Australia². These gains are a result of technology making processes more timely, increasing access to information, supporting online transactions, opening up opportunities for more flexible work practices and creating new areas of economic activity.

Technology, particularly ICT, has made a significant contribution to Australia's strong productivity growth, accounting for some 40 to 70 per cent of the total productivity growth in manufacturing and service industries between 1984–85 and 2001–02³. As equipment capabilities grow, broadband will come to underpin the future connectivity requirements of the whole economy. Broadband will enhance the range of consumer services such as digital TV and digital devices in the home. It will produce further growth in business productivity and result in better quality services, for example in e-commerce, e-banking and e-health⁴.

- 1 Whisler A and Saksena A (2003): Igniting the next broadband revolution, Accenture Outlook Journal, January 2003, available on the Internet: http://www.accenture.com/Global/Research_and_Insights/Outlook/By_Alphabet/IgnitingRevolution.htm, accessed May 2006
- 2 Accenture, *Innovation Delivered—Broadband for Australia, An Economic Stimulus Package*, 2001, Page 8.
- 3 *Productivity Growth in Service Industries*. Occasional Economic Paper April 2005. Department of Communications, Information Technology and the Arts, see www.dcita.gov.au
- 4 *Forecasting Productivity Growth 2004 to 2024*. Occasional Economic Paper March 2006. Department of Communications, Information Technology and the Arts, see www.dcita.gov.au

Broadband is the backbone to Australia's new workplace paradigm, because broadband allows organisations—both large and small—to adopt more flexible and productive ways of working. These practices, known as tele-commuting or mobile working, will come to dominate modern businesses over the coming decades. And more and more businesses are interacting with their customers online saving time and money for both businesses and consumers.

What is real broadband?

Broadband comes from the words 'broad bandwidth' and is a general term used to describe fast, 'always-on' Internet access. Broadband delivers access to digital content, applications and a range of services, some or all of which can occur simultaneously. The exponential growth in data speed unlocks more sophisticated capabilities, most notably those featuring audio-visual elements. However, the intrinsic value of broadband is not just the technology—it is what it enables people to do.

There is unlikely to be a 'one-size-fits-all' broadband solution for Australia as different users will always have different needs. The objective is for Australians to have always-on, multi megabit-per-second (Mbps) access, anywhere, anytime, simply. Above all, Australia needs to strive for access to a level of broadband functionality and capacity that enables full community and business participation in the online economy.

Most people are not concerned about which technology delivers their broadband access. What they care about is the ability to access services and perform tasks where, when and how they want. As shown in Figure 1, at a basic level broadband will deliver email, make Internet searching faster, allow people to check their account balance and download software. Few of the tasks illustrated in Figure 1 are bandwidth intensive. However, the Australian Government recognises that different users have different needs and what may be adequate speed for one domestic user may not be adequate for other users with more bandwidth hungry requirements. This diversity of consumer demand underscores the shortcomings of setting 'one-size-fits-all' broadband targets.

There is unlikely to be a 'one-size-fits-all' broadband solution for Australia as different users will always have different needs.

Neither industry nor government can say precisely what the 'real' broadband of tomorrow will be. Australia's telecommunications infrastructure must provide fast broadband services and must be capable of scalability to ensure that networks can continue to be upgraded as the demand for speed increases in the future, offering efficient connectivity to industry, the community and government.⁵

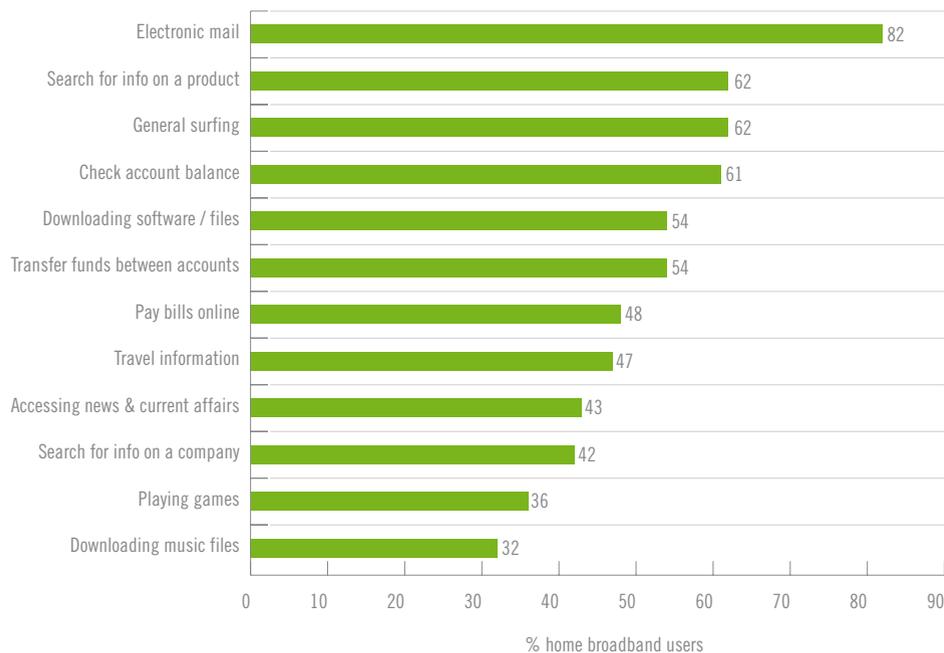


Figure 1: Broadband top 12 uses for home users

The current broadband debate in Australia is about ever-increasing bandwidth or speeds. But what constitutes 'real broadband'? With ever-increasing consumer demands one thing is certain; what may constitute real broadband today will not be considered real broadband tomorrow. Real broadband can be characterised as whatever speed is required to meet the needs of the various markets for broadband.

⁵ Correspondence from the Hon. Francis Logan MLA, Minister for Energy; Science and Innovation, Western Australia, 25 August 2006, to Senator the Hon Helen Coonan

A consumer's perception of broadband depends very much on what it is being used for.

'Use' is the primary determinant of the value of broadband and the criterion for assessing what can constitute 'real broadband'. A consumer's perception of broadband depends very much on what it is being used for. Online activity will vary greatly depending on the needs of the individual. For businesses, there will be even greater diversity of needs. But clearly it is less about what broadband *is* and more about what broadband *can do* that will shape the critical policy objectives for governments and industry.

Real broadband as a concept cannot be used as a target—it is a value ascribed by individual consumers and limited by where we sit on the technology continuum today—not where we will sit tomorrow. Australia's future broadband infrastructure will need to be fit-for-purpose and scalable to meet the needs and requirements of a wide range of different users.

Facilitating broadband rollout

The Australian Government's role in fostering a competitive environment for the delivery of broadband includes facilitating an open regulatory environment, encouraging private sector investment, providing direction through strong leadership and, where necessary, strategic and well-targeted Government financial support.

The role of state and territory governments is complementary to that of the Australian Government⁶. They can enhance the provision of broadband through the strategic delivery of cost-effective and high bandwidth services⁷. A coordinated and collaborative approach between all tiers of government is essential⁸. However, the private sector operating in a competitive market environment will continue to be the key driver of investment in broadband infrastructure and services.

Facilitating broadband rollout is covered in more depth in Chapter Six.

6 Correspondence from the Hon Marsha Thomson MP, Minister for Information and Communications Technology; Consumer Affairs, Victoria, 15 September 2006, to Senator the Hon Helen Coonan

7 Correspondence from the Hon. Francis Logan MLA, Minister for Energy; Science and Innovation, Western Australia, 29 September 2006, to Senator the Hon Helen Coonan

8 Correspondence from the Northern Territory Government, 3 October 2006, to the Department of Communications, Information Technology and the Arts





2

THE AUSTRALIAN BROADBAND MARKET



Broadband market structure

Australia has an open competitive market for the provision of broadband services. This market is supported by a regulatory regime that is technology-neutral and encourages market-driven solutions.

Australia’s broadband market has grown rapidly, with suppliers evolving from traditional telecommunications companies and dial-up Internet Service Providers (ISPs). There is now a wide range of broadband providers in Australia using a mix of technologies from fixed services such as Asymmetrical Digital Subscriber Line (ADSL) to wireless and satellite broadband. These technologies provide the broadband capacity to satisfy demand for current and most emerging applications and uses. At 30 June 2006 there were 719 registered ISPs. However, most of the market is serviced by the 10 largest ISPs, including Telstra and Optus, which together provide services to 77 per cent of subscribers.

There is now a wide range of broadband providers in Australia using a mix of technologies

Broadband technologies

Today Australians can access broadband from a range of different technologies. For the average user, each of these technologies can provide a versatile broadband service at a comparable price.

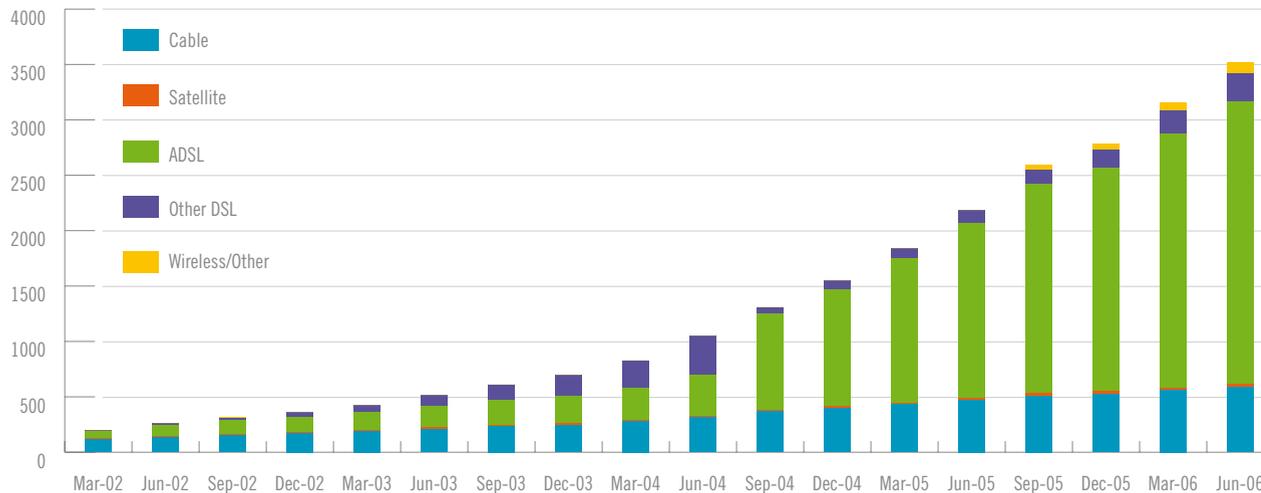


Figure 2: Broadband subscribers by technology

ADSL

The vast majority of Australian users receive broadband over the copper telephone network using a technology called ADSL. Currently about 90 per cent of households can access ADSL broadband providing maximum speeds of between 2 Mbps and 8Mbps depending on the distance between the premises and the exchange.

The number of service providers deploying their own ADSL network infrastructure increased from nine in 2004–05 to 19 in 2005–06⁹. ISPs are rolling out their own DSLAM (Digital Subscriber Line Access Multiplexer) infrastructure as they seek independence from re-selling Telstra's wholesale service. Installation of competitive broadband equipment is made possible through the unbundling of the local loop under the telecommunications regulatory regime.

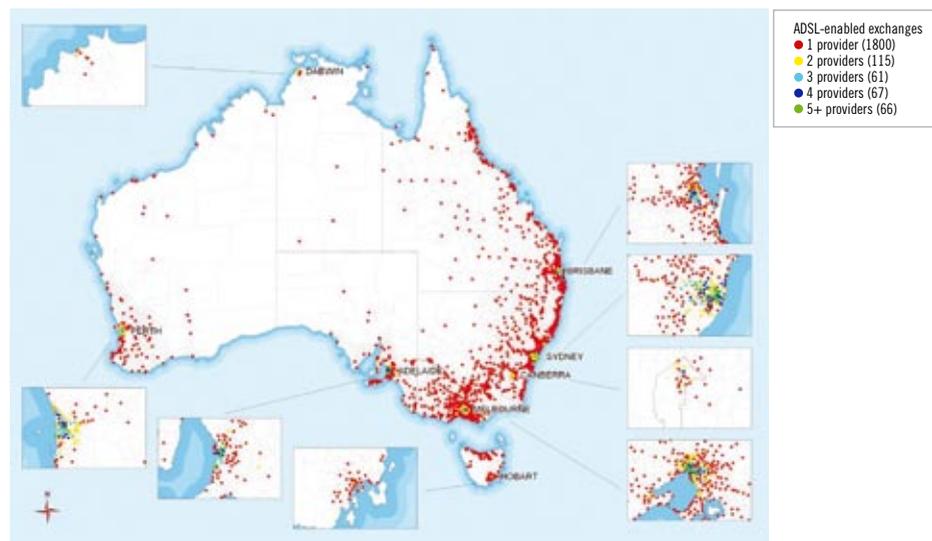


Figure 3: ADSL enabled exchanges

9 Communications Services Availability in Australia 2005–06, page 12, Australian Communications and Media Authority, December 2006

ADSL availability can be impeded, particularly in some metropolitan areas, by the existence of network components installed to facilitate the provision of voice services prior to the widespread take-up of broadband services. Telstra has acted to remove these impediments in recent years and wireless technologies often provide an effective 'last mile' connect where ADSL cannot.

ADSL2+

Fourteen Internet service providers, including Telstra, Optus, iiNet and Internode are now offering more advanced ADSL2+ services¹⁰. ADSL2+ services are delivering speeds up to a maximum of around 20Mbps, with speeds reducing as the distance from the exchange increases.

ADSL2+ services are already being provided to premises connected off nearly 400 exchanges in metropolitan areas and major regional centres. However, ADSL2+ equipment has been installed and enabled in hundreds of more exchanges but these services have not yet been switched on.

In 2006, iiNet, Powertel, Optus NextStep and Agile were in the process of actively wholesaling or establishing commercial arrangements for wholesaling their ADSL2+ networks to other ISPs¹¹. This is a significant step towards wholesale infrastructure competition in the broadband market.

ADSL2+ services
are delivering speeds
up to a maximum of
around 20Mbps

Hybrid Fibre Coaxial (HFC) Cable

HFC cable uses optical fibre and coaxial cable to carry data at high rates capable of delivering broadband access, subscription television and voice services. HFC networks pass around 2.7 million premises in major capital cities and offer data speeds of up to 17 Mbps. There are two major HFC cable networks in Australia which are operated by Optus and Telstra with other smaller cable operators now in regional Victoria and Western Australia.

¹⁰ DCITA estimates as at 1 December 2006

¹¹ Communications Services Availability in Australia 2005–06, page 14, Australian Communications and Media Authority, December 2006



Broadband Over Powerlines (BPL)

Also known as PLT (powerline telecommunications), BPL is an emerging technology that utilises existing electricity powerlines for transmission of broadband data. Power companies are considering using it to provide broadband data access as well as for managing the electricity supply network. BPL can be used in two different network elements:

- Access BPL which utilises the electricity distribution network as the means of broadband delivery to and from premises such as the home or office; and
- In-house BPL technologies which are designed to provide short-distance communications within the home or office.

The Australian Communications and Media Authority (ACMA) is working with industry and community stakeholders to address issues specific to the deployment of BPL services, including potential interfere with other radio communications services. A small number of energy utilities have trialed BPL technologies, including Aurora Energy in Tasmania and the New South Wales regional energy provider Country Energy.

Wireless broadband

Wireless broadband is delivered using a number of technologies in differing spectrum bands. Wireless services, some offering up to 2Mbps, are available to almost 6.5 million premises in Australia. Depending on the platform used and local conditions, wireless technology can deliver a broadband service in a radius of up to 40km from a base station. Industry proponents suggest that speeds of up to 12Mbps or more are expected to be available in the near future. There are 60 wireless broadband providers currently operating in Australia¹². Personal Broadband Australia and Unwired are two of the larger wireless ISPs that are competing with fixed broadband providers.

Wireless broadband does not require a fixed telephone line to provide a broadband service which means it can provide an effective 'last mile' solution to around 835 000 premises across Australia that cannot access ADSL broadband.

Wireless services, some offering up to 2Mbps, are available to almost 6.5 million premises in Australia.

¹² See www.whirlpool.net.au/

There are four 3G mobile providers currently operating in Australia, all of which offer broadband services.

3G wireless broadband

Third generation—or 3G—mobile phone networks are designed to provide both fixed and mobile voice and broadband services. The broadband service can be supplied to a mobile handset, to a modem for a personal computer or a data card that is inserted into a laptop computer.

There are four 3G mobile providers currently operating in Australia, all of which offer broadband services. These services were established through infrastructure-sharing agreements, between Optus and Vodafone on one network, and Telstra and Hutchison on another. The high level of network competition, compared to basic ADSL services, has meant that mobile services are subject to limited access regulation.

On 6 October 2006 Telstra launched its own 3G network—called ‘Next G’—which can deliver multi-megabit broadband services. At present the Next G network is the largest wireless broadband network in Australia with Telstra indicating that it will be available to 98 per cent of Australia’s population when it is fully operational.

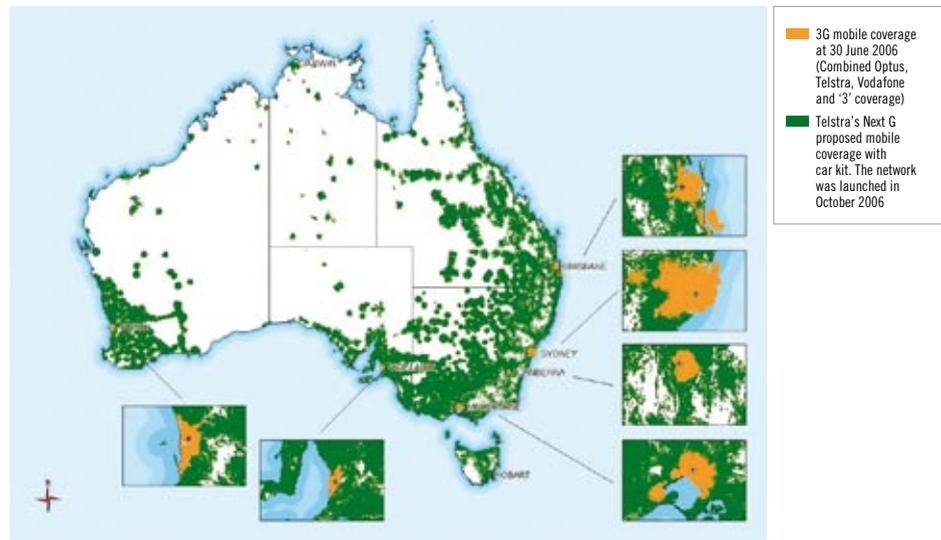


Figure 4: 3G Mobile Coverage 30 June 2006

Satellite

Satellite broadband services are now ubiquitous across all of Australia. They fill a niche in providing access to the Internet in even the most remote locations at speeds similar to those experienced by most current ADSL users. At the end of 2005–06 there were at least 13 satellite service providers offering broadband services to both residential and business customers¹³.

The primary issue with satellite services is the high cost, and therefore high prices for consumers. The Australian Government has addressed this issue through the Broadband Connect program which subsidises the cost of these services with the result that consumers pay prices comparable to those paid in metropolitan areas. As take-up and competition has grown in the satellite market, costs and prices have come down. However, it is still clear that without Australian Government subsidies, prices for satellite services would be significantly higher than those for other broadband technology platforms.

Fibre optic

There are two commonly discussed fibre-optic technologies—Fibre-to-the-Node (FTTN) and Fibre-to-the-Premises (FTTP). FTTN extends fibre from the telephone exchange to a cabinet on the street. The remaining ‘last-mile’ connection to the premises still uses the copper network. FTTP extends fibre all the way to the home or business.

While FTTN and FTTP can provide fast broadband speeds, they are expensive to deploy and require high levels of ‘per-household’ investment by broadband providers. Expenses can include the digging of new trenches and/or the replacement of existing infrastructure which is already profitable.

Without Australian Government subsidies, prices for satellite services would be significantly higher than those for other broadband technology platforms.

¹³ Communications Services Availability in Australia 2005–06, page 21, Australian Communications and Media Authority, December 2006

The Government put in place a telecommunications regulatory regime that encourages market-driven solutions and promotes industry self-regulation where it is reasonably able to work.

Australia's telecommunications regulatory environment

The competitive broadband market in Australia has developed under a robust and balanced regulatory regime.

In 1997 the Australian Government opened up the telecommunications market to full competition, offering simplified licensing procedures for carriers and licence-free entry for any service providers that do not own telecommunications infrastructure. The Government put in place a telecommunications regulatory regime that encourages market-driven solutions and promotes industry self-regulation where it is reasonably able to work.

Foreign investment in telecommunications is only limited by the general foreign investment laws. However, foreign ownership of Telstra is capped at 35 percent in aggregate and a maximum of five per cent for an individual shareholder.

The Australian Government does not restrict the use of any particular technology, leaving investors to select technologies that best meet market needs. This has resulted in a broad mix of wireline, wireless and satellite-based broadband technologies deployed across Australia's diverse geographic and demographic markets.

Carriers are also assisted in their infrastructure deployment by special land access powers and some immunities from state and territory planning and other related laws. These laws also encourage the sharing of facilities, including poles, ducts and towers.

Telecommunications specific competition measures

To support the transition from a monopolistic to a competitive market, the Australian Government introduced industry-specific anti-competitive conduct and access laws for telecommunications in 1997. These laws apply to all carriers and service providers. Australia's approach has been influenced by the fact that for nearly 100 years Australia had a single provider of telecommunications services. The former monopoly provider, now Telstra, has retained a position of market power in many areas. As a consequence Australia has had to adopt robust regulatory settings in order to encourage competition and drive down prices for consumers.

Part XIB of the Trade Practices Act (TPA) was introduced to prevent a dominant telecommunications carrier or carriage service provider from taking part in anti-competitive behaviour. Part XIC of the TPA enables third party access to bottleneck infrastructure where it was necessary to support competition or investment in telecommunications infrastructure. This competition regime is administered by the Australian Competition and Consumer Commission (ACCC).

As well as underpinning a competitive telecommunications market, the access regime has supported broadband competition, in particular through the unbundling of the local loop (ULL). ULL and the line sharing service enable Telstra's competitors to access the copper lines which connect the customer premises to the local telephone exchange¹⁴.

As in many other countries, access to the ULL affords competing service providers greater flexibility in terms of how they offer broadband services to customers and greater control of their costs as opposed to merely reselling another provider's DSL broadband service. The ACCC has also pointed out that access to the copper lines provides competitors with the building blocks to make further investments in broadband infrastructure¹⁵.

As well as underpinning a competitive telecommunications market, the access regime has supported broadband competition, in particular through the unbundling of the local loop (ULL).

14 Using the ULL competitors can then attach their own DSLAMs, backhaul and other equipment to these lines, allowing them to provide competing broadband services, while differentiating their products and controlling their costs

15 Australian Competition and Consumer Commission, *Strategic review of the regulation of fixed network services* position paper (June 2006) available at www.accc.gov.au

The Australian Government has reviewed and updated the regulatory framework a number of times since its enactment in 1997 to enhance its effectiveness.

These pro-competitive safeguards were reinforced in 2005 when the Australian Government introduced the operational separation of Telstra, which is designed to ensure that Telstra does not treat its own retail business units more favourably than it treats its wholesale customers. Telstra is required to maintain separate retail, wholesale and key network services business units. It must also provide network support functions for key services, such as ULL and wholesale ADSL, at equivalent standards of service and quality to both Telstra's retail units and Telstra's wholesale customers.

The Australian Government has reviewed and updated the regulatory framework a number of times since its enactment in 1997 to enhance its effectiveness. These reviews involved full public consultation. The most recent review was in 2005 and it resulted in legislative amendments to the competition regime to require the ACCC to specifically take into account the costs of an investment and the legitimate commercial interests of the infrastructure owner, including the investment risks faced by the owner and the need to provide incentives for investment. Investors can utilise two special mechanisms designed to provide regulatory certainty for any broadband infrastructure investment—a special access undertaking or an anticipatory exemption.

The Australian Government has stated publicly that it will review the telecommunications competition regime again in 2009 to evaluate whether the level of competition warrants further change.





3

BROADBAND IN AUSTRALIA

Australia's position in the international broadband stakes is neither leader nor laggard. Australia is in line with comparable countries, has a healthy and growing competitive telecommunications sector and has had significant investment in infrastructure that has supplied the majority of Australia's population with fast broadband speeds.



Australia's broadband take-up

Australia is sometimes labelled by critics as a broadband backwater in terms of take-up and penetration. However, the June 2006 Organisation for Economic Cooperation and Development (OECD) Broadband Statistics Report ranked Australia 17th for the number of broadband subscriptions per 100 inhabitants. This is on par with Australia's OECD per capita income ranking and should be considered in the context of Australia's low population density relative to those higher ranked countries. The same report shows that Australia is now above the OECD average for subscribers per 100 inhabitants (Figure 5) and that Australia now has the second strongest per-capita subscriber growth in the OECD as illustrated by Figure 6¹⁶.

Australians did not embrace broadband in great numbers until 2003 when broadband prices were substantially reduced in line with comparable countries. But Australians are now taking-up broadband faster than any other OECD country except Denmark and Australia has nearly four million broadband connections.

Australians are now taking-up broadband faster than any other OECD country except Denmark

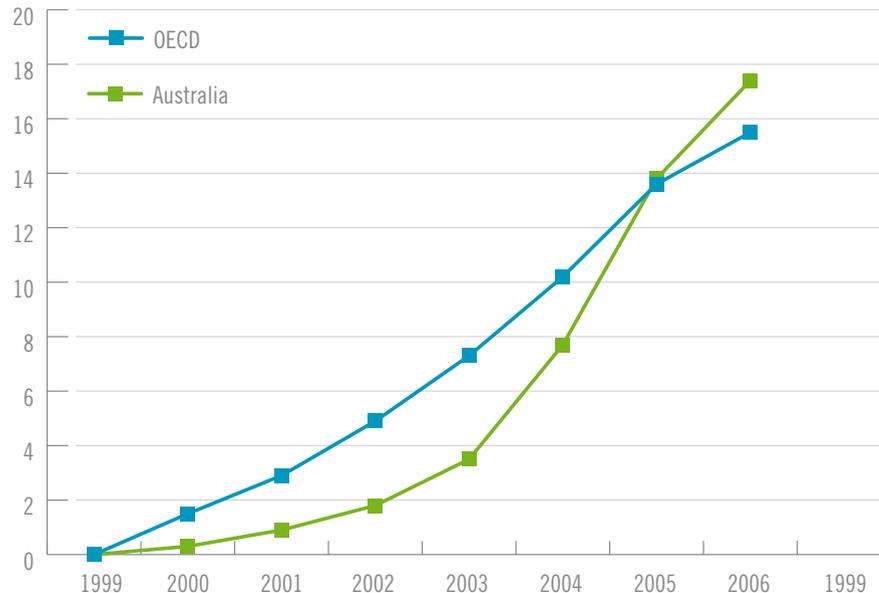


Figure 5: Broadband penetration per 100 inhabitants, Australia vs. OECD

16 See www.oecd.org/sti/ict/broadband

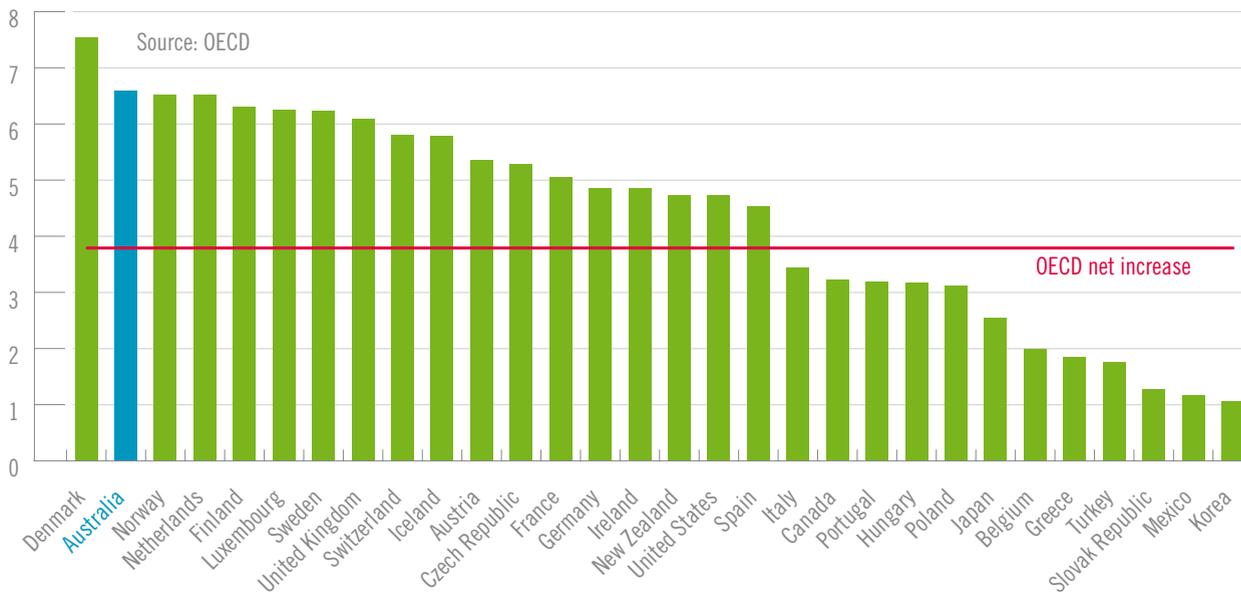


Figure 6: Broadband penetration in the OECD (per 100 inhabitants), net increase Q2 2005–Q2 2006, by country

The ACCC's latest Broadband Snapshot shows that, at June 2006, there were 3 518 000 broadband subscribers.

The ACCC's latest Broadband Snapshot shows that, at June 2006, there were 3 518 000 broadband subscribers. This followed an increase in subscriber numbers of 346 900 in the June 2006 quarter¹⁷.

ACMA reports¹⁸ that just over a third of all Australian homes (both offline and online homes) have broadband at June 2006. In terms of online homes, Nielsen figures show that Australia (71 per cent of home users on broadband) is just trailing the United States (74 per cent) and the United Kingdom (76 per cent), but is ahead of Germany (64 per cent), as at June 2006¹⁹.

The migration from dial-up (as shown in Figure 7) has been substantial and there are now more broadband users than dial-up in online homes.

¹⁷ See www.accc.gov.au

¹⁸ See ACMA *International Broadband Report* June 2006 at www.acma.gov.au

¹⁹ Nielsen//NetRatings. Copyrighted. All Rights Reserved

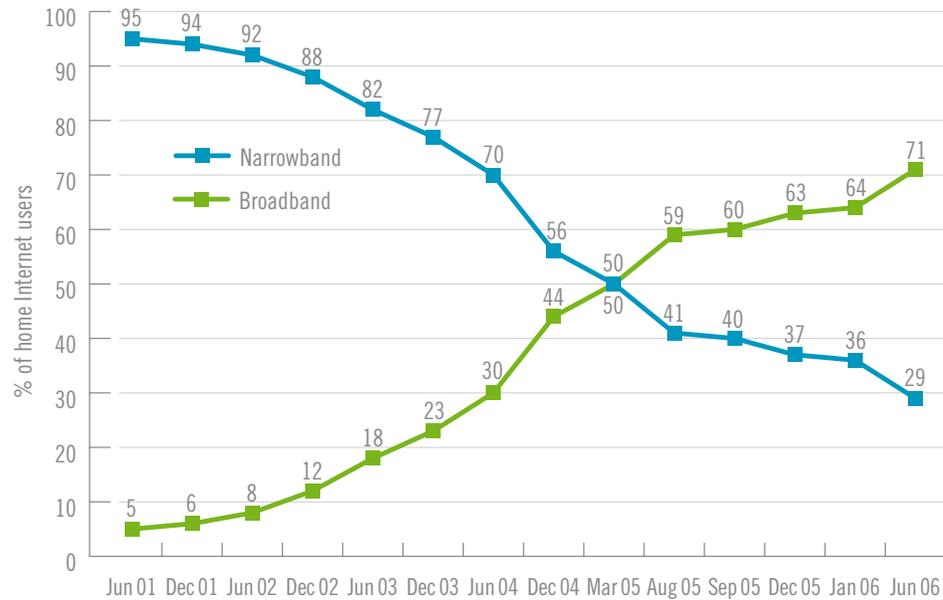


Figure 7: Home Internet users in June 2006 (Nielsen), using broad and narrow band (dial-up) technology (June 2001–June 2006)

As noted in the June 2006 ABS Internet Activity Survey two out of every three broadband subscribers use 512kbps connections or greater, with more than 700 000 subscribers on 2Mbps or greater speeds.

Just as they did with dial-up Internet access and mobile telephones, Australians have demonstrated a willingness to rapidly adopt new technologies. Broadband take-up in Australia is well progressed along the technology adoption curve.

Broadband take-up in Australia is well progressed along the technology adoption curve.

90 per cent of Australian households and small businesses can already access fast broadband

Australia's broadband speeds

The wide availability of fast broadband in Australia is perhaps this country's biggest broadband secret. Few people are aware that close to 90 per cent of Australian households and small businesses can already access fast broadband providing speeds of between 2 and 8 Mbps, from a total of 19 broadband providers²⁰. Telstra recently increased its basic ADSL speed offering to up to 8Mbps and has also switched on its ADSL2+ network in selected areas.

Meanwhile, 14 broadband providers are now delivering more advanced ADSL2+ services which can deliver speeds of up to a maximum of 20 Mbps in some areas, with speeds reducing as the distance from the exchange increases. Current Australian Government estimates suggest that ADSL2+ technology is capable of delivering a minimum of 6 Mbps services to at least 3.9 million premises (35 per cent nationally) and minimum 2 Mbps services to at least 5 million premises (45 per cent nationally). These percentages are significantly higher in metropolitan areas and exceed an average 80 per cent given the slightly greater reach of ADSL2+ over standard ADSL. Appendix 1 contains figures for each state and territory capital which demonstrate the speeds currently available over ADSL2+ in Sydney and Perth.

Meanwhile, HFC cable networks, which pass around 2.7 million premises in major capital cities, can provide very fast broadband speeds of up to 17 Mbps without the distance limitations of ADSL2+. Wireless broadband services, in particular Telstra's Next G network, are offering increasingly faster broadband speeds. Industry proponents suggest that speeds of up to 12 Mbps or higher are expected to be available via wireless broadband in the near future. Telstra's Next G network, which is slated for 98 per cent of the population, promises speeds of up to 14.4 Mbps by 2007.

Many critics of broadband speeds in Australia point to a 'last mile' issue, especially in relation to ADSL2+ distance limitations. This is a valid concern and as Figure 15 shows, it is an issue that impacts those premises that are much further away from broadband-enabled exchanges. Investments such as Telstra's Next G are helping to cover the last mile but more can be done as demand for higher bandwidth rises.

Fibre in Australia?

Optical fibre has long been discussed as a part of Australia's emerging broadband landscape and there is a growing consensus that the superior bandwidth and network performance enabled by fibre will eventually lead to its use as a replacement for the existing copper network. Fibre is currently one of many broadband platforms in Australia and it will be used more substantially in the future.

Fibre is being deployed into the last mile internationally, but still at relatively low levels. As noted by the OECD²¹ the primary technology type deployed is DSL at 62 per cent, followed by cable modem at 30 per cent with the remaining 8 per cent made up of satellite, fibre and fixed wireless connections.

We must be careful when looking at international examples to ensure we are making valid comparisons. For instance, many critics point to countries such as South Korea and Japan as leading the way in terms of broadband. But it must be recognised that both of these countries are geographically very different from Australia and have significantly larger populations that are more densely located. Both have spent tens of billions of dollars on next generation networks, with varying degrees of success.

There is no question that fibre-to-the-node and fibre-to-the-premises are very worthy platforms. However, claims made quite regularly that fibre could be rolled out to 98 per cent of Australia's population at a cost of a couple of billion dollars are questionable. Australia is unique geographically and socially and due to this fact it will take a mix of technologies and a mix of providers to provide scalable, national, end to end broadband solutions.

Recently Telstra has had discussions with the ACCC about competitive access arrangements for a fibre-to-the-node (FTTN) investment in five capital cities across Australia. A group of nine competitors to Telstra—dubbed the G9—have also proposed a FTTN build in metro areas and have flagged their intention to release more details on this plan next year.

Australia is unique geographically and socially and due to this fact it will take a mix of technologies and a mix of providers to provide scalable, national, end to end broadband solutions.

21 See www.oecd.org/sti/ict/broadband

A valuable starting point from which to consider FTTP opportunities is how fibre deployment to new estates might be considered as standard infrastructure nationally. The Victorian Government's Aurora Fibre to the Home Project and associated case study explore some of the solutions to challenges faced nationally²².

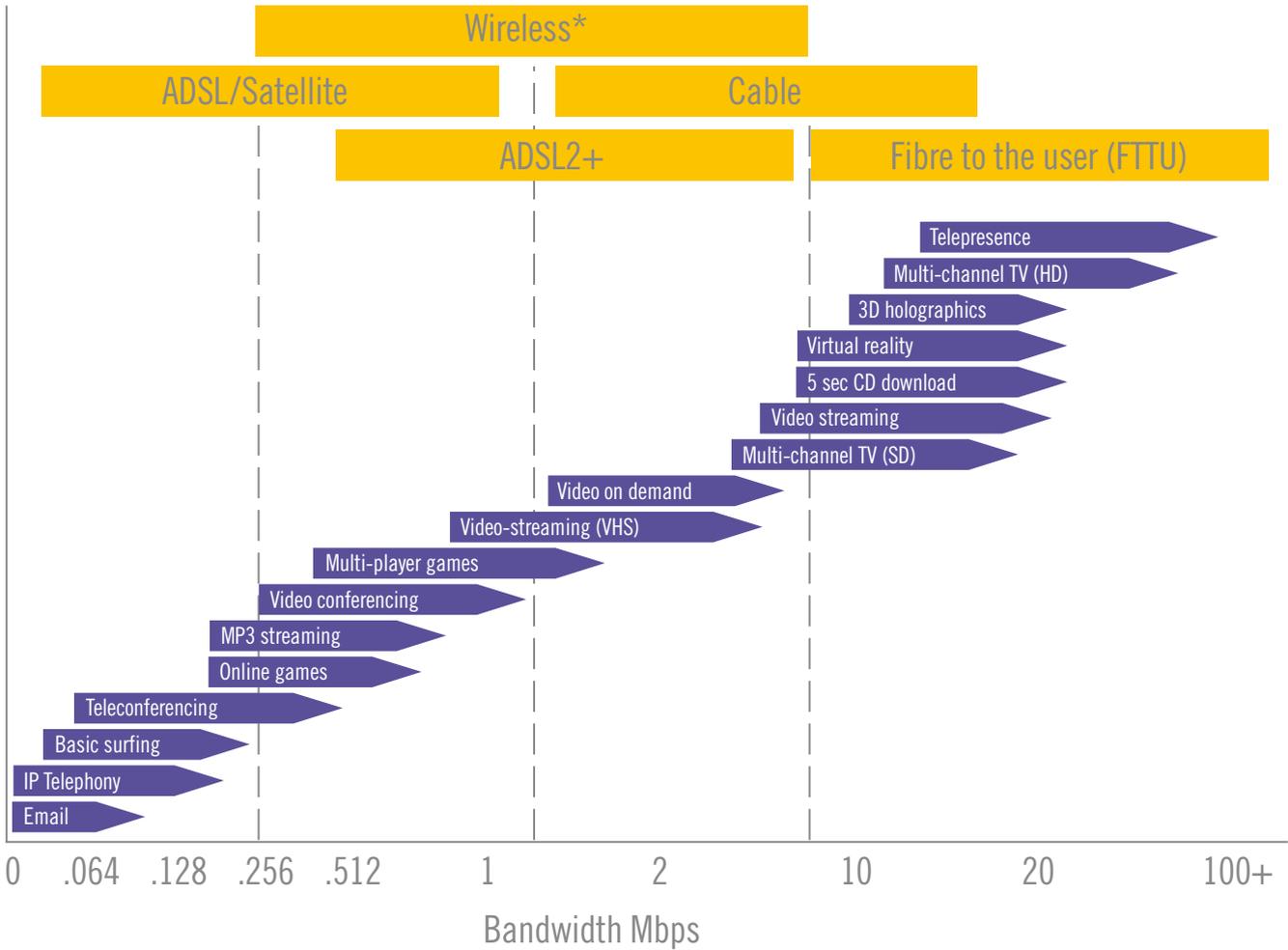
Importantly, fibre is not the only solution to deliver next generation broadband to Australians. As evidenced by the recent rollouts of 3G broadband, technology continues to evolve as do the capabilities of individual platforms with it. ADSL continues to be the most prevalently taken up broadband technology. In the European Union for example, it accounts for 80 per cent of broadband subscriptions while fibre accounts for only two per cent. There are a range of technology platforms that can provide the broadband capacity to satisfy demand for current and most emerging applications and uses (See Figure 8). A mix of technologies should always be the starting point for connecting Australia to fast and scalable broadband. What will suffice in metropolitan Australia is very unlikely to be the optimum solution for the most remote parts of the country.

Clearly the availability of broadband is not the only indicator. The relatively low take-up of broadband over fibre in South Korea demonstrates that consumers will access what they need at a price point they can afford and via a technology that suits their individual needs. Most consumers are largely ambivalent about the technology used to deliver their broadband. They are interested in its ability to connect them to the services they need and that it lets them perform the tasks they want, when they want and where they want. It is highly unlikely that the majority of consumers will want to pay for capacity they will not use.

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²² Correspondence from the Hon Marsha Thomson MP, Minister for Information and Communications Technology; Consumer Affairs, Victoria, 15 September 2006, to Senator the Hon Helen Coonan

The Aurora Fibre-to-the-Home Case Study can be found at www.mmv.vic.gov.au/broadband/AuroraFTTHproject



* Non broadcast technologies for example 3G, WiFi and WiMAX

Figure 8: Primary technology suitability [Source: KPMG (Updated June 2006) used with permission]

e-Readiness

The Economist Intelligence Unit-IBM 2006 e-Readiness Rankings is positive about Australia. The e-readiness ranking measures a group of indicators covering connectivity, government and consumer adoption, the legal and policy environment, as well as social and cultural support for e-adoption.

In 2006, the Unit scored Australia 8.5 out of 10 ranking it eighth of 60 countries, ahead of Canada, South Korea and Singapore. In its report the Unit noted that, “The countries of North Asia have led the way, but Australia, Canada, the US and Western Europe have over the last two years made considerable leaps in broadband penetration and have effectively “caught up” with South Korea and Japan”.²³

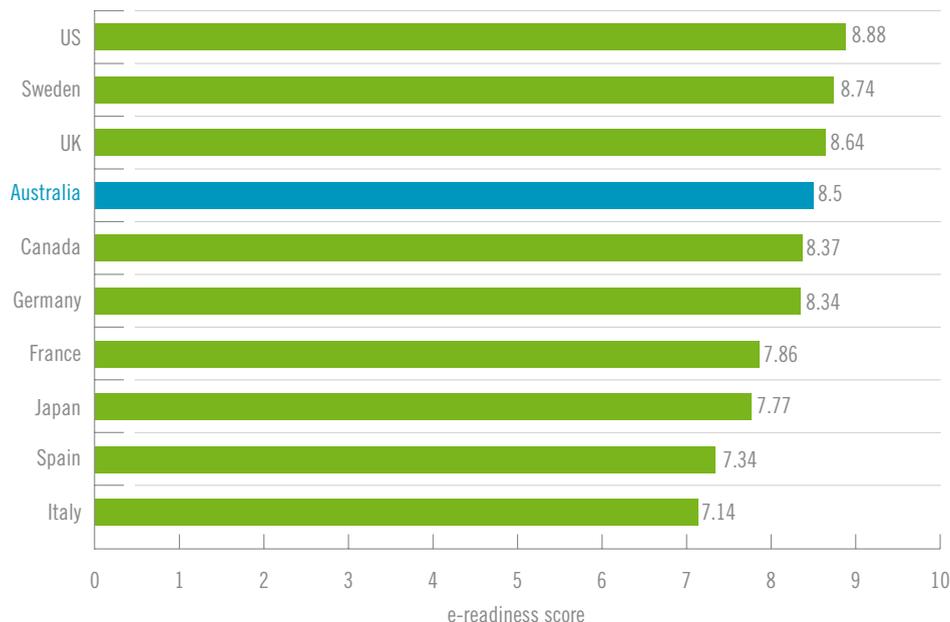


Figure 9: Comparative e-readiness ranking for 10 countries including Australia [Source: OECD]

NOTE ‘e-readiness’ measures a country’s information and communications technology infrastructure, and the ability of its consumers, businesses and governments to use online technologies to their benefit.

23 See: www.eiu.com/site_info.asp?info_name=eiu_2006_e_readiness_rankings

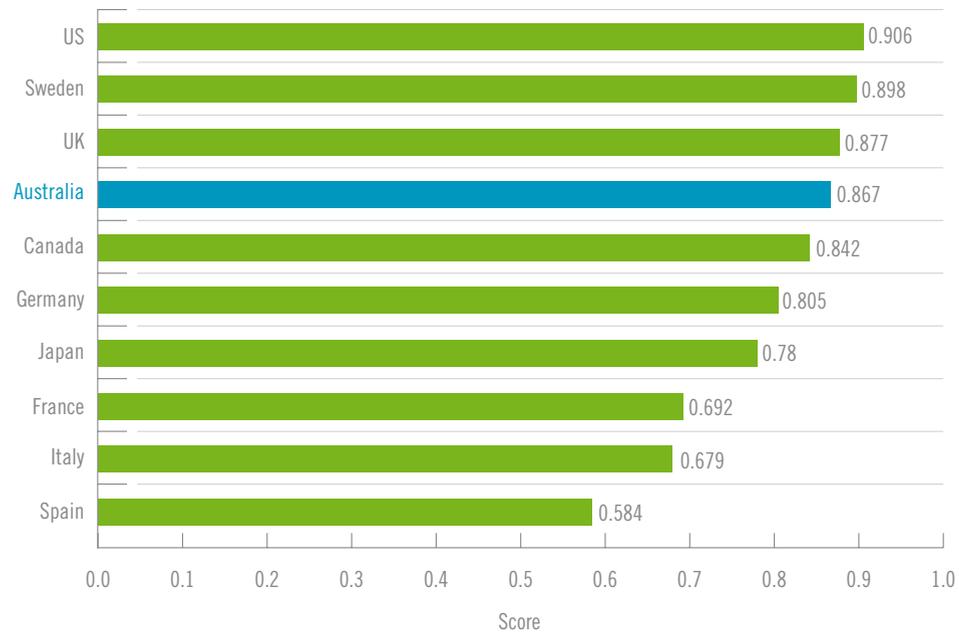


Figure 10: Comparative global e-government ranking (UN) [Source: OECD]

NOTE e-government measures the availability and utilisation of online government services



4

AUSTRALIA'S BROADBAND MARKET—INTERNATIONAL COMPARISONS



International experiences provide insight into the benefits and challenges of different regulatory and investment approaches for broadband connectivity. However, it is inevitable that there will be differences in approach which reflect the unique geography, population base and market conditions in each country. It is important when comparing countries that these differences are taken into account.

The international evidence generally shows that OECD economies place a heavy emphasis on open market entry and measures to promote competition. The approach to network access regulation and the levels of direct government funding vary from country to country and are influenced by the number of competing last mile networks.

United States

In the United States there is robust infrastructure competition between telecommunications companies and cable television operators. The US has multiple competing 'last-mile' networks, including national independently owned cable and copper networks.

In Australia, the two major cable networks only reach 2.7 million premises and Telstra owns one of these networks. As a result, there is only one ubiquitous national fixed line network in Australia—the predominantly copper network—which is also owned by Telstra.

Despite the multiple competing last mile networks, the US strongly emphasised the role of access regulation when Congress passed the Telecommunications Act in 1996. This led to extensive network unbundling. However, in 2003 the Federal Communications Commission (FCC) changed its rules about unbundling for both traditional telecommunications carriers and of fibre optic networks. The FCC acknowledged the strong competitive infrastructure market in the US and exempted next generation broadband networks from unbundling requirements but maintained unbundling requirements for traditional telecommunications carriers with rules that are now more in line with those in Australia. Major fibre-based networks are being deployed in the US by Verizon and Southwest Bell.

South Korea and Japan

South Korea and Japan are often identified as leaders in the provision of next generation broadband. The major drivers of broadband in these countries have been the provision of tens of billions of dollars in government funding support. South Korea has directed an estimated \$US40 billion over 12 years to drive the roll-out of fibre-to-the-premises (FTTP). However, concerns have been expressed over the ongoing financial sustainability of some of these network investments. For example in December 2005 FTTP connections accounted for just 14 per cent of South Korea's total residential broadband subscriptions despite the ubiquity of FTTP.²⁴

United Kingdom

In the UK and EU generally there continues to be a strong emphasis on both facilities-based and access-based competition. In recognition that the copper local loop can be a bottleneck to broadband competition, regulated access to the local loop is generally required in the UK. This access is widely credited with strong competition in the supply of DSL-based broadband.

In the UK, the importance of ULL-based competition has been an important factor in the operational separation of British Telecom, which is designed to ensure competitors have fair and ready access to this important network resource.

Germany

In late 2005 Germany's Deutsche Telekom sought relief from access regulation to upgrade its network to make next-generation broadband more widely available. This approach has been strongly criticised by the European Commission which has indicated it considers the German regulator should give competitors access to Deutsche Telekom's broadband infrastructure where it is a bottleneck.

²⁴ www.bbwo.org.uk/broadband-3335#_ednref26



Internationally the predominant broadband technologies are either DSL or cable, with technologies like wireless and fibre making up the remainder.

European Union

Regulated access to the local loop is generally required in the European Union (EU). However, the EU is now looking at whether changing market conditions mean new regulatory approaches should be taken and it is currently reviewing its regulatory framework. As in North America, much of the EU has a well established cable television industry which is now providing broadband in competition with companies whose roots lie in the telecommunications sector. As well as spurring on competition, this is also causing the EU to question the extent to which facilities-based competition may reduce the need for access regulation.

Other international trends

Another important trend that has emerged in recent years has been the increasing role of municipalities and utilities in the deployment of next generation broadband. For example, Danish power companies are rolling out fibre to consumers as they install underground power lines.

Internationally the predominant broadband technologies are either DSL or cable, with technologies like wireless and fibre making up the remainder. While fibre roll-outs are increasing, they still represent only a small proportion of total broadband subscriptions in most OECD countries, with Japan and South Korea being the major exceptions. Figure 9 shows broadband subscriptions by technology.

Competing broadband networks are the norm in the OECD, with DSL networks operated by telecommunications companies typically competing with cable networks operated by companies with subscription television backgrounds. In most instances, this competitive tension reflects historical needs to improve television reception and historical decisions which saw cable companies being prohibited from entering the formerly protected markets of telecommunications companies.

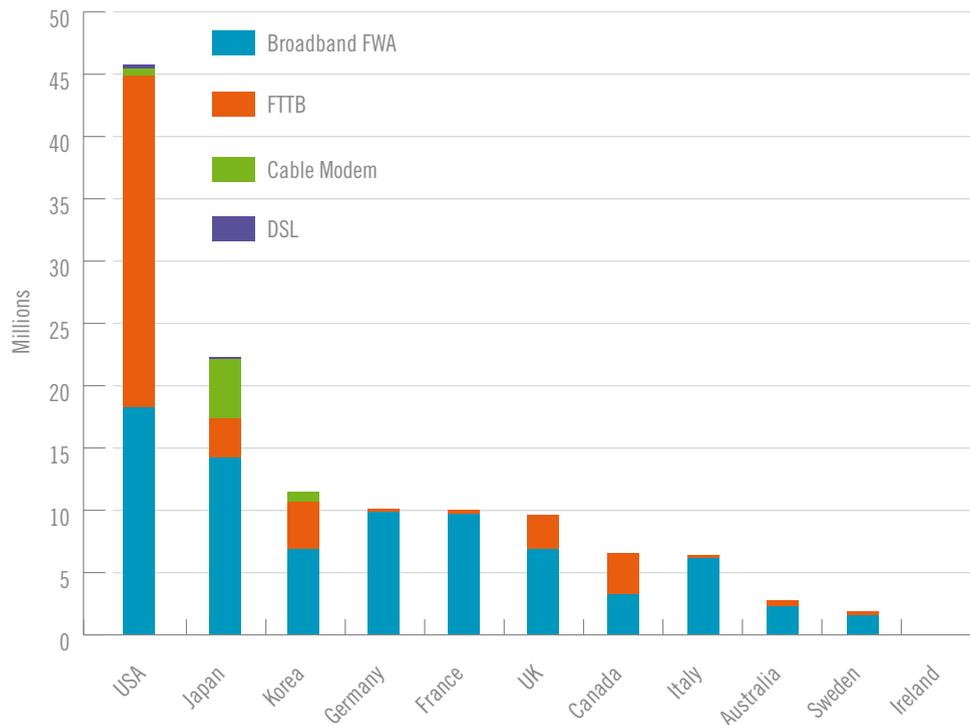


Figure 11: Broadband market share by technology

Some countries, like the USA and Germany, have looked at regulatory relief. However, experience suggests that regulatory “access holiday” arrangements are more likely to be justified where there are well established and extensive competing last-mile network providers. In the Australian context, there is an appreciable risk that the arbitrary creation of regulatory “safe harbours” outside the provisions of Part XIC of the Trade Practices Act is likely to reinforce the dominance of incumbent providers in the supply of broadband services, thereby undermining the competitive environment. Conversely, the evidence suggests that pro-competitive policies, such as unbundling of the local loop do promote broadband competition and increased take-up²⁵.

²⁵ OECD, *Communications Outlook 2005*, p.36; European Regulators’ Group, ‘Broadband Market Competition Report, (ERG (05) 23), (22 May 2005),

As well as establishing pro-competitive regulatory settings, international governments are also exploring the use of other policy levers, including leveraging their procurement practices, supporting the creation of broadband pilots, facilitating demand aggregation or entering into public-private partnerships²⁶. These initiatives are typically aimed at either building more competitive regional backhaul networks or competing access infrastructure.

One of the most well known and ambitious examples that demonstrates the power of governments to contribute to regional infrastructure deployment is the Alberta, Canada, SuperNet model.



CASE STUDY

Alberta SuperNet²⁷

“The SuperNet solution provides high speed broadband access throughout the province of Alberta, creating competition at the network and application layer that leverages an infrastructure that is sustainable and scaleable. The solution was built by a consortium of partners, led by Axia, and including Cisco, Bell and Microsoft. Keys to the SuperNet success have been provision of standardised network, access and transport capabilities, eliminating the rural/urban disparities, adopting next generation IP-based networking solutions and driving an aggregated buying model.”

26, 27 Cisco Systems (Australia and New Zealand) response to the Broadband Connect and Clever Networks Discussion Paper, January 2006





5

BROADBAND—THE THREE ESSENTIAL ELEMENTS



Further extending Australia’s adoption and equitable access to scalable broadband requires a broad range of initiatives that are targeted to the key components of the market. There are three vital layers to Australia’s evolving broadband market:

1. physical infrastructure which provides the access network;
2. content and services which embody the applications that consumers use; and
3. effective use which ensures consumers are able to operate effectively on-line and that industry manages the networks to their maximum potential.

All three are essential to making the most of next generation broadband.

1. PHYSICAL INFRASTRUCTURE

Australia’s large geographic area and low population density present challenges for the roll-out of broadband infrastructure. Broadband connects Australia nationally and globally and provides important economic opportunities for government and business regardless of location. The physical infrastructure supporting Australia’s broadband Internet connectivity is underpinned by the two following distinct components:

- Backbone Networks (national broadband highways)—transporting massive volumes of data traffic between cities and countries. There is no single backbone network, rather many networks across which service providers exchange traffic with other providers; and
- Customer Access Networks (the ‘Last Mile’)—the infrastructure that connects businesses and households to the nearest exchange via either fixed line or wireless connections.

Backbone networks

Backbone networks provide a process through which traffic on a broadband network, that begins at homes and business, is channelled and pooled for transmission over regional and national backbone networks. Access to efficiently-priced backhaul over these backbone networks is critical to providing a level playing field between major metropolitan markets and regional areas.

Australia’s large geographic area and low population density present challenges for the roll-out of broadband infrastructure.

In Australia there are now a number of major backhaul providers. These include telecommunications companies, as well as utility companies (such as electricity providers) that have installed infrastructure for the purpose of monitoring their own operations that is perhaps underutilised. The market for backhaul has also matured considerably over recent years, with increasing numbers of operators looking to interconnect their networks and some starting to offer dark fibre.

On those backhaul routes where there is still limited competition, the ACCC has identified a regulated transmission service. This guarantees service providers with access to these transmission routes at cost based prices.

Customer access networks (the ‘Last Mile’)

The customer access network provides the important link to the customer’s premises. While the whole broadband network has an influence on the nature of the service experienced by the customer, the last mile connection plays a crucial role in determining the speed and service characteristics the customer experiences.

As a result of the development of a competitive broadband market and targeted government investment where the market has not been fully effective, all Australians can now enjoy access to a basic level of broadband (500kbps to 8mbps). Users have a wide choice of Internet service providers and, in most parts of Australia, a choice of technology platforms to access basic broadband services.

In the more populous and most profitable parts of metropolitan Australia, networks and equipment are being rapidly installed to offer advanced broadband services at speeds of 6mbps and above. These advanced services are primarily being offered via ADSL2+ and enhanced HFC cable networks. ADSL2+ services in particular, are becoming increasingly available with aggressive rollouts of ADSL2+ equipment in telephone exchanges by 14 different broadband providers.

Users have a wide choice of Internet service providers and, in most parts of Australia, a choice of technology platforms to access basic broadband services.



The historical challenge for Australia has been that like all technology and service innovations, advanced broadband is rolled out first in the most commercially viable parts of metropolitan areas. This is due to uncertainty about the commercial business case to invest in new, advanced infrastructure in markets where the densities are lower and return on investment less certain. The Australian Government's \$1.1 billion *Connect Australia* package and \$2 billion Communications Fund, which follows \$1 billion in targeted funding assistance in the past 10 years, are designed to offer sufficient incentives for industry to provide metropolitan comparable telecommunications services in rural and regional Australia.

The central plank of Connect Australia—the \$878 million Broadband Connect program—will support new, scalable broadband infrastructure for rural Australia so that commercial broadband investments in country areas can keep up with those in the cities.

Limitations on the extent to which current enabling technologies such as ADSL2+ can reach customers beyond a certain distance from exchanges presents challenges to ensure equity across Australia. This happens whether the exchange is in Longreach or in Sydney. While it is believed that this limitation affects about nine per cent of households that are serviced by broadband enabled exchanges (typically those premises beyond three kilometres from an exchange), it still presents a challenge to policy makers and the industry to ensure that potential customers of very fast broadband can receive it via the new broadband platforms.

The issue here is not whether or not these premises beyond three kilometres from an exchange can get broadband—they can via basic ADSL, wireless or satellite. It is an issue of whether these premises can receive very fast broadband that is available to premises closer to an exchange.

It is essential that both governments and industry implement a strategy to extend access to scalable broadband for all users across Australia.

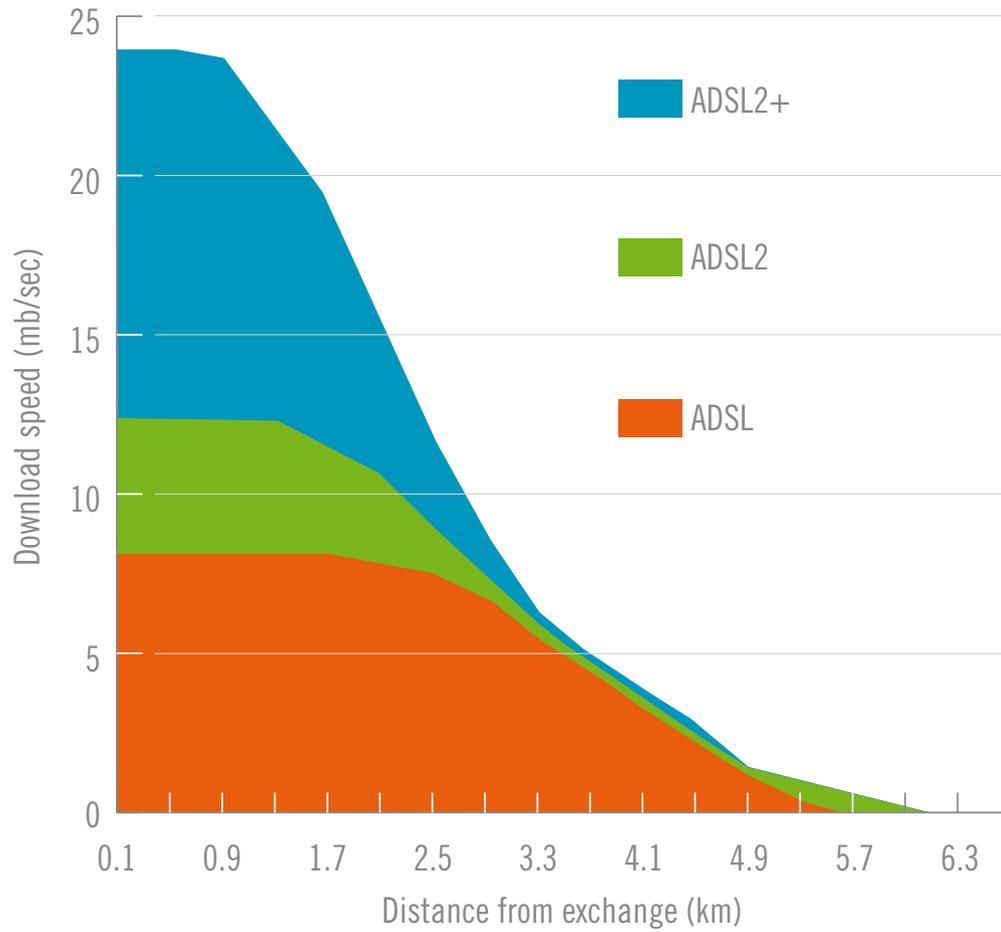


Figure 12: Effective reach of ADSL technologies



2. CONTENT AND SERVICES

As flagged in Chapter One focusing on infrastructure alone misses a major point. How broadband is used, not broadband itself, is the source of the greatest economic and social benefits. Thus it is important to understand what individuals, businesses, government and key sectors are doing with broadband for Australia to maximise the benefits of broadband.

Content

The digital content industry plays a vital role in driving the growth of broadband services, including digital TV, film and radio, mobile phones and gaming. Five years ago this industry was tiny. It now employs 300 000 people in some 95 000 firms and is worth \$21 billion to the Australian economy.

Much of the innovative content in Australian games, animation, film post production and advertising originates with small-to-medium creative firms. The health sector has also recognised the benefits of digital content in delivering health services, for example, remote diagnostic work. The education sector is increasing the range of curriculum services delivered online. The work of professionals involved in mining, architecture and spatial industries has been transformed by the visualisation capability provided by digital content and new technology applications.

Through the March 2006 *Digital Content Industry Action Agenda Report* the digital content industry has established a vision to double its output to \$42 billion by 2015. The report provides strategies to boost investment, build exports, extend industry-based training activity and link industry with research and development priorities. The industry will progress these strategies over the next 12–24 months.

In parallel, a comprehensive Digital Content Strategy, designed to accelerate the production of digital content, is being progressed by the Australian Government.

Five years ago the digital content industry was tiny. It now employs 300 000 people in some 95 000 firms and is worth \$21 billion to the Australian economy.

Services—The value proposition for broadband consumers

Domestic

Broadband is helping Australians find information, stay connected, bank, and buy just about anything, from anywhere in the world. Nationally, just under 12 million Australians used the Internet (broadband and dial-up) in the 12 months to June 2006, and 80 per cent of these people performed multiple online transactions²⁸.

Country users are benefiting from increased broadband availability, with the number of home Internet users on broadband increasing by 61 per cent in regional areas in the 12 months to August 2006, compared to households in metropolitan areas (43 per cent increase)²⁹.

Business

It is estimated that 73 per cent of Australia's 1.2 million small businesses now use broadband (as at June 2006)³⁰, and 19 per cent of small businesses are using VoIP to lower business costs (as at September 2006)³¹.

As noted in one report: "SMEs are less likely to afford dedicated leased lines to connect to the Internet and so are often dependent on much slower dial-up access. Connecting to broadband is therefore likely to have a disproportionately beneficial effect on the SME sector. High-speed, always on access to the Internet gives small businesses access to new markets."³²

28 See: www.dcita.gov.au/_data/assets/pdf_file/34142/Trust_and_Growth_Report.pdf

29 Nielsen//NetRatings. Copyrighted. All Rights Reserved.

30 The Sensis@ e-Business Report, July 2006

31 Pacific Internet, Broadband Barometer Australia, October 2006

32 See: www.btplc.com/Societyandenvironment/PDF/BroadbandBT.pdf

Government

A major challenge for all levels of government is identifying ways of using the Internet to efficiently and effectively deliver relevant services, applications and content to all Australians. As noted by the Western Australian Government broadband has a critical role to play in delivery of services in areas as varied as “community development, child protection services, security and terrorism activities, policing, conservation and land management, emergency services, coast watch, and library services”.³³

In recent years, many Australian Government departments and agencies have made major investments in putting their services online. Centrelink, Australia’s largest government-funded service delivery agency, has one of the most-used government websites. At March 2006, an estimated 10 terabytes of traffic was sent per month over the Centrelink Service Delivery Network across more than 400 locations. Centrelink’s online services provide clients with many self-service options.

CASE STUDY

Working with broadband

Many businesses are using broadband to reduce costs, increase productivity and expand their markets.

A niche business in the Gold Coast Hinterland, Huppy’s Chalk Art, creates custom designed, smudge-proof chalk boards for local and international markets. To serve an international clientele in Japan, the USA and Canada, the owner makes initial contact through a website. To clarify requirements he uses a VoIP facility which enables him to have a 10 minute conversation for about 30 cents. He is also using a VoIP gateway to allow potential clients to ring him for the cost a local call.
www.chalkart.com.au



³³ Correspondence from the Hon. Minister Francis Logan MLA, Minister for Energy; Science and Innovation, Western Australia, 25 August 2006, to Senator the Hon Helen Coonan.



State governments have also made good progress in utilising broadband to improve access to their services. The NSW Government is currently trialling digital television as a delivery mechanism for a wide range of public and government information.

The Australian Government Information Management Office (AGIMO) is monitoring consumer satisfaction with e-Government services to provide data for future development activities.

Education sector

Schools, higher education institutions and the vocational and technical education (VTE) sector will deliver enhanced learning outcomes through improved access to next generation broadband. Consequently all levels of government are working to provide all schools, pre-schools and tertiary institutions with the necessary bandwidth to access services, applications and innovative online content.

Despite many positive efforts, the education sector in Australia is still characterised by differing levels of connectivity. Online education requires scalable and symmetrical broadband connectivity for initiatives such as collaborative work spaces, electronic white boards, expert lectures at a distance and virtual field trips. Videoconferencing and digital television in particular are vital to enable schools in regional and remote areas to provide the full range of curriculum material and activities to students.

Broadband demand in the education sector is likely to grow further as institutions and communities continue to access collaborative online curriculum developed by The Le@rning Federation, a project funded by the Australian Government and the state, territory and New Zealand governments. Investment in the Le@rning Federation for the period 2006–2008 is \$54 million with approximately half of this funding provided by the Australian Government.

Also, the Australian Government, in conjunction with all state and territory governments, is providing \$15 million annually in funding for the Australian Flexible Learning Framework. The Framework supports the VTE system to develop e-learning skills, professional development opportunities, products, resources and support networks to meet today's increasingly technology-driven learning environment.

Health sector

The convergence of voice, data, and video is becoming increasingly important in the health sector as videoconferencing, health call centres, tele-health services and shared secure databases are used. These applications enable regional hospitals to remotely access specialist and allied health skills available within major health facilities, predominantly found in metropolitan centres.

Broadband is improving communications between doctors and other health providers and is assisting with the rapid online delivery of results, referrals and requests across different geographical settings, encompassing the high need areas of rural and remote regions. From this, productivity benefits can be gained through more widespread use of electronic health information.

Through the National e-Health Transition Authority (NEHTA), substantial investments have been made in projects and developing standards that will support national connectivity across the health sector. NEHTA is accelerating the e-Health agenda to achieve desired health system reforms and standards to allow industry to develop solutions to meet the needs of the health sector.



CASE STUDY

The Le@rning Federation—Schools Online Curriculum Content Initiative

The online curriculum is bringing many benefits, including the production of a pool of materials which is free to all jurisdictions to distribute. This material is highly interactive and supports leading education practice.

Online curriculum material is available in the following areas: Science, Mathematics and Numeracy, Literacy for Students at Risk, Studies of Australia, Innovation, Enterprise and Creativity, and languages including Chinese, Japanese and Indonesian.



Collaborative efforts in health

On 10 February 2006, the Council of Australian Governments announced an additional \$130 million investment to “accelerate work on a national electronic records system” to improve safety and quality for patients and increase efficiency for health-care providers.

As an important first step in facilitating improved access to broadband for health care providers, the Australian Government introduced the Broadband for Health Program (1 July 2004–30 June 2007). This \$60 million program aims to provide broadband Internet access to general practitioners, community pharmacies and Aboriginal Community Controlled Health Services (ACCHS) nationwide.

Funding has also been made available through the Managed Health Network Grants to assist in the development of Managed Health Networks across Australia (December 2005–April 2007). The development of these networks will enhance connectivity and provide a platform for the advancement of the e-Health agenda nationwide.



CASE STUDY

Virtual Critical Care

In collaboration with Wentworth Area Health Service and NSW Health, the CSIRO has developed and installed a “Virtual Critical Care Unit” (ViCCU®). This facility allows a specialist intensivist who is located in one hospital to supervise a resuscitation team located at a peripheral hospital.

In the first instance, the central hospital is Nepean Hospital, on the western outskirts of Sydney. The peripheral hospital is Blue Mountains District Hospital, located 60 km away in Katoomba. The communications are based on technology developed by CeNTIE.

ViCCU® is designed so that all information required by the intensivist to make judgements on patient treatment is available in real time, as if he or she were present at the peripheral hospital.

This is achieved by transmitting several high quality digital video channels, high quality audio, vital sign data, written notes and medical images. Two-way high bandwidth video permits natural, low-latency “telepresence” interaction with the intensivist.

The CeNTIE project is supported by the Australian Government through the Advanced Networks Program and the CSIRO ICT Centre.

Research sector

The Australian Government continues to give priority to ensuring that the Australian research community has access to the bandwidth necessary to participate in and lead international collaborative research. The \$500 million National Collaborative Research Infrastructure Strategy is providing strategic direction and coordination to Australia's national research infrastructure investment. It will support the development of technological platforms to collect, share, analyse, store and retrieve information. This will include high-bandwidth connectivity and high performance computing capacity. Furthermore, the \$60 million Advanced Networks Program (2001–2007) supports the development, trial and demonstration of advanced communications networks, experimental networks and test-beds.

Perhaps the most significant success story for broadband in the research sector is Australia's Academic and Research Network (AARNet)—a major education/research network which operates a national 10 gigabit backbone from Brisbane to Perth, and has some 23 points of presence nationally and internationally (see Figure 13). AARNet has extensive international connections and capabilities. AARNet connects directly with (i.e. peers with, free of traffic charge) key international research networks in the USA and Europe (e.g. Abilene, the Internet2 network, and GEANT2—the pan-European research and education network), which in turn connect with most research networks around the world.

In recent years, AARNet has invested significantly in next generation infrastructure, and provides bandwidth and services, such as VoIP, advanced videoconferencing and user controlled light paths to over 1.4 million users, located in 40 campuses and research institutions throughout Australia. While still in its infancy, e-Research, which encapsulates research activities that use a range of advanced ICT capabilities, is already placing Australian researchers at the forefront of international developments.

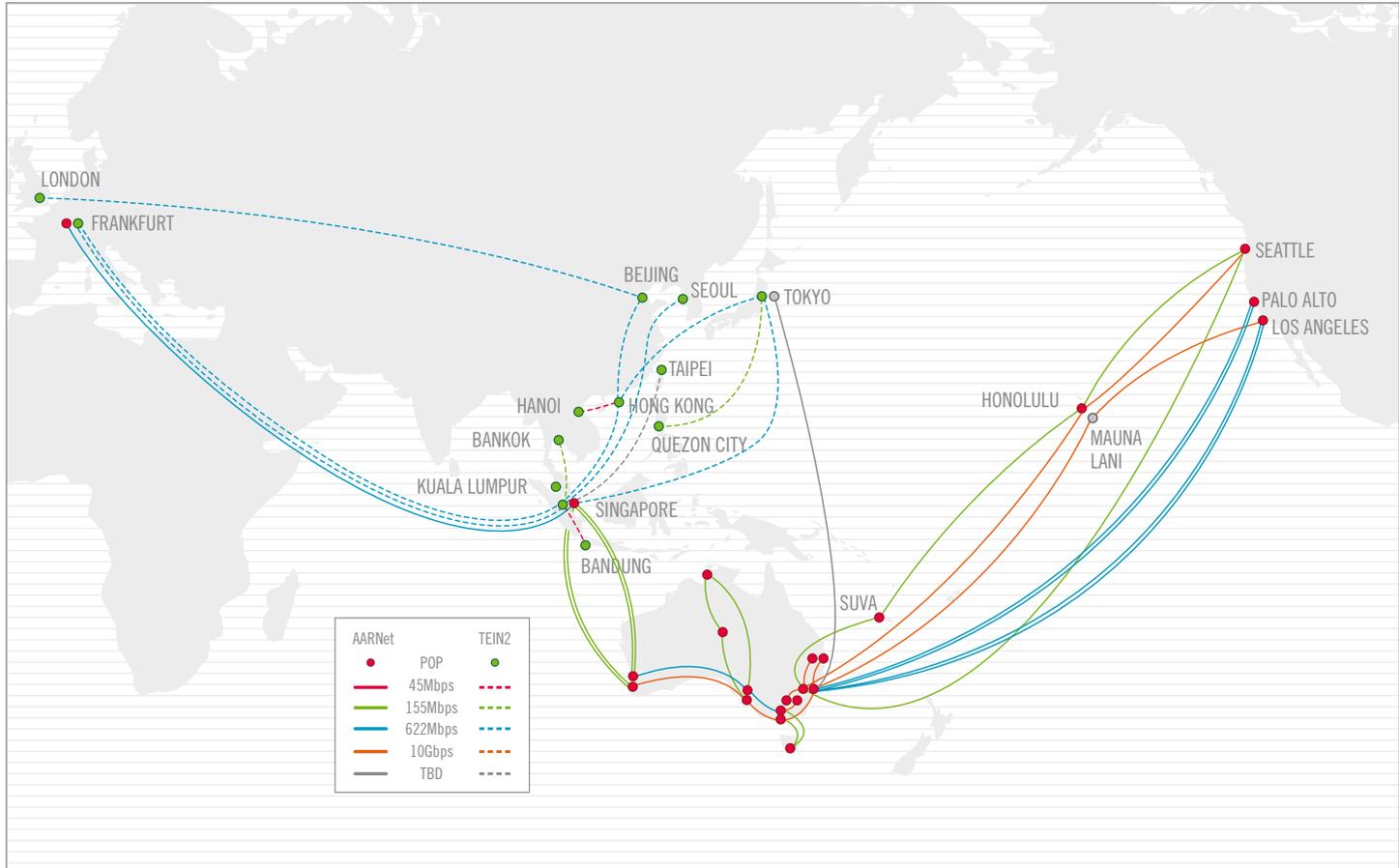


Figure 13: AARNET: Regional and international networks

Cultural and entertainment industries

Australia's cultural organisations are part of a dynamic movement which is offering consumers new sources of information and entertainment. Across all levels of government and industry, the cultural sector is working to meet Australia's strong demand for improved online access to arts, cultural activities and networks, and to Australia's valuable cultural heritage collections.

In the 2005–06 Budget, the Australian Government announced additional funding of \$9 million over three years for the Australian Film Television and Radio School. This funding will be used to deliver digital interactive and multi-platform production courses, and the establishment of a national Screen Business Skills Centre to develop and deliver advanced business skills.

Film Australia, through its National Interest Program, has commissioned several online documentary projects including Australian Biography Online, From Wireless to Web and the digital cross-platform initiative Pacific Stories that is accessible via broadband and ABC2. In addition, the Australian Children's Television Foundation has developed and distributed a highly successful multimedia program for schools called Kahootz. This program delivers a powerful set of 3D multimedia tools that allows students and teachers to be creators, designers, inventors and storytellers.

CASE STUDY

USMob

This is a website which presents a seven-part, choose-your-own adventure story about a group of central Australian indigenous teenagers. Visitors to the site can interact with characters by choosing to try endings, playing games, activating video and text diaries and uploading their own stories.

USMob is the first project to be launched under the Australian Film Commission and Australian Broadcasting Commission New Media and Digital Services AFC/ABC Broadband Production Initiative, which supports dynamic projects developed and produced specifically for broadband delivery on ABC Online.



3. EFFECTIVE USE OF BROADBAND

The physical infrastructure and content and services combine to create a new operating environment that defines the broadband marketplace. For industry that environment is defined by the technical characteristics of the network which must be managed. For consumers broadband is about the ‘always-on’ Internet. Making the most of broadband now and into the future requires both groups to manage their operations and interaction effectively.

Net neutrality

Just as the deployment of next generation infrastructure is important to the business case for higher-speed broadband, some industry players have raised the issue of providers being able to offer differing levels of service to the future business models of infrastructure, applications and content providers. This has given rise to countervailing calls for ‘net neutrality’ and a lively debate, especially in the United States. On the face of it, the ability to offer differing levels of service is a normal aspect of economic activity and appears to offer benefits for application and content providers and end-users, as well as network operators. For example, it is well accepted that real-time applications like VoIP perform better with packet prioritisation.

At the same time, consumers will—and should—expect to have clarity about the capabilities and quality of the services, and have confidence that they are receiving the level of service, for which they are paying. If they have subscribed to a high-speed service they should be able to expect to use it at a high speed, subject to clear terms and conditions, including about prioritisation, and to access the content and applications they want.

The Australian Government is confident that existing competition and consumer arrangements are well placed to deal with such issues. The market for the supply of Internet services in Australia is competitive and the ACCC has strong powers to deal with anti-competitive discrimination in the Internet environment. In addition, the Australian Government is committed to monitoring these issues and working constructively with stakeholders to address any substantive problems should they arise.

Industry collaboration on standards

Convergence and next generation connectivity will require cooperation and collaboration between service providers at both national and international levels.

Industry bodies, such as the Communications Alliance, have played a valuable role by resolving a range of technical, commercial and operational issues that will continue to be encountered during this period of rapid change.

In order to keep pace with these changing technologies the Communications Alliance should be encouraged to develop a coordinated, structured process similar to that established by NGN-UK in Britain or the Network Reliability and Interoperability Council in the United States of America.

The Australian Government will continue to play a leadership role by encouraging and assisting Australian industry to pursue such collaborative processes and engaging in relevant international forums, including the Asia Pacific Economic Cooperation (APEC), the International Telecommunications Union (ITU) and the Internet Corporation for Assigned Names and Numbers (ICANN's) Government Advisory Committee.

The role of self-regulation

Since 1997 the Australian Government has championed industry self-regulation and it will continue to do so. Self-regulation requires industry to take responsibility for its actions and enables it to find the best solutions to the issues it faces. As described above standards development is an example of self-regulation.

Self-regulation has already made an important contribution to the transition to next generation broadband, for example by:

- updating rules for the deployment of new ADSL technologies to send signals over traditional copper telephone lines;
- providing greater clarity on contracts and prices, terms and conditions; and
- dealing with internet spam, gambling and content issues.

Self-regulation on both an enterprise and industry basis will have an important role as new technologies and services are deployed, the complexity of the marketplace increases and new challenges emerge. The Australian Government will continue to work closely with the Communications Alliance and other self-regulatory industry organisations to develop policies appropriate to the communications issues facing Australia in relation to the next generation of converging networks, technologies and services.

Consumer awareness

While broadband offers the benefits of convenience and efficiency, its ‘always on’ nature increases the risk of online fraud through the theft of financial and personal information. This enhances the need for consumers and businesses to always use strong online security defences and engage in secure online practices.

Recognising the need to raise awareness about e-security issues with private and business users, in October 2006, the Australian Government launched a National E-Security Awareness Week which was a collaborative initiative between the Australian Government, industry and community groups. The Australian Government has also produced information material for consumers and small businesses such as *Internet Security Essentials for Small Business*, *Phishing: Don't Take the Bait*, and *Taking Care of Spyware*.

The Australian Government remains committed to ensuring that Australians are able to reap the economic and social benefits afforded by online technologies. As such, the Government is currently reviewing its e-security policy framework, the E-Security National Agenda, which was established to create a secure and trusted electronic operating environment for both the public and private sectors.

Changing use patterns

As with any new technology people need to develop the necessary awareness, skills and confidence to reap the full benefits broadband has to offer. Individuals are moving along the broadband adoption curve at different rates based on differing needs and comfort with the technology.

As Figure 15 demonstrates, the most common uses of broadband differ between age groups—with 14 to 24 year olds more likely to download music and software files than the rest of the population.

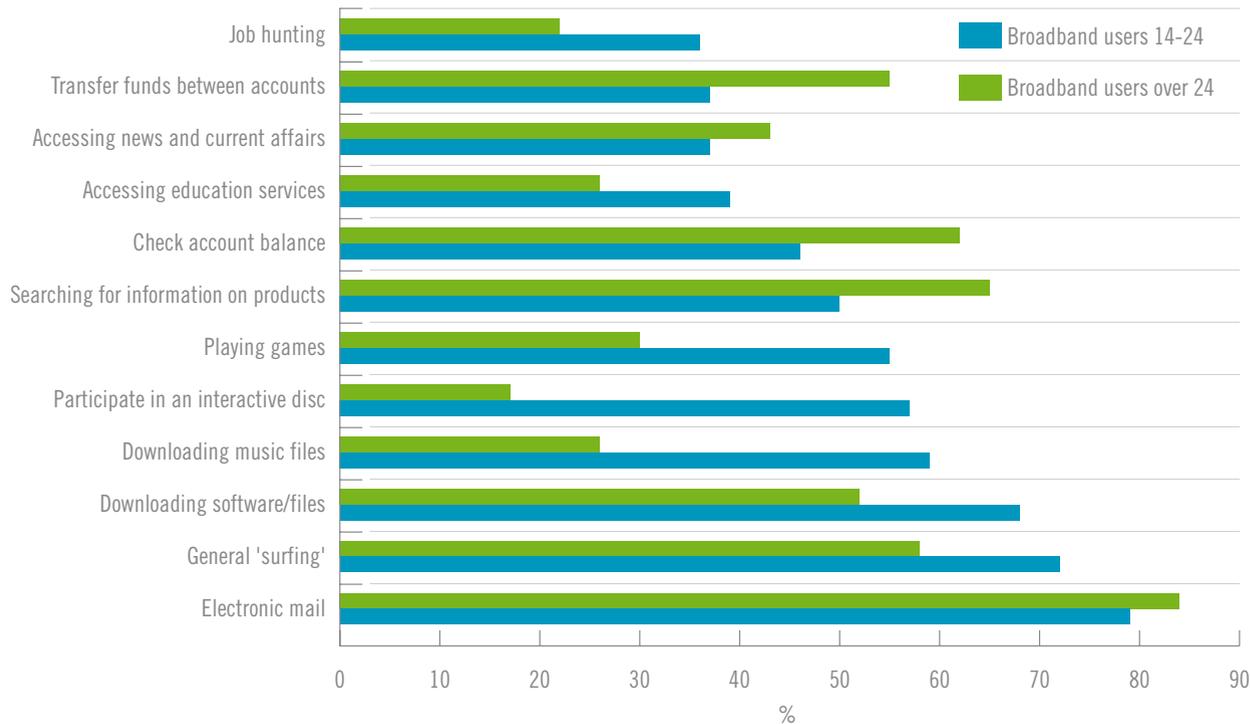


Figure 14: Top 12 activities of home broadband users, 14–24 versus over 24 years, 2006

As well as rapid growth in broadband take-up, the number of services being accessed by individuals is increasing at an even faster rate. As people become familiar with and capable of using broadband, they learn to use new services and applications such as videoconferencing, online collaboration, sharing digital content and VoIP. These applications complement more routine tasks such as email and online banking. Australia is yet to use the full potential of broadband.



6

FOSTERING A COLLABORATIVE APPROACH TO INVESTMENT IN BROADBAND



In looking to the future, it is essential for all levels of government and the industry to adopt a strategic and coordinated approach to the development of scalable broadband infrastructure. With a number of commercial infrastructure rollouts underway and several more proposed, and with the Australian Government poised to make its largest ever investment in broadband infrastructure, it is timely that Australia adopts a clearly-defined national approach to broadband development.

The Broadband Blueprint has been a collaborative process with input received from state, territory and local governments as well as advice from an expert industry reference group. Details of individuals who contributed through both groups are provided at Appendices One and Two.

In addition, the Australian, state and territory governments already have considerable experience of successful collaboration on broadband rollout through their joint membership of the National Broadband Strategy Implementation Group (NBSIG) and joint funding of broadband projects under the Coordinated Communications Infrastructure Fund (CCIF) program. It is now time to build on the work of the NBSIG to achieve a more effective coordination of government action to accelerate broadband rollout.

In moving forward, the Australian Government will continue to work closely with state, territory and local governments to streamline initiatives to encourage investment in next generation broadband infrastructure. A coordinated effort across all jurisdictions, based upon the complementary roles of Australian, state, territory and local governments, is important to maximise the incentives for investment in next generation broadband infrastructure.

WHAT EACH GOVERNMENT IS DOING

The Australian Government

The Australian Government will be undertaking a range of activities to stimulate broadband availability. These include promoting the development of digital content, ensuring adequate spectrum availability, raising awareness of e-security, mapping the telecommunications infrastructure and working with all tiers of government and industry on encouraging next generation broadband network deployments.

A coordinated effort across all jurisdictions, based upon the complementary roles of Australian, state, territory and local governments, is important to maximise the incentives for investment in next generation broadband infrastructure.

In relation to the health sector, the Australian Government has directly supported the take up of broadband by general practitioners and pharmacies.

In education, it has supported development of leading edge content through The Le@rning Federation.

In research, it funded the Advanced Networks Program, the National Collaborative Research Infrastructure Strategy and Australia's Academic and Research Networks.

In the cultural sector, it has funded the Australian Film Television and Radio School to deliver digital interactive and multi-platform production courses. Details of these initiatives and the funding provided are outlined in other parts of the document.

The Australian Government will also maintain a stable and effective regulatory environment to promote robust competition, allocate *Connect Australia* funding in 2007, and conduct an awareness campaign on consumer opportunities for broadband use.

\$1.1 billion *Connect Australia* package

In 2005, the Australian Government announced the largest ever targeted funding package for telecommunications and broadband infrastructure investment—the \$1.1 billion *Connect Australia* package. *Connect Australia* is critical to Australia's broadband future, particularly in rural and regional areas. The *Connect Australia* package includes four separate elements:

1. Broadband Connect—\$878 million

Broadband Connect will boost the reach, quality and capacity of broadband networks in regional, rural and remote areas.

The Broadband Connect Incentive Program builds on the highly successful Higher Bandwidth Incentive Scheme (HiBIS), which has already allocated over \$150 million of Australian Government funding and resulted in almost 1000 additional exchanges having been enabled for ADSL, and a large number of new satellite and wireless providers offering competitive services.

Overall more than one million additional premises in rural and regional areas have gained access to terrestrial broadband as a direct result of HiBIS and Broadband Connect. Importantly, the new Broadband Connect Infrastructure Program is aimed at delivering investment in infrastructure that is scalable to deliver higher broadband capacity in step with growing speeds in metropolitan Australia. This program has the potential to result in a quantum leap forward by enabling scalable, high capacity broadband infrastructure in under-served markets, and in providing opportunities for regional ISPs to compete effectively with national players.

2. Clever Networks—\$113 million

This program continues the successful approach taken in the \$23.7 million CCIF and builds on the \$8.4 million Demand Aggregation Broker Program (DAB). Clever Networks will support the delivery of improved government services such as interactive remote education or real time medical diagnosis using high bandwidth networks, as well as provide assistance for communities and sectors (such as health and education) to benefit from broadband.

3. Mobile Connect—\$30 million

This program extends the Satellite Phone Subsidy Scheme and mobile phone coverage. Under the terrestrial element, mobile phone coverage will be extended in smaller regional communities and along highways where a case for strategic location or economic importance can be established and where services will have ongoing commercial viability. Prior to Mobile Connect, the Australian Government had spent \$145 million on expanding terrestrial mobile coverage in regional Australia, and \$6.9 million on satellite phone subsidies.

4. Backing Indigenous Ability—\$90 million

Through this program, the Australian Government is seeking to address deficiencies in communications services in regional and remote Indigenous communities. Building on the success of previous programs such as the Telecommunications Action Plan for Remote Indigenous Communities and the IT Training and Technical Support program, BIA will include a telecommunications package to provide services such as telephones, Internet and videoconferencing in remote Indigenous communities as well as a broadcasting package to improve Indigenous radio and television services.



The implementation of the *Connect Australia* programs is being carefully managed to maximise the synergies between them. For example, Broadband Connect funded wholesale access facilities might be used to deliver more effective outcomes under Clever Networks and Backing Indigenous Ability programs. Also project managers and officers funded under Clever Networks Broadband Development will work with the more localised regional agents that will be funded through the Backing Indigenous Ability program.

The need to be more pro-active about scaling up to higher broadband speeds in regional Australia has been a key driver for the Australian Government's new approach to the Broadband Connect program. The Broadband Connect Infrastructure Program will invest up to \$600 million in major infrastructure projects in regional Australia and will leverage significant commercial investment. Applications for this program close on 18 December 2006 and an announcement regarding successful applicants is expected in the 2006–07 financial year.

The Australian Government is also implementing the \$50 million Metropolitan Broadband Connect program which is aimed at improving access to broadband services for those premises in blackspot areas, primarily those areas where technology impediments prevent access to comparable broadband services.

\$2 billion Communications Fund

The Australian Government is actively addressing the challenges of today while preparing for the future. The investment of \$2 billion into the Communications Fund will provide an income stream to address future challenges for regional Australia. This will provide a strong and on-going response to the earlier recommendation of the Regional Telecommunications Inquiry (Estens Report) which highlighted the need to have a long term future-proofing mechanism in place to ensure the sharing of telecommunications benefits across Australia into the future³⁴.

34 *Connecting Regional Australia*—The Report of the Regional Telecommunications Inquiry, 2002, p. 307 available at www.dcita.gov.au

\$1 billion targeted funding assistance (1996–2005)

The \$1.1 billion investment in *Connect Australia* and the \$2 billion Communications Fund follows previous expenditure of approximately \$1 billion since 1996 to support the rollout of advanced communications networks and services. This \$1 billion in targeted assistance included several broadband programs, such as:

- \$157.8 million Higher Bandwidth Incentive Scheme—connected more than 1000 rural and regional communities to broadband at prices comparable to those available in metropolitan areas by providing incentive payments to industry.
- \$23.7 million Coordinated Communications Infrastructure Program—supported broadband infrastructure projects that improved the delivery of health, education and government services in regional, rural and remote communities.
- \$60 million Advanced Networks Program—provided high capacity backbone networks linking Perth, Melbourne, Canberra, Sydney and Brisbane and an advanced wireless network which enables research into wireless network technologies and applications.
- \$8.4 million Demand Aggregation Broker program—coordinated demand for broadband services at the regional and sectoral level to encourage investment in broadband infrastructure and the delivery of services.

Regulatory amendments

The Australian Government also recently reviewed and amended the competition regime to require the ACCC to specifically take into account the increased risk of investing in next generation networks. When setting competitive access prices for services on a new network, the ACCC is now required by law to consider the costs of an investment and the legitimate commercial interests of the infrastructure owner, including the investment risks faced by the owner and the need to provide incentives for investment.

New South Wales Government

The most recent initiative announced by the NSW Government is a plan to install a free wireless broadband network throughout the Sydney CBD and other major centres by early 2008. The NSW Government has indicated it will seek expressions of interest from companies wanting to provide the service in early 2007. It intends to have the system fully operational by early 2008.

The 2002 NSW Government Telecommunications Strategy identified education and health as priority areas for broadband services. The NSW Government has spent more than \$240 million on delivering broadband services to public schools.

In November 2005, the NSW Government Broadband Service was launched to deliver high speed data services to 24 regional centres. Over a five year period it is expected that the NSW Government will spend in excess of \$200 million to provide the latest in broadband services to government agencies in rural and regional NSW.

Further details are available at www.gcio.nsw.gov.au

Victorian Government

The Victorian Government's plans and vision are summarised in its *Broadband Framework*, issued in 2005.

The Framework contains six strategies for action:

- aggregating broadband demand to increase government purchasing power and facilitating improved community access to broadband infrastructure;
- improving the delivery of government services through leading broadband use;
- making available public infrastructure assets and using its role in planning to support strategic broadband projects;
- assisting industry and communities to develop innovative market solutions;
- providing information that supports the development of broadband in Victoria;
- and
- advocating in the interests of Victorian broadband users.

Recent initiatives include a \$6 million grant to improve the accessibility of broadband in the Loddon-Mallee and Grampians regions and a \$15 million Broadband Innovation Fund funding pool.

Further details are available at www.mmv.vic.gov.au

Queensland Government

The Queensland Government has announced that it will open up access to state and local government utility assets and easements for industry to utilise in a fibre network roll out in Brisbane. It has foreshadowed an “expressions of interest” process to gauge investment community interest in building a \$550 million fibre-to-the-home network in metropolitan Brisbane.

An earlier Queensland Government broadband initiative was the Reef Network, providing optical fibre along the Brisbane to Cairns rail corridor.

Further details are available at www.coordinatorgeneral.qld.gov.au

Western Australian Government

The Western Australian Government recently announced its Broadband Network Strategy. Under the strategy, the \$100 million spent on telecommunications annually by the Western Australian Government will be pooled and offered as a 10-year, \$1 billion contract to facilitate the installation of a state-wide broadband network by the private sector.

The Western Australian strategy is based largely on the telecommunications model successfully implemented in Alberta, Canada. For more details on the Alberta model see Chapter Four.

The Western Australian Government’s previous broadband policy is outlined in two key papers.

WA—A Connected Community: State Communications Policy identifies five objectives with associated strategies around the following themes: availability, equity, skills and awareness, applications and government infrastructure.

Further details are available at www.doir.wa.gov.au

The Western Australian Government’s *Connected Government Strategy*, which was released in 2005, provides direction on the investment and management of telecommunications in the WA public sector for the next five to 10 years.

Further details are available at www.egov.dpc.wa.gov.au

The needs of the state's more remote communities are being addressed through projects such as one in the Ngaaytjarra Lands. This joint project with the Australian Government uses CCIF funding to provide advanced communications services to remote Indigenous communities.

The Western Australian Eastern Goldfields Regional Reference Site is a widely-acknowledged model for the integration of medical and health services using broadband technologies.

South Australian Government

The South Australian Government's Broadband Strategy set the following goal, "*By 2008, affordable broadband services will be available to all South Australians, and many will be using the technology daily as a tool for business, research, learning and community life*" along with seven objectives to assist in achieving this goal.

Further details are available at www.innovation.sa.gov.au

The \$7 million South Australian Broadband Development Fund, a key element of the strategy, and demand aggregation activities, has done much to facilitate new broadband investment in the state.

Using funding provided by both the state and Australian Government together with private sector partners has seen broadband initiatives implemented in Port Lincoln, Whyalla, Port Augusta and Mount Gambier.

Tasmanian Government

The Tasmanian Government's *Broadband Action Plan 2005* draws together a number of policy elements and activities from the Tasmanian Government's broader strategic platform, which are relevant to the facilitation and enhancement of the delivery of broadband services to Tasmanians.

Further details are available at www.tas.gov.au

Connect Tasmania aims to increase competition in the broadband sector and boost business investment in the state. Tasmania is investing around \$30 million to establish a *Connect Tasmania Core* network.

Key activities of the project include TasGovNet, an optic fibre backbone owned by the Tasmanian Government. With the assistance of the Australian Government, the Tasmanian Government is currently extending this network.

Australian Capital Territory Government

The objective of the ACT Government's Broadband Action Plan is to ensure that people throughout the ACT, regardless of their age, race, gender, location or socio-economic circumstances, have equitable access to information technologies.

Further details are available at www.cmd.act.gov.au

All ACT Government schools have broadband connections. Over 60 major government sites, as well as more than 100 minor sites have been connected through a fibre optic network which is intended to achieve savings and increased performance.

Northern Territory Government

The Northern Territory Government has developed a Remote Area Telecommunications Strategy Action Plan to direct initiatives including broadband access.

Further details are available at www.dpi.nt.gov.au

The Northern Territory is using government procurement processes for services (such as videoconferencing) across the territory to help drive demand for services in remote communities.

Local government initiatives

Australia has 675 local government authorities, and many are well-advanced in promoting the delivery of broadband services within their particular area. The City of Whittlesea has changed local planning laws to require developers to install council-owned conduit as part of any sub-division development process. The Council then leases the conduit to broadband service providers at a low cost, with the provider having to commit to delivering a minimum service package of telephony, data and video services.

CountryTELL, operated by the Murray Regional Development Board, provides a wireless local loop network, using Wi-max base stations to deliver broadband, VoIP and local loop telephony services.

The Thamarrurr Regional Upgrade Project is being undertaken by the Local Government Association of the Northern Territory in association with the Thamarrurr Regional Council. The project will connect the communities of Wadeye, Palumpa, Peppimenarti and Daly Rivers through installation of approximately 190 km of optic fibre. This initiative is supported by the Australian Government through the CCIF.





7 FUTURE ACTIONS



As foreshadowed in the previous chapter, the critical next step for broadband development in Australia is for the Australian Government to work closely with state, territory and local governments to streamline initiatives to encourage coordinated investment in next generation broadband infrastructure. A coordinated effort across all jurisdictions based on complementary roles for Australian, state, territory and local governments, is important to maximise the incentive for investment in next generation broadband infrastructure to avoid duplication and to maximise value for taxpayers. Closer collaboration between governments and industry is also important.

Continuing collaboration with all tiers of government

The Australian Government has invited all tiers of government to participate in the development of an implementation plan for next generation broadband infrastructure investment under the auspices of the Online and Communications Council (OCC). An OCC sub-committee would be well placed to coordinate a strategic approach across all tiers of government to stimulate industry investment in scalable next generation broadband infrastructure. In doing so, the Australian Government will initiate a special session of the OCC in the second quarter of 2007 to discuss a framework for the implementation plan. The plan would include initiatives to leverage the outcomes of the Broadband Connect Infrastructure Program.

The OCC and its working groups have provided important oversight and direction to the development and implementation of broadband in Australia. The role of the OCC's existing working group, the NBSIG, which is charged with monitoring next generation broadband developments, will be substantially modified in light of the Blueprint. In particular, its role will be revised to include participation by peak user groups in setting national broadband priorities.

An area of increased focus for brownfields sites is how the assets of governments and their utilities (i.e. electricity poles, gas and sewer ducts, easements) can be used to reduce costs associated with infrastructure deployment. The recently proposed fibre deployment in Brisbane should provide a better understanding of the degree to which the provision of access to utilities' facilities will act as a catalyst for private sector investment. The Australian Government will encourage all levels of government to use the OCC and its standing committees to share their experiences with next generation network deployments. Collective consideration of these matters may result in common approaches that can be promoted across all jurisdictions and inform future regulatory development.

The Australian Government has invited all tiers of government to participate in the development of an implementation plan for next generation broadband infrastructure

Learning from international experience

Internationally, governments are applying a wide range of policy levers to facilitate high speed broadband deployments, including leveraging their procurement practices (i.e. anchor tenancies), supporting the creation of broadband pilots, facilitating demand aggregation or entering into public-private partnerships

The Australian Government is continuing to contribute towards demand aggregation strategies through the \$113.4 million Clever Networks program. It will also undertake international research into ways in which government can act as a catalyst for further broadband developments.

Guidance for local councils and planning authorities

Australia has 675 local authorities, with some located in large metropolitan centres and others in regional and remote parts of the country. The diversity of local authority requirements may present challenges for companies wanting to invest in rolling out broadband infrastructure in greenfield sites. The Australian Government is committed to working with local governments to assist them to adopt a more common regulatory approach to this matter.

Awareness campaign on use and consumer opportunities

The Australian Government is implementing a community information campaign in regional, rural and remote areas to raise awareness and understanding of consumer issues including telecommunications rights and Government programs for broadband and mobile phone services.

The campaign will include a series of briefings to be held across Australia to provide key local community stakeholders with information on Australian Government broadband initiatives under *Connect Australia* including Broadband Connect and Clever Networks.

Mapping backhaul

Access to efficiently-priced backhaul is important in a competitive market because it allows new carriers to provide a service in places where they do not own their own networks. The more competitive the backhaul networks the lower the prices that will be paid by consumers.

In the past, commercial sensitivities have prevented sharing of the extent of networks across Australia, particularly backhaul. For the benefit of all providers and government these issues need to be resolved as far as possible. The results of work conducted to date are shown at Figure 15.

For the benefit of all providers, the Australian Government will continue to work with industry to develop an interactive map of backhaul supply.

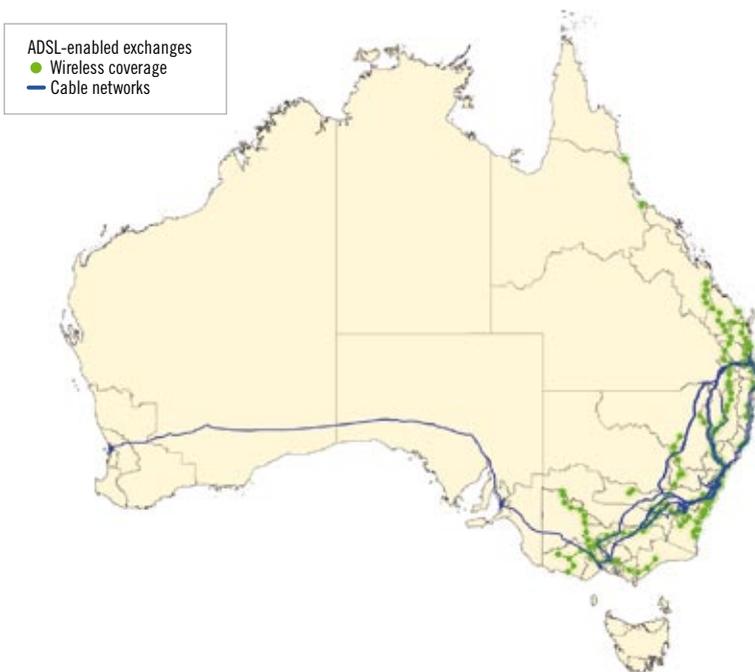


Figure 15: Broadband backhaul infrastructure map: phase 1

Spectrum

The Australian Government is examining international trends on spectrum policy and management issues and will consider how to improve the delivery of wireless services in Australia. The Australian Government made a reallocation declaration in April 2005 for the 2010–2025 MHz band for metropolitan, regional and remote Australia. The reallocation declaration enables ACMA to allocate new spectrum licences in the 2010–2025 MHz band, maximising accessibility and affordability, and encouraging greater participation in the broadband market.

Recognising the under-utilisation of spectrum in regional and remote areas—and the potential for greater broadband competition in these areas—the Australian Government has also decided to allocate apparatus licences ‘over the counter’ in the 1900–1920MHz band for regional and remote areas, and in the 2010–2025MHz band for remote areas. Over 200 of these apparatus licences have been issued by ACMA since February 2005.

Many commentators consider that the nature of some of these technologies is likely to present spectrum regulators with a range of new challenges. Some of the key shifts include devices that are increasingly ‘smart’, low powered and versatile, as well as a major rise in the number of transmitters and receivers likely to be deployed.

The Australian Government is committed to examining future ‘last mile’ Wireless Access Services (WAS). Following consultations and work undertaken early in 2006, ACMA will continue to work with industry stakeholders to guide the development of medium and long-term spectrum strategies to support WAS development and deployment across Australia.



DCITA will continue to report annually on the 11 broadband key performance indicators, which have been developed in consultation with state, territory and local governments.

Measuring progress

It is important that Australia's progress in the deployment and use of broadband is assessed and measured. There are a number of Australian Government agencies involved in monitoring, assessing and reporting on broadband availability, take-up and service quality, notably DCITA, ACMA, the ACCC and the ABS. The Australian Government is actively examining ways to further enhance work in this area without placing an undue burden on industry.

In this context DCITA will continue to report annually on the 11 broadband key performance indicators, which have been developed in consultation with state, territory and local governments. Internationally, Australia's performance is measured annually against 10 other countries (depending on data availability) as part of DCITA's Information Economy Index.

Key performance indicators for broadband reported on by DCITA include:

- increased broadband take-up
- increased broadband availability
- increased broadband competition
- reduced price of broadband services
- increased quality of broadband services
- increased range and use of broadband applications, content and services
- increased use of broadband in education and research
- increased use of broadband in health
- increased use of broadband to deliver government services
- increased use of broadband in business
- increased use of broadband in the community sector

Reviews

Due to the rapid evolution of the technology and industry, any framework for national broadband development will have a relatively short lifespan and will need to be frequently adjusted. Planned reviews will ensure that Australia continues to take an integrated and up-to-date approach to investment in next generation broadband.

It is therefore anticipated that the Blueprint will be reassessed following the implementation of the Broadband Connect Infrastructure Program in early 2008. Reviews of the implementation of the Blueprint will enable measurement of the performance of Australia's next generation rollout, take-up and speed against international best practice.

The implementation of the Broadband Blueprint will be a contributing factor in the next regional telecommunications review scheduled for 2008.

The development of the broadband market will also be a key consideration in the next major review of the telecommunications specific regulatory regime in 2009.

Conclusion

Broadband is increasingly recognised as critical infrastructure and all levels of government, as well as industry, have a part to play in its continued rollout. While the Australian Government has primary responsibility for communications in Australia, there is a need for a collaborative and comprehensive approach to encourage the rollout of scalable broadband infrastructure.

The contributions of state and territory governments have been significant in advancing the interests of their individual jurisdictions. Local government also has a role to play by using appropriate planning laws to support the deployment of next generation networks. The OCC will provide a focal point to stimulate industry investment in scalable next generation broadband infrastructure.

For its part, the Australian Government will continue to provide leadership to shape Australia's broadband future and will foster investment confidence through a stable yet responsive regulatory environment and targeted investment to areas of market failure and need.

ACRONYMS

AARNet	Australia's Academic and Research Network	ICAAAN	Internet Corporation for Assigned Names and Numbers
ABS	Australian Bureau of Statistics	ICT	Information and communications technology
ACCC	Australian Competition and Consumer Commission	IP	Internet protocol
ACCH	Aboriginal Community Controlled Health Services	IPv4	Internet Protocol version 4
ACMA	Australian Communications and Media Authority	IPv6	Internet Protocol version 6
ADSL	Asymmetrical Digital Subscriber Line	ISP	Internet service provider
AGIMO	Australian Government Information Management Office	ITU	International Telecommunications Union
APEC	Asia Pacific Economic Cooperation	Mbps	Megabit per second
CeNTIE	Centre for Networking Technologies for the Information Economy	MHz	Megahertz
CCIF	Coordinated Communications Infrastructure Fund	NEHTA	National eHealth Transition Authority
CSIRO	Commonwealth Scientific and Industrial Research Organisation	NGN	Next generation network
DAB	Demand Aggregation Brokers	OCC	Online and Communications Council
DCITA	Department of Communications, Information Technology and the Arts	OECD	Organisation for Economic Co-operation and Development
DSL	Digital subscriber line	SME	Small and medium sized enterprises
EOI	Expression of Interest	TasColt	Tasmanian Collaborative Optical Leading Testbed
FTTH	Fibre to the home	TPA	<i>Trade Practices Act 1974</i>
FTTP	Fibre to the premises	ULLS	Unbundled Local Loop Service
HiBIS	Higher Bandwidth Incentive Scheme	VICCU®	Virtual Critical Care Unit
HFC	Hybrid Fibre Coaxial	VoIP	Voice over Internet Protocol
		VTE	Vocational and Technical Education
		WAS	Wireless Access Services

GLOSSARY

Asymmetrical Digital Subscriber Line

(ADSL) A data communications technology that enables faster data transmission over copper telephone lines than a conventional modem can provide. The asymmetric nature of the connection means that the downstream speed (from an external point to your Internet connection) is faster than the upstream speed (from your Internet connection out to the rest of the Internet).

Anchor tenancy

An arrangement whereby government agencies can provide initial support to a venture by contracting for enough of the future product or service to make the venture viable in the short term. Long-term viability and growth must come primarily from the sale of the product or service to customers outside of these government agencies.

Backbone network

Transporting massive volumes of data traffic between cities and countries. There is no single backbone network, rather many networks in which service providers exchange traffic with other providers.

Backhaul

The process of transmitting data from multiple points to a central telecommunications backbone.

Bandwidth

The rate at which data may be transmitted through a telecommunications system. Bandwidth is defined in bits per second (e.g. 256kbps).

Broadband infrastructure

The physical network (e.g. cable, wireless transmitters, exchanges) that together create a telecommunications facility for the delivery of a broadband service.

Brownfields

Related to broadband infrastructure deployment, the term refers to a site which has already been developed to a significant extent, and having some form of telecommunications structure in place. Often, this infrastructure will be limited to the original copper wire based network.

Customer Access Networks

The infrastructure that connects businesses and households to the nearest exchange via either fixed line or wireless connections.

Dark fibre

Dark fibre is optical fibre infrastructure that is currently in place but is not being used. Optical fibre conveys information in the form of light pulses so the 'dark' means no light pulses are being sent. Dark fibre can refer to infrastructure that is in place but not yet ready to use.

Demand aggregation

This process brings potential buyers together to increase their purchasing power and establish a viable market, improving the availability and price of broadband infrastructure and services. Demand aggregation strategies can support emerging broadband markets where there may be pockets of existing or potential demand, which are either too small or too isolated in their own right to be commercially viable from an ISP's perspective.

Dial up

Internet access involves a modem-to-modem connection across telephone lines between the user and the ISP. The ISP then routes the connection to the Internet. Unlike broadband access, dial-up access is a transient connection, because either the user or the ISP terminates the connection. The maximum theoretical connection speed is 56kbps.

Greenfield

Related to broadband infrastructure deployment, the term refers to the development of a new real estate site (e.g. a new residential, commercial or industrial property development). Typically, it is a site without an existing telecommunications infrastructure.

High speed broadband

A broadband service which delivers data at rates capable of supporting next-generation services, such as interactive video, broadcast-quality television and videoconferencing.

Interoperability

A situation in which different network technologies can operate seamlessly within a single telecommunication infrastructure or across multiple infrastructures.

Latency

The amount of time it takes a single piece of data to travel from source to destination. Thus, the greater the distance between the originating and terminating points of a transmission, the greater the latency. Together, latency and bandwidth define the speed and capacity of a network.

Multimedia

The simultaneous use of several forms of media (e.g. text, audio, graphics, animation, video) to convey information.

Next Generation Network

A packet-based network able to provide multiple and diverse services. These include communications, transaction and content services using multiple broadband, quality of service-enabled transport technologies, and in which service-related functions are independent from underlying transport-related technologies. It offers unrestricted access by users to different service providers.

Spectrum

Spectrum is the distribution of radio communications wavelengths and frequencies. In the context of broadband spectrum allowance, this refers to the number and size of frequencies allowed for broadband services from the total spectrum available.

3G

The abbreviated descriptor commonly used in relation to third-generation mobile telephone technology. The services associated with 3G provide the ability to transfer both voice data (a telephone call) and non-voice data (such as downloading information, exchanging email, and instant messaging). Video telephony has often been used as the flagship application for 3G.

VoIP (Voice over Internet Protocol)

The routing of voice conversations over the Internet or through any other IP-based network.

Appendix One

Online and Communications Council

Online and Communications Council Members who assisted in preparation of the Broadband Blueprint either as part of the 8 September 2006 meeting or through written correspondence.

Australian Government	Senator the Hon. Helen Coonan (Chair) Minister for Communications, Information Technology and the Arts and The Hon. Gary Nairn MP Special Minister of State
New South Wales	Mr Graham West, MP, Parliamentary Secretary to the Minister for Finance
Victoria	The Hon. Marsha Thomson MLC, Minister for Information and Communication Technology; Consumer Affairs
Queensland	The Hon Robert Schwarten MP, Minister for Public Works, Housing and Information and Communication Technology
Western Australia	The Hon. Francis Logan, Minister for Energy; Science and Innovation
South Australia	The Hon Karlene Maywald MP, Minister for Science and Information Economy; River Murray; Regional Development; Small Business; and Minister Assisting the Minister for Industry and Trade

Tasmania	The Hon. Michael Aird MLC, Treasurer and Minister for Racing
Australian Capital Territory	Mr Jon Stanhope MLA, Chief Minister
Northern Territory	Mr Elliot McAdam MLA, Minister for Local Government; Housing; Corporate and Information Services; Communications; Central Australia; and Minister Assisting the Chief Minister on Indigenous Affairs; and Dr Christopher Burns MLA, the then Minister for Planning and Lands; Infrastructure and Transport; Public Employment; Corporate and Information Services; Communications (Mr McAdam's predecessor)
Australian Local Government Association	Councillor Paul Braybrooks

Appendix Two

Industry Reference Group

Members of the Industry Reference Group convened by Minister Coonan to assist in the preparation of the Broadband Blueprint. The Group convened on two occasions 17 July 2006 and 11 August 2006.

Mr Paul Cameron	General Manager, IT Infrastructure, Suncorp Ltd
Mr Dick Estens	Chair, Regional Telecommunications Inquiry (2002)
Mr Ross Fowler	Managing Director, Australia and New Zealand, Cisco Systems Ltd
Ms Ros Hill	Manager, eHealth Planning Unit, Division of Community, Population and Rural Health, Department of Health and Human Services, Tasmania
Dr Terry Percival	Director, Neville Roach Laboratory, National ICT Australia
Dr Michael Sargent	Chair, National Collaborative Research Infrastructure Strategy



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