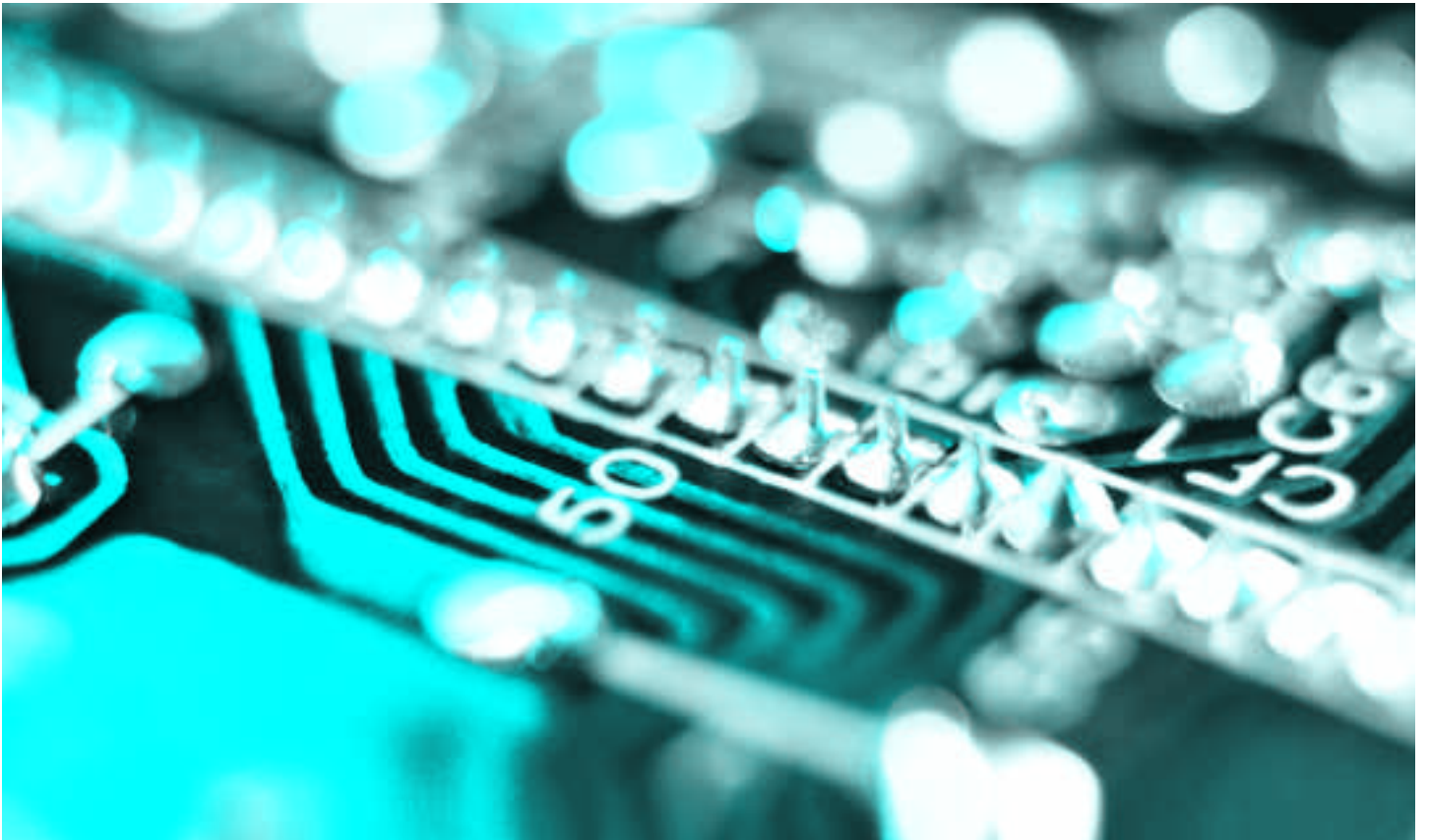


AUSTRALIA'S BROADBAND CONNECTIVITY

The Broadband Advisory Group's Report to Government



AUSTRALIA'S BROADBAND CONNECTIVITY



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FOREWORD

The Broadband Advisory Group (BAG) has developed recommendations to contribute to the Commonwealth Government's strategic review of broadband policy. The group was formed in March 2002 to advise the Government on broadband issues and has consulted widely with stakeholders and the public. Major themes to emerge have been the great potential of broadband to boost economic growth and the importance of a coordinated national approach to broadband connectivity. This will ensure that Australia has the infrastructure necessary to support innovation and productivity growth, underpinning future economic prosperity in an increasingly open and competitive global economy.

This report raises the principal issues associated with broadband development in Australia and identifies opportunities for action. It should be read with recent reports from other inquiries into Australian communications capabilities, including the Estens Regional Telecommunications Inquiry (RTI) and the House of Representatives inquiry into wireless broadband technologies. This should help to advance the Government's Strategic Framework for the Information Economy, of which broadband connectivity is a key priority.

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EXECUTIVE SUMMARY

Broadband communications technologies can deliver substantial economic and social benefits to Australia. They reduce the constraint of distance and greatly increase the quality of communications in many sectors. Their defining characteristics (fast, always-on) enable a paradigm shift in the way people or resources (such as computers) interrelate. In short, broadband technologies can transform the way people live, work and do business.

This is being recognised across the industrialised world, making the development of broadband and wider national information infrastructures a key policy issue for many governments. In the words of United States Federal Communications Commission Chairman Michael Powell, 'The widespread deployment of broadband infrastructure has become the central communications policy objective today.'¹

In March 2002, the Federal Government established a Broadband Advisory Group (BAG) to provide high-level advice on the development of the broadband market in Australia and to conduct a strategic review of broadband policy with a view to stimulating the availability and take-up of broadband. The BAG process has taken place alongside other inquiries into Australia's telecommunications market.

The focus of this report is primarily on sectors such as education, health, government services and, more generally, across rural and regional Australia, recognising the clear public interest case for Government action in these areas.

Government can also best affect those sectors of the broadband environment where it is a substantial participant or where private sector organisations may be reluctant to invest. As the first generation internet has shown, sectors such as health and education are proven pioneers in the creation and rollout of advanced networks.

The Broadband Advisory Group has made 19 recommendations to Government based on extensive consultations with all tiers of government and industry stakeholders.

RECOMMENDATIONS

Vision (Section 3)

1. Australia should adopt the following national vision for broadband:
'Australia will be a world leader in the availability and effective use of broadband, to deliver enhanced outcomes in health, education, commerce and government and to capture the economic and social benefits of broadband connectivity.'

Goals (Section 3)

2. Australia should adopt the following national goals for broadband:
 - (a) Broadband should be available to all Australians at fair and reasonable prices
 - (b) Market arrangements should be pro-competitive and encourage investment in infrastructure, services, applications and content, and should advance the long term interests of end users.

1. Powell, Michael - *Digital Broadband Migration Part II, Press Conference, 23 October 2001*
<http://ftp.fcc.gov/Speeches/Powell/2001/spmkp109.txt>

National Strategy and Implementation (Section 3)

3. The Government should adopt a National Broadband Strategy, in cooperation with all levels of government and industry stakeholders, based on the vision, goals, objectives and principles outlined in Section 3 of this report.
4. The Government should establish a National Broadband Strategy Implementation Group to oversee implementation of the actions in the national strategy and to review and evaluate its progress. The Group would also:
 - (a) In cooperation with all levels of government and industry stakeholders, develop a national broadband infrastructure planning framework to identify ways in which individual broadband infrastructure elements can be aggregated to form a national broadband network.
 - (b) Coordinate the activities between the public and private sectors to accelerate the deployment and take-up of broadband applications and services.

Strategic Investment (Section 4)

5. The Government should identify areas that are unlikely to receive services on a commercial basis at fair and reasonable prices within an acceptable timeframe.
6. The Government should consider initiatives, investment incentives and public-private partnerships to develop services that may not be commercially viable, but which could potentially deliver significant economic, security and social benefits. These should be predominantly but not exclusively focused on rural and regional Australia and should take into account the outcomes of the process in Recommendation 5.

Strategic Coordination (Section 5)

Demand Aggregation (Section 5)

7. All tiers of government should cooperate to develop demand aggregation strategies to stimulate broadband investment and provision of services in the key sectors, such as health and education, and also in regional areas. Demand brokers could be used to assist rural and regional communities and sectors to develop broadband services.

Education (Section 5)

8. All schools and educational institutions should be connected to broadband internet services to facilitate research, support interactive learning and provide access to innovative and varied curriculum content.
9. The Government, in cooperation with state and territory governments, education stakeholders and cultural and media institutions, should implement initiatives to ensure high-quality email and web browsing services in schools and educational institutions. This should include the development of a nationwide intranet for content and curriculum interaction among schools, training and key cultural institutions.

Research (Section 5)

10. The Government should give priority to establishing an Australian Research and Education Network which meets the domestic bandwidth needs of higher end research in universities, in keeping with the proposals in the report of the Higher Education Bandwidth Advisory Committee, *A Framework for an Australian Research and Education Network*.
11. The Government should give priority to ensuring that Australia can participate effectively in collaborative global research and learning networks.

Health (Section 5)

12. The Government, in cooperation with state and territory governments and industry stakeholders, should develop an implementation plan for connectivity infrastructure to achieve improved health outcomes and efficiency of the health system through eHealth initiatives such as teleradiology, telehealth applications and electronic patient health records.

SMEs (Section 5)

13. The Government, in cooperation with industry stakeholders and state and territory governments, should ensure the availability of independent data and statistics on SME broadband take-up trends, intentions and influences.

14. The Government should encourage increased take-up of broadband by SMEs to deliver improved economic growth and employment levels. The Government should also encourage industry associations to develop industry-based or regionally-based broadband business case workshops for SMEs.

Information Economy Environment (Section 5)

15. The Government should implement initiatives to develop a culture of security and authentication to encourage market confidence in broadband applications. The BAG supports the Government's recently announced initiatives designed to protect Australia's critical infrastructure.

Strategies to promote broadband content, applications and awareness (Section 6)

Content

16. The Government should give high priority to stimulating the digital content industries in Australia through:

- (a) supporting research and development in the application and design of interactive broadband technologies and content

- (b) working with industry stakeholders to develop an effective digital rights management regime

- (c) ensuring that the Federal Government's Intellectual Property (IP) policies are not acting as a barrier to the development of digital content industries. This may include encouraging a more flexible approach for Government agencies in dealing with Crown copyright

- (d) improving access to international distribution channels for the output of Australia's digital content industries.

Encouraging Take-up

17. The Government, in cooperation with state and territory governments and industry stakeholders, should develop and provide detailed information to key sectors about the benefits of broadband applications, such as educational opportunities, improved health care, business process improvement, productivity gains and better government services.


Flexible regulatory regime and policy setting (section 7)

18. The Government should:

- (a) commit to refine the regulatory regime as required to ensure that it continues to advance the long term interests of end users and to promote facilities and services based competition

- (b) require the ACCC to monitor and report on progress in ensuring an open, competitive and interoperable broadband market

- (c) request the ACCC to investigate and report on industry concerns regarding domestic internet peering arrangements and provide the Minister for Communications, Information Technology and the Arts with recommendations on how this matter may be appropriately addressed.



Measurement, monitoring and evaluation (section 8)

19. The Government should monitor and evaluate the implementation of the national strategy to ensure effective outcomes. This should include measurement of Australia's international position in relation to the availability and effective use of broadband in key sectors. The Government should also encourage the OECD to introduce mechanisms that measure the effective use of broadband and not merely take-up.

1 WHY IS BROADBAND IMPORTANT?

1.1 Productivity

Harnessed effectively, broadband connectivity will be a key driver of Australia's Gross Domestic Product (GDP), jobs and wages growth. Broadband technologies will be the roads and railways of the 21st century, generating the next wave of economic expansion. Just as transport opened up new economic horizons in the last century, advanced communication networks will pave the way for productivity gains across global economies in the new century.

What quantum of productivity gains might be possible? Accenture² estimates that next generation broadband could produce economic benefits of \$12 billion to \$30 billion per annum to Australia. This assumes that broadband is adopted as universally as the telephone over the next 25 years. A policy of encouraging widespread broadband adoption could deliver accelerated economic value within years rather than decades.

In the United States studies have estimated that widespread, high-speed broadband access could increase US GDP by US\$500 billion by 2006³ and that building and using a robust, nationwide network will expand US employment by an estimated 1.2 million new and permanent jobs⁴.

Broadband technologies make a range of networked communications possible, many of which are not apparent using first generation internet technologies. The 'always-on' network effect will also change business and user behaviour and revolutionise the way content and services are delivered and managed. Innovative use of broadband connectivity will be critical to Australia's ability to participate and compete in the global economy.

As Thomas Friedman has said:

'Jobs, knowledge use and economic growth will gravitate to those societies that are the most connected, with the most networks and the broadest amount of bandwidth – because these countries find it easiest to amass, deploy and share knowledge in order to design, invent, manufacture, sell, provide services, communicate, educate and entertain. Connectivity is now productivity⁵.'

Several industrialised nations have recognised the economic advantages of broadband connectivity and are implementing comprehensive national broadband strategies. The OECD has said that it is crucial to build strong broadband access in the immediate future as the technology gains prominence in fields that go well beyond communications policy:

'One reason is the role advanced communication capabilities play in generating higher growth in productivity rates, as well as new network-based economic activities. If new communication tools such as the Internet and wireless networks boosted growth in the latter half of the 1990s, then the next steps towards broadband are of critical importance⁶.'

Key decision-makers in major Western economies, including the United Kingdom, Canada and the United States, concur. The next steps towards broadband access are critical for Australia's future productivity and growth. If we lose momentum, we may be left behind in the wake of countries whose policy makers are enthusiastically embracing these emerging technologies.

2 Accenture, *Innovation Delivered – Broadband for Australia, An Economic Stimulus Package, 2001*, p8.

3 Crandall and Jackson, *Criterion Economics Study The \$500 Billion Opportunity: The Potential Economic Benefit of Widespread Diffusion of Broadband Internet Access, July 2001*.

4 New Millennium Research Council Study *Building a Nationwide Broadband Network: Speeding Job Growth, February 2002*.

5 T. Friedman, *The Lexus and the Olive Tree*, London, HarperCollins, 2000.

6 OECD, *OECD Information Technology Outlook 2002*, p 246.

1.2 Service delivery revolution

Broadband technologies will stimulate Australia's economic growth by revolutionising the way services are delivered and business is conducted. In short, broadband enabled technologies will change the way Australians live, work and do business. This is particularly true in service sectors such as health and education, as well as research, national security and general government.

Australia faces expanding demand for health care, fuelled by the availability of new treatments and the ageing of the population. Current health expenditure is 8.5 per cent of GDP and is expected to double in the next 40 years⁷. Connectivity in the health sector will help address the need to deliver health services to all Australians, regardless of where they live or work. Broadband technologies can help to contain costs, improve services and deliver better health outcomes.

High bandwidth applications are transforming distance learning programs in schools and allowing students and teachers access to interactive content. Broadband is also enabling tertiary students to use cutting-edge course materials from campuses around the world.

Broadband applications, which allow videoconferencing and facilitate large data-set transmission, are being used to integrate Australian researchers into global networks. Broadband applications such as graphics-intensive visualisation and simulation are also increasingly important tools for both industry and the consumer market. By providing a rich communications experience unable to be achieved with narrowband, broadband makes new business and service models feasible. These technologies will allow small and medium enterprises (SMEs) to become more efficient and to streamline their production and supply processes. Better networking capabilities will allow them to collaborate and supply to global markets.

As well as producing productivity gains in traditional and new industries, advanced connectivity can enrich community life,

particularly in rural and regional areas. It provides the basis for integration of remote communities into national economic, cultural and social life.

The broadband debate has tended to dwell on how to exploit existing telecommunications infrastructures effectively. This is an essential first step in broadband development. Small business operators and consumers need to recognise the value proposition in broadband-enabled services in ways that they can relate to and understand. For many, the killer application is that the service is always-on and faster, as well as more cost effective as a result of bundling telephony and data.

However, it is also important to focus on enabling the emergence of next-generation networked services. These involve the delivery of personalised transactional services and new delivery channels for service industries. This is the true broadband of the future. The challenge is to maximise the opportunities of current and emerging broadband services while ensuring that Australia is positioned to participate effectively in the next stage.

1.3 Definition

Broadband refers to the ability of a single access line or wireless or satellite link, connected to a telecommunications network, to provide support for fast, always-on access to digital content, applications and a range of services, some or all of which can occur simultaneously.

This definition deliberately focuses on functionality rather than speed. The critical aspect of broadband is what it allows a user to do. The first generation of internet services used dial up modems and standard ISDN links to connect users to the internet at 'narrowband' speeds. The second 'broadband' generation of internet services depends on ADSL, cable modems and certain corporate and satellite data connections. This level is usually described as 'broadband' if it provides always-on data services of 200 kilobits per second (Kbps) or more.

However, there are those who argue the term 'broadband' should only apply to a third generation of services with connection speeds of 10 megabits per second (Mbps) or greater on the basis that it is only at these speeds that broadband becomes something more than a faster version of today's Internet services.

The BAG has included both second and third generation technologies in its consideration of broadband. Second generation services are becoming widely available, and require immediate attention, but it is also important to focus on issues likely to arise in the transition to next generation broadband services.



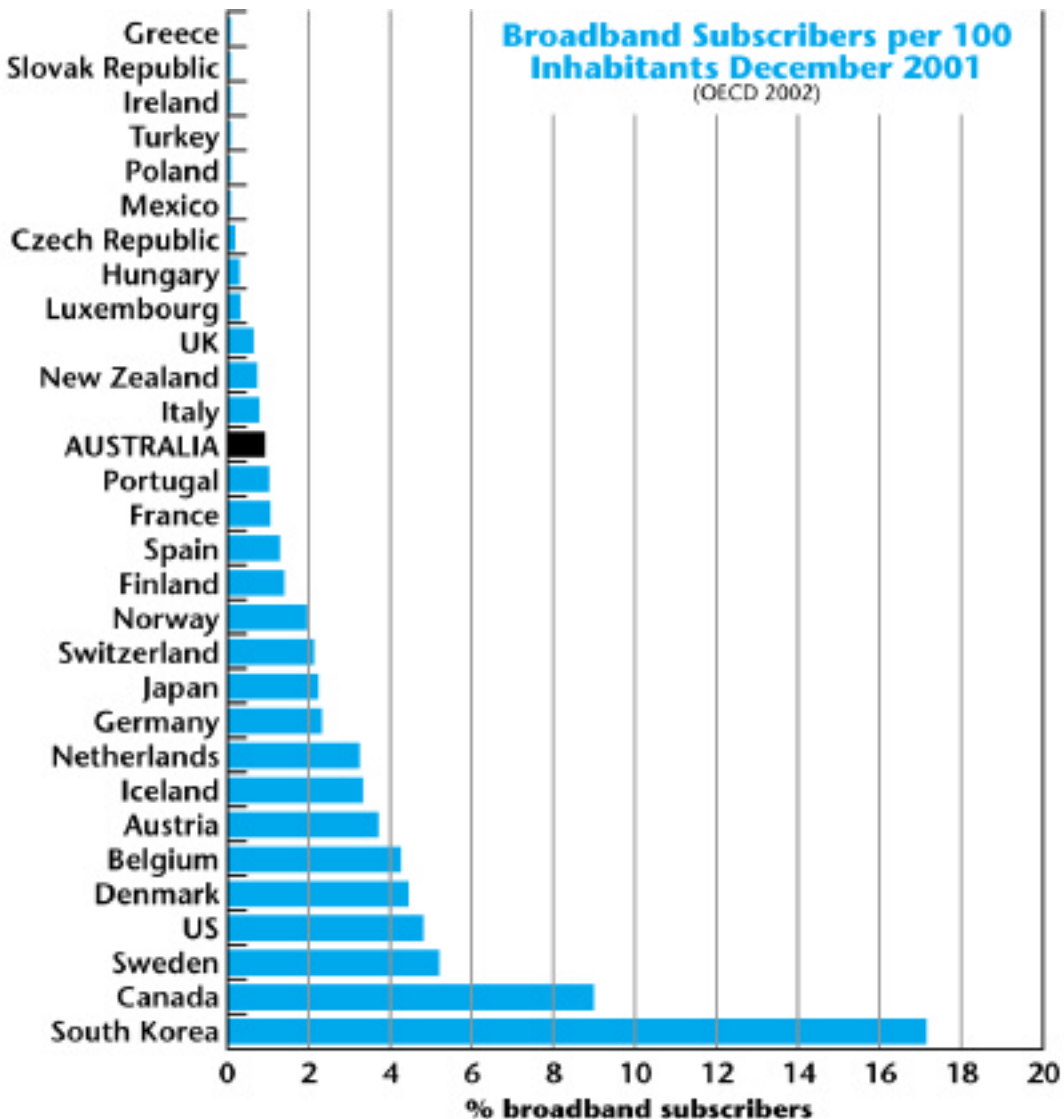


2 STATE OF PLAY AND GOVERNMENT INITIATIVES

2.1 Recent Growth

Australians have been quick to adopt earlier generations of communications technology such as faxes, mobile phones and the internet. Like most developed nations we were slow to start with broadband but we are now beginning to climb the broadband adoption curve for second generation services.

OECD research indicates that in December 2001 Australia was ranked 18th in broadband penetration out of 30 OECD countries⁸. However, as the graph below illustrates, Australia is in the middle of the pack and there are very few countries that have achieved a high rate of broadband penetration.





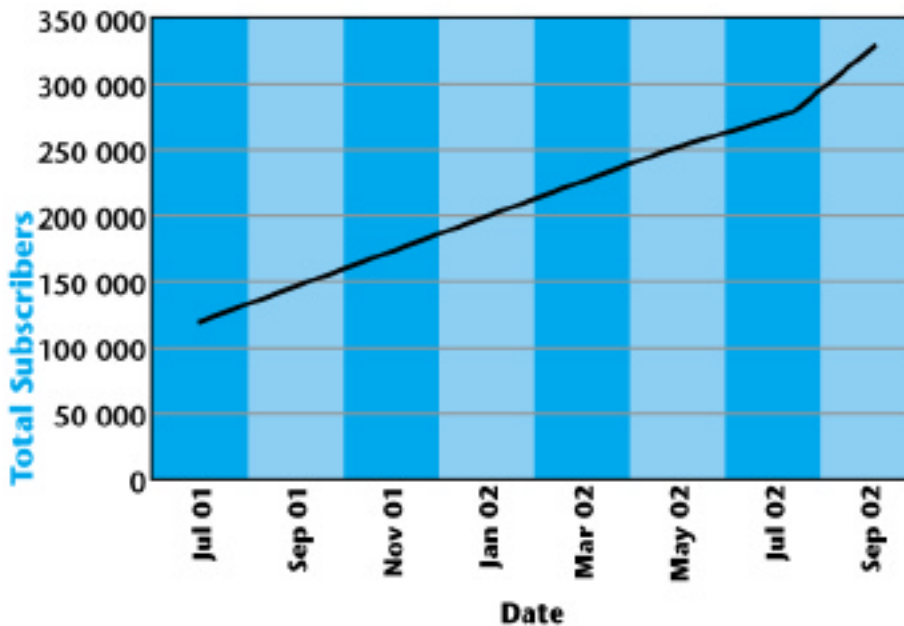
According to the Australian Competition and Consumer Commission (ACCC), which tracks broadband take-up there was a 162 per cent increase in broadband take-up in Australia between 31 July 2001 and 30 September 2002. Over the same period the number of business customers increased by 333 per cent (now 71 500) and the number of residential customers increased by 97 per cent (now 204 900). Significantly, there was a 23 per cent increase in take-up in the June to September 2002 quarter.

Recent growth has been fuelled mainly by increased take-up of DSL and ADSL technology and reflects a broader consumer awareness of broadband services. A more detailed discussion of the measurement of take-up and success is provided in the findings against the terms of reference (Appendix 1).

2.2 Government Initiatives

The Commonwealth Government has implemented measures to guide the development of the broadband environment. The foundation for an advanced communications market was laid in 1997, with the introduction of full and open competition that changed the telecommunications market to deliver positive outcomes for consumers, including improved choice and lower prices.

There are now more than 80 licensed carriers in Australia, with many of these providing competitive broadband services. According to a recent ACA/Allens Consulting study the Australian economy was \$10 billion larger in 2001-02 than it would have been without the Government's telecommunications reforms⁹. The study estimated the reforms had led to the creation of 100,000 new jobs in the Australian economy, consumer benefits of between \$595 and \$878 per household, and \$900 million in increased profits for small business.



Source: <http://www.accc.gov.au/telco/fs-telecom.htm>

⁹ The Allen Consulting Group Benefits Resulting from Changes in Telecommunications Services Report for the Australian Communications Authority, October 2002 p v.

The Government has also made considerable investments in broadband and other telecommunications infrastructure through targeted programs:

- The \$50 million **National Communications Fund** to deliver broadband infrastructure and applications to improve education and health services delivery to regional Australia.
- The \$36 million **Advanced Networks Program** to support the development, testing and demonstration of advanced networks that will deliver long term benefits to the Australian economy.
- The \$464 million **Networking the Nation Program** to help bridge the telecommunications gap between urban and regional Australia.

Compelling digital content will be a key driver of demand for broadband services. Recognising this, the Government has taken steps to promote the development of broadband content:

- The \$2.1 million **Broadband Content Fund** to provide seed funding for Australian content producers to pursue opportunities in new broadband applications.
- The **Copyright Amendment (Digital Agenda) Act 2000** to reform intellectual property rules to protect the rights of content developers.
- Projects to improve interoperability – to enable the transfer and use of business-critical information across multiple organisations and technology systems, and builds confidence in technology's ability to meet these aims.
- \$12.4 million for a new Cooperative Research Centre for Interaction Design to undertake research into human interaction with emerging technologies and design, with focus on sectors such as computer games, interactive television and digital media art.
- The \$68.2 million Le@rning Federation – to develop online educational content for schools (50 per cent contributed by state and territory governments).

In addition, most state and territory governments have plans and initiatives for broadband services, reflecting the significance of broadband infrastructure for regional economic development and the delivery of health, education services and general government services. For example, the NSW Government is evaluating expressions of interest for the supply of broadband solutions for government agencies that encourages private sector use of state owned fibre assets and other state owned telecommunications infrastructure. It also recently awarded tenders to provide a new \$247 million broadband system to nearly 2400 schools and TAFEs, making Internet connections more than 30 times faster for students.

Similarly, the Victorian Government established the Telecommunications Purchasing and Management Strategy to provide a strategic framework for the procurement and management of telecommunications services across the whole of government, linked to a Regional Connections Strategy. Queensland has implemented the \$172 million REEF network deploying 1820 km of underground fibre from Brisbane to Cairns to improve communications services in regional areas, particularly where services were previously unavailable. In relation to education specifically, the Western Australian government is investing \$90 million over three years to connect all schools to broadband and in the ACT all schools have been connected to the local broadband network operated by TransACT.

2.3 Feedback on initiatives

The **Networking the Nation (NTN)** program was deliberately designed to be responsive to local circumstances and local initiatives in rural and regional communities, and decision-making was required to be at arm's length from government and to take account of rural and regional contexts. During consultations, state and territory governments and industry stakeholders confirmed the positive outcomes from this initiative, such as concrete services and increased communications, as well as increased awareness and training in rural and regional areas. However, a number

observed that following the completion of the NTN program there will be scope for a second stage of coordination.

Many stakeholders praised the catalytic effect of the **National Communications Fund**. The process of negotiating consortia and preparing applications encouraged collaboration between agencies in state and territory governments. Similarly, the **Advanced Networks Program** was viewed positively. Some stakeholders called for another round of funding to join regional universities to the advanced network available to universities in capital cities.

Overall, the BAG noted that outcomes from funding initiatives of Commonwealth, state and territory governments will be enhanced if they go the next step to achieve higher-level outcomes and potential network effects from investments as part of a strategic, coordinated national plan.

2.4 International approaches

Canada

The Canadian Government's Connecting Canadians strategy outlines a commitment that all Canadian communities will have access to broadband by 2004 as part of its broader commitment to make Canada the most connected country in the world.

The Canadian National Broadband Taskforce set out a range of recommendations for government funding of initiatives to achieve this goal in July 2001. The Canadian Government has not formally responded to the report, however it has implemented a broad range of strategies to assist broadband deployment and take-up, including:

- establishing up to 10,000 public Internet access sites in rural, remote and urban communities and helping to connect Canada's public schools and libraries to the Internet

- supporting the deployment of broadband services to Canadian communities that currently have no high-speed Internet access through the **Broadband for Rural and Northern Development Pilot Program**
- developing **CA*net**, a broadband network linking Canadian research institutions and universities
- support for the development of on-line content and broadband demonstration projects

Individual provinces have also been active in developing local networks.

United Kingdom

Recognising the potential provided by broadband for the health and education sectors, Prime Minister Blair recently announced that the Government will deliver:

- broadband connections to every school by 2006
- broadband connectivity for every GP surgery, every hospital and every Primary Care Trust in the country.

The United Kingdom has set a national target for the UK to have the most extensive and competitive broadband market in the G7 by 2005. This strategy was outlined in the Government report *UK Online: The Broadband Future*, which established a Broadband Stakeholder Group to develop a detailed strategy for meeting that target. A framework of 16 detailed recommendations was put forward, including supply-side measures such as infrastructure sharing, competition measures, local loop unbundling, measures to promote content development, fiscal incentives to accelerate take-up and public sector demand aggregation measures.

The key principles of the Government's initiative include:

- providing a stable macroeconomic environment and flexible and efficient labour and capital markets

- ensuring a stable and predictable regulatory environment for communications providers, which promotes competition wherever possible and effective regulation where not
- leveraging European regional development funding to assist broadband development
- establishing more effective procurement of the public sector's broadband requirements to improve value for money and the availability of broadband.

The strategy involves encouraging broadband rollout in rural areas without providing financial incentives.

France

In 2001 the French government set itself a target to provide a 2Mbps connection at an affordable cost to anywhere in the country by 2005. According to some estimates, 20 to 25 per cent of the population will not have high speed access to the Internet within this time through the existing telecommunications providers.

The French Government has developed a three-pronged approach to address this issue:

- encouraging local authorities to invest in telecommunications infrastructure and in content development that is likely to drive demand
- providing a mandate to the state owned bank **Caisse des Dépôts et des Consignations(CDC)** to support new telecommunications infrastructure and content projects
- encouraging the use of electricity networks to facilitate the provision of fibre optic networks between areas outside cities.

Sweden

The Swedish Government's aim is for all citizens to have at least 5 Mbps to the home by 2005. The strategy is based on improving access and addressing the digital divide. Approximately US\$1 billion was earmarked to support a fibre optic network with a four-level hierarchical structure.

- **Backbone network**- the top level of the network, linking the principal town in each of the 289 administrative areas.
- **Regional networks**- a network within each of the 289 administrative areas to connect the local communities in those areas and interconnect with the backbone network.
- **Local access networks**- a fine meshed distribution network within a local community intended to give private and commercial subscribers access to the higher level networks.
- **Private access**- private access networks serving, for example, a residential building or an industrial campus. This assistance is provided through tax deductions.

United States

The United States has a multi-faceted approach to assisting broadband deployment. The Federal Government's approach is underpinned by providing a competitive regulatory environment and removing hurdles to broadband deployment. Initiatives also include:

- providing grants, loans, and loan guarantees to improve access to broadband telecommunications services in rural areas through the 2002 Farm Bill
- extending the Internet tax moratorium and research and experimentation tax credit
- modifying tax depreciation schedules to allow companies to depreciate the capital costs associated with broadband roll-out over a shorter time period

- 
- making broadband demand a priority of the President's Committee of Advisers on Science & Technology

Korea

In 2002, South Korea's Ministry of Information and Communication announced a plan to deliver Internet connections of at least 1 Mbps and preferably 20 Mbps to every household by 2005. South Korea already has over 10 million broadband Internet connections giving it the highest penetration rate of such services. Over the three-year period, the government's plan involves:

- encouraging the industry to invest US\$10.9 billion in their broadband networks
- providing loans to the industry to increase the number of homes passed by broadband from 55% of Korean homes to 70% by the end of 2002

Other recent initiatives have included:

- investing US\$1.2 billion in high speed networks
- providing free broadband connections to schools

3 A NATIONAL BROADBAND STRATEGY AND IMPLEMENTATION FRAMEWORK

RECOMMENDATIONS

Vision

1. Australia should adopt the following national vision for broadband:

'Australia will be a world leader in the availability and effective use of broadband, to deliver enhanced outcomes in health, education, commerce and government and to capture the economic and social benefits of broadband connectivity.'

Goals

2. Australia should adopt the following national goals for broadband:
 - (a) Broadband should be available to all Australians at fair and reasonable prices
 - (b) Market arrangements should be pro-competitive and encourage investment in infrastructure, services, applications and content, and should advance the long term interests of end users.

National Strategy and Implementation

3. The Government should adopt a National Broadband Strategy, in cooperation with all levels of government and industry stakeholders, based on the vision, goals, objectives and principles outlined in Section 3 of this report.
4. The Government should establish a National Broadband Strategy Implementation Group to oversee implementation of the actions in the national strategy and to review and evaluate its progress. The Group would also:
 - (a) In cooperation with all levels of government and industry stakeholders, develop a national broadband infrastructure planning framework to identify ways in which individual broadband infrastructure elements can be aggregated to form a national broadband network
 - (b) Coordinate the activities between the public and private sectors to accelerate the deployment and take-up of broadband applications and services.

3.1 Australia's place in the global information economy

The Government's main objective for the digital economy should be to stake Australia's claim to a disproportionate share of the benefits of the emerging global information economy. This will involve the successful adoption of regulatory, industrial and cultural structures. A number of countries have recognised this and are developing new communications infrastructure, advancing the skills of their populations and promoting policies that encourage innovation and creativity in the services and content sectors.

Broadband networks will be an important enabler, providing key infrastructure for the information economy. Just as road and rail infrastructure has been critical to the effective functioning of an industrial economy, so is broadband infrastructure critical for the information economy.

There are two important reasons why a holistic approach to broadband should be adopted. The first is the pursuit of economic efficiency and innovation. Broadband networks are a platform for economic growth and structural transformation. The second is 'nation-building' or 'community-building'. Broadband networks are a platform for enhancing social, cultural and national cohesion.

3.2 Where do we want to be?

Vision

If Australia is to achieve these outcomes we must have a clear vision of what we are aiming for as a nation. The recommended vision has several important elements. It aims to position Australia as a leader, not simply in the take-up of broadband but in its effective use. This is a significant departure from the basis on which international comparisons have been made to date. While take-up is a useful measure

it is simplistic because it does not address the real driver of enhanced outcomes in key sectors and of improved economic and social benefits.

This shared understanding of where we are heading and why will be an essential foundation for cooperation between all levels of government and industry in accelerating the rollout of broadband infrastructure.

Goals

The recommended goals deal directly with the potential impediments to Australia's take-up of broadband most frequently raised during the BAG's consultations. These were price, availability and lack of competition, particularly in the last mile.

The Government should make a clear commitment to overcoming these impediments by setting the following national goals:

- The availability of broadband to all Australians at fair and reasonable prices; and
- Market arrangements that are pro-competitive and encourage investment in infrastructure, services, applications and content, to advance the long term interests of the end users.

According to a recent international report by A T Kearney, the prices of broadband services in Australia compare favourably with other industrialised countries, with ADSL and cable pricing amongst the lowest in the world¹⁰. Despite this, the cost of broadband services is frequently claimed to be a major impediment for potential broadband users. The Estens Regional Telecommunications Inquiry provided some support for this position in so far as it found that some regional users pay higher prices for broadband services than metropolitan users. A T Kearney concluded that greater government support, compelling content and aggressive marketing will make the difference. Ultimately, potential business and consumer users, must make their own assessment of the value proposition of enhanced services. The challenge for broadband service providers is to achieve a

balance between affordability and value for consumers and pricing that allows suppliers of broadband services to make a reasonable return on investment. Pricing and availability are complex market issues of supply and demand. These issues are covered in more detail in Appendix 1.

The level of international prices has been the subject of regular criticism, particularly by non-Tier 1 carriers and ISPs as a factor that contributes to higher relative broadband data charges in Australia. Diplomatic efforts to address inequitable international pricing should be continued as a priority.

Whilst there is some community concern that there is no real competition in the customer access network (CAN), evidence of competition is emerging in the delivery of broadband services (more detail is provided in Sections 7.1 and 7.2). If the broadband market is to continue to develop, the regulatory framework must concentrate on encouraging efficient market outcomes, sustainable competition and removing barriers to entry. It is also important that the focus be not simply on market arrangements that encourage investment on the supply side but also as on the demand side in the development of services, applications and content.

3.3 Objectives

A national broadband strategy should aim to maximise the following:

- Productivity by providing a platform for Australian innovation and transforming the economy, enhancing GDP, employment and wage growth.
- International competitiveness by enabling the integration of Australian companies into global supply chains, encouraging new business strategies and models, and providing a platform for Australian scientists and engineers to participate in advanced technology activities on the international stage.
- Quality of services available to all communities through innovative e-learning, e-health and e-government applications.
- Communities by strengthening the social cohesion of regional and remote communities and providing support for community networks in urban environments.
- The information economy environment by developing a range of building blocks to promote market confidence in broadband applications, including interoperable systems, e-security and awareness of the benefits of broadband.
- Choices in work and recreation activities available to all Australians independent of location, background, age or interests.

3.4 Principles

In realising these objectives, a National Broadband Strategy should adopt these principles:

- Coordinated infrastructure development: private industry stakeholders, Commonwealth, state, territory and local governments should work together to encourage the development of broadband infrastructure, applications and services, concentrating on market failure such as lack of information and other impediments to infrastructure investment. Commonwealth Government and state urban and regional planning processes should incorporate a consideration of relevant telecommunications planning issues.
- Efficient resource allocation and competitive markets: broadband policies, regulation and other initiatives should be transparent and flexible and should build foundations for sustainable contestable markets, including competitive technology solutions.
- Access: all Australians should have the opportunity to access broadband services at fair and reasonable prices.
- Innovation: Australia should pursue continuous innovation and productivity improvements by enhancing global connectivity for research and

development, and by developing world class, innovative broadband technologies, applications, content and services.

- Policy responsiveness: policies should be regularly measured and re-evaluated in the light of emerging market conditions. Policy settings and programs should be similarly responsive and adaptive.

3.5 National Broadband Strategy Implementation Group

To achieve the national vision and goals, all levels of government, industry stakeholders, the corporate sector and community groups need to work as partners on a national approach to broadband issues that is responsive to a dynamic communications environment. This requires a stated commitment from leaders in the public and private sector to work strategically to develop broadband infrastructure and innovative applications.

A National Broadband Strategy Implementation Group should be established with representation from these key sectors. The Group would be responsible to the Minister for Communications, Information Technology and the Arts and would report to the Online Council. It would oversee the implementation of the national strategy and the associated initiatives recommended in this report. It would also review and evaluate the progress of the national strategy and its initiatives.

A diagram showing the operational relationships of a National Broadband Strategy Implementation Group is contained in Appendix 3.

3.6 National Broadband Infrastructure Planning Framework

An important role for the National Broadband Strategy Implementation Group

will be to develop a national broadband infrastructure planning framework, in order to identify the ways in which individual broadband infrastructure elements should be aggregated to create a national broadband network. It would maximise the impact of public infrastructure spending through improved coordination. This would provide a model that leverages, encourages and coordinates public and private sector collaboration around agreed national, interregional and local priorities.

A national broadband infrastructure planning framework would make it possible to prioritise public sector broadband investment and programs, measuring government initiatives against:

- National Broadband Strategy objectives and principles, recognising that not all aspects will be relevant to any given project
- the benefits likely to be achieved by the proposed service delivery outcomes.

3.7 Demand and Supply Objectives

Another role for the National Broadband Strategy Implementation Group would be to liaise with appropriate government and industry stakeholders in key sectors to define appropriate sectoral goals as a component of the national strategy. Relevant sectors would include education, health, commerce and government. Other demand-side goals would need to be developed for research and development in broadband access, services, content and applications. Existing programs should be reviewed and updated regularly in the context of the national vision and goals.

Similarly, the National Broadband Strategy Implementation Group would liaise with appropriate representatives on the supply-side to develop appropriate goals for the national strategy in competition, deployment and regional access. Supply side goals would need to have due regard to the service performance and price monitoring roles of the ACA and ACCC.

4 STRATEGIC INVESTMENT

RECOMMENDATIONS

Strategic Investment

5. The Government should identify areas that are unlikely to receive services on a commercial basis at fair and reasonable prices within an acceptable timeframe.
6. The Government should consider initiatives, investment incentives and public-private partnerships to develop services that may not be commercially viable, but which could potentially deliver significant economic, security and social benefits. These should be predominantly but not exclusively focused on rural and regional Australia and should take into account the outcomes of the process in Recommendation 5.

4.1 Rationale for Strategic Investment

The key outcome from strategic investment will be an effective national network that will be a platform for innovation and productivity gains. It is evident that some areas will not receive services through market forces and the following guiding principles should be used in relation to any strategic investment from governments:

- Market responsiveness: Actions should foster market responsive solutions to broadband issues to ensure sustainable solutions that foster innovation and investment
- Non-distortion: Government action should not distort investment in the market by 'picking winners' in technology or by entrenching market dominance of existing service providers
- Leverage of private sector spending: Governments should work in partnership with the private sector to leverage their respective investments and strive for a coordinated approach to developing infrastructure and applications solutions.

4.2 Rural and Regional

Estens Regional Telecommunications Inquiry

The report of the Estens Regional Telecommunications Inquiry identified the need for certain additional actions to address the communications needs of people in regional, rural and remote areas. Of particular interest is the recommendation that:

'The Government should establish an incentive scheme for the provision of higher bandwidth services to regional, rural and remote areas, to enable all Australians to have access to services at prices comparable to those prevailing in metropolitan areas.'¹¹

The report further recommends that 'the incentives should be targeted to those areas where services of a designated price and functionality, comparable to what is available in metropolitan areas, are not commercially available, and are not likely to be available in the immediate future'¹². The implementation of such an incentive scheme is supported in principle.

¹¹ D. Estens, *Connecting Regional Australia, The Report of the Estens Regional Telecommunications Inquiry*, p228.

¹² *ibid* p 229.

If the Government were to implement such an incentive scheme it is recommended that:

- (a) The process of identifying areas unlikely to receive services on a commercial basis within a reasonable timeframe at fair and reasonable prices (BAG Recommendation 5) become a key component to inform the implementation
- (b) The implementation of the incentive scheme should be built into the infrastructure planning mechanism developed by the National Broadband Strategy Implementation Group
- (c) The brokers discussed in section 5.1 and Appendix 4 of this report be given a clear role in working with communities, business and government services sectors to assist in coordinating demand aggregation in relation to the incentive scheme. These brokers will make information available to allow for informed decision-making and should be an extension of existing sectoral, regional and local organisations.

4.3 Strategic Use of Special Purpose Infrastructure

The National Broadband Strategy Implementation Group should give priority to building on existing special purpose infrastructure, which could then be used to bridge infrastructure gaps where private sector investment is lacking, particularly in regional areas. Possible special purpose infrastructure that could be used to supplement general telecommunications infrastructure includes state-owned railway fibre, utility infrastructure and the Australian Research and Education Network (AREN). With regard to higher education infrastructure, for example, the network could extend long haul capacity from major cities to regional centres and act as a regional hub for regional telecommunications service providers of local access. This concept also underpins the NSW Government's call for expressions of interest for supply of broadband solutions maximising the use of existing state-owned fibre and telecommunications infrastructure.

4.4 Market Development

Government initiatives should be directed at developing the broadband supply market in key sectors, where potential demand has been demonstrated and there is a clear public interest benefit from accelerated broadband take-up. This should involve initiatives to remove impediments and to promote take-up, to ensure that Australian industries and key sectors such as SMEs can access global markets and supply chains and achieve productivity gains.

The Government already has a \$20.5 million Information Technology Online (ITOL) program involving co-funding between the Government and the private sector for e-commerce development for SMEs. This can be used for relevant SME projects involving broadband applications. Emphasis should be given to collaborative projects to develop and deploy e-business strategies and applications. The outcomes of these projects could be used to demonstrate the benefits of broadband applications, identify problems and to establish best practice models to apply generally throughout the SME sector.

There is a difference between policy-making for the current, second generation broadband marketplace, and policy-making for the emerging next-generation broadband marketplace. The current broadband marketplace is based on existing infrastructure that is vertically integrated with services. In contrast, the next generation marketplace presumes ongoing investment in a new kind of platform which will allow for services to be delivered by a wide range of providers with less vertical integration. It will be important that the Government achieves a balance in introducing initiatives to foster the current market as well as encouraging the emerging market.

4.5 Strategic Links

In the interest of national security, there is a public benefit in having particular infrastructure in metropolitan areas that may not be supplied by market forces. For instance, redundancy to increase network reliability for critical information infrastructure assurance or national security may not be adequately addressed by market forces alone.

4.6 Metropolitan Services

In certain metropolitan areas there are some problems with availability of particular broadband technologies. In relation to ADSL this is frequently caused by distance from the exchange, or other technical considerations such as RIMS. The Estens Inquiry considered that there needed to be an assessment of whether this was a problem of commercial viability, or simply a technology restriction that should be remedied by Telstra. The Government should only consider strategic investment in metropolitan areas that are identified as unlikely to receive a service on a commercial basis at fair and reasonable prices within a reasonable timeframe.



5 STRATEGIC COORDINATION

5.1 Demand Aggregation

RECOMMENDATIONS

Demand Aggregation

7. All tiers of government should cooperate to develop demand aggregation strategies to stimulate broadband investment and the provision of services in key sectors, such as health and education, and also in regional areas. Demand brokers could be used to assist rural and regional communities and sectors to develop broadband services.

Some regional areas have not yet had broadband services other than satellite made available because of insufficient demand to support a commercial investment in new infrastructure. Where a business case for investment is marginal, uncertainty about consumer, business and public service demand is a dampener on commercial initiatives.

Research and consultations undertaken by the Broadband Advisory Group in the health and education sectors suggest that impediments such as cost, availability and scepticism about practical benefits prevent the take-up of broadband despite considerable potential demand in these sectors.

Demand aggregation strategies – where customers pool demand to achieve cheaper pricing – would enable regional communities, and health and education sectors particularly, to benefit from economies of scale and secure access to improved bandwidth. This suggestion is supported by the Estens Regional Telecommunications Inquiry, which found that the education and health sectors have a critical need for high quality internet access in regional, rural and remote areas.¹³ The Inquiry recommended that the

Government should provide further support to communities to undertake demand aggregation strategies.¹⁴ End users will benefit by means of the shift of power from suppliers to customers.

The following principles are critical to long-term sustainable demand aggregation:

- Demand aggregation strategies should seek to balance the competing requirements of initiatives for particular sectors (such as health, education and general government) across a state or region, as opposed to area-based strategies aggregating demand from multiple sectors and consumers within that local area.
- There should be a flow-on effect to the wider community from any sectoral demand aggregation in regional and remote areas
- Strategies should promote competitive market outcomes rather than reinforce the market position of major players.

¹³ D. Estens, *Connecting Regional Australia, The Report of the Estens Regional Telecommunications Inquiry, 2002, p. 180.*

¹⁴ *ibid*, p. 232.



Demand aggregation strategies can, if misapplied, reduce competition in particular marketplaces by reducing the number of companies that are able to tender for contracts (by making contracts too large, too geographically dispersed or encompassing too wide a range of services). It is important that any demand aggregation strategies promote competition. Ensuring that there are good communication flows between potential purchasers as well as ensuring that contract conditions are publicly disclosed can help to reduce the market power of dominant suppliers and deliver the best outcomes for the whole community.

Given the high costs and risks associated with private sector development of broadband infrastructure in regional areas, demand aggregation measures are required to leverage public sector demand as a catalyst for wider deployment of broadband services to regions. Governments could use existing public sector infrastructure in regional areas more effectively by extending cross-sectoral infrastructure-sharing arrangements. Coordinated, strategic investment by funding programs and public sector agencies might improve outcomes in regional areas, helping to maximise the economic and social gains from investment.

Bandwidth brokers should work with relevant organisations to assist with demand aggregation. These brokers would be an extension of existing sectoral, regional and local organisations and would act in the public interest to bring together potential user organisations and information about their planned procurements. They would identify sources of supply and assess whether there is potential for group purchasing that would be more effective than if members sought individual solutions. They would also disseminate information to organisations about improving broadband price and performance.

Appendix 5 expands on demand aggregation and brokering principles and approaches.

5.2 Education

RECOMMENDATIONS

Education

8. All schools and educational institutions should be connected to broadband internet services to facilitate research, support interactive learning and provide access to innovative and varied curriculum content.
9. The Government, in cooperation with state and territory governments, education stakeholders and cultural and media institutions, should implement initiatives to ensure high-quality email and web browsing services in schools and educational institutions. This should include the development of a nationwide intranet for content and curriculum interaction among schools, training and key cultural institutions.

All schools and educational institutions should be connected to broadband to achieve enhanced educational outcomes through improved research, interactive learning and innovative curriculum content. Although most of the operational decision-making for these sectors rests with states and territories, the Commonwealth should support a framework to enable all levels of government and education communities to work together to provide access to broadband technologies. As part of Recommendation 4, a key role for the National Broadband Strategy Implementation Group will be to work with the relevant government and industry bodies in education to establish appropriate targets for the education sector.

Given adequate technical support and professional development, educational institutions are eager to maximise the benefits of broadband. There are already many good broadband applications available. Improvements in the price, availability and take-up of broadband will stimulate application developers to create even more compelling content. Even institutions that have lower levels of Internet access recognise the considerable benefits that use of the Internet for student research through email and web browsing can bring. It allows increased student participation, broader access to information sources for research projects, improved scholastic achievement and the ability to deliver high quality education to remote students.



The South Australian School of the Air¹⁵ provides an example of innovative broadband application use. The school has used \$325,000 from the Networking the Nation program to pilot a virtual classroom¹⁶ to service 20 of the most isolated families in the state. The School of the Air uses laptop computers connected via satellite to allow students to interact and work collaboratively on projects through features including a virtual whiteboard and virtual 'breakout rooms' for smaller group work.

This project provides students with a quality of service not previously possible using two-way radio and allows the teachers to engage the students as a group. The feedback to date indicates that simply being able to hear each other properly has enormously improved interaction and increased the feeling of a real classroom. The service has also had flow-on benefits to the community. Parents have become Internet literate while helping their children with schoolwork and have been able to interact with others in their geographically dispersed community through the Internet.

Source: Broadband in Education: Availability, Initiatives and Issues – A paper prepared by NOIE for the Broadband Advisory Group 2002.

Available at:
<http://www.noie.gov.au/projects/framework/Priorities/BAG.htm>

¹⁵ School of the Air is run by the Open Access College and caters for students in remote areas from reception (most commonly known as kindergarten in other states) to year 10. <http://www.oac.schools.sa.edu.au/sota/>

¹⁶ The School of the Air uses Centra Symposium software: <http://www.centra.com/products/symposium/info.asp>

Timely access to affordable broadband communications is the critical element for the continuing growth in the use of ICT in education. It is central to development strategies in all sectors of education, in all jurisdictions. Failure to address this issue will prove a major impediment to continuing successful growth in the use of ICT in education. It is anticipated that the lack of affordable broadband will have a flow-on impact to both the development of a strong education system relevant to the information economy and the capacity of the education system to provide a strong base for building future skills in ICT for Australia. Some states and territories are attempting to address these problems by aggregating demand across their own jurisdictions.

Although groups representing higher education, Vocational Education and Training (VET) and schools are addressing these issues identified, significant infrastructure issues remain that may prove to be beyond the capacity of individual institutions or sectors to resolve.

The cost of downloading content is a potentially significant inhibitor to the effective use of broadband in education. To reduce this impediment, the formation of a nationwide intranet for content and curriculum interaction is recommended.

A nationwide content intranet among schools, training institutions, media and cultural institutions would comprise a series of regional, state and territory networks (including Virtual Private Networks) connected to form a national network. Individual components of the network would be sufficiently discrete to be able to be tendered for on a competitive basis, encouraging competition and promoting investment in infrastructure to meet the growing bandwidth needs of educational institutions. These individual networks would peer to provide data to each other at minimal cost. Key cultural and media institutions such as the ABC and SBS, state and national libraries and galleries could connect to the network to increase the availability and to reduce the cost of their content to educational institutions.

The implementation of this network could be overseen by the National Broadband Strategy Implementation Group (See Appendix 4), with an implementation board largely drawn from the education sector responsible for its progress. This board would coordinate the strategic allocation of funds from Commonwealth, state and territory governments to particular projects.

The content intranet would also benefit from a 'broker' to coordinate demand and interconnect state education networks, as discussed in Section 5.1. This approach has been used effectively in the higher education sector through the Australian Academic and Research Network (AARNet) and a similar approach might lead to improvements in competition, pricing and availability for the schools and VET sectors.



The Virtual Schooling Service (VSS) offered by Education Queensland is an example of the innovative use of broadband applications. The service offers upper secondary courses to students enrolled in state schools, where the provision of comprehensive subject options has traditionally been problematic.¹⁷ In some instances, the students are in schools outside the metropolitan area. In other cases, the students are in metropolitan schools, with small populations wanting to do particular academic units. Classroom components of the service use a telephone hook-up in concert with Microsoft Netmeeting on the PC.

The VSS has the capacity to deliver a broad curriculum across Queensland regardless of school size or location, but even in its current form it requires considerable bandwidth to operate effectively. Increased bandwidth would allow significant improvements to the educational outcomes this service can provide. In consultations with NOIE, VSS staff stated that they would prefer to use video-conferencing technology to make the service more like a traditional classroom but that the schools it services cannot currently access the bandwidth this would require.

Source: Broadband in Education: Availability, Initiatives and Issues – A paper prepared by NOIE for the Broadband Advisory Group 2002.

Available at:
<http://www.noie.gov.au/projects/framework/Priorities/BAG.htm>

5.3 Research

RECOMMENDATIONS

Research

10. The Government should give priority to an Australian Research and Education Network which meets the domestic bandwidth needs of higher end research in universities, in keeping with the proposals in the report of the Higher Education Bandwidth Advisory Committee, **A Framework for an Australian Research and Education Network**
11. The Government should give priority to ensuring that Australia can participate effectively in collaborative global research and learning networks.

Australia has a reputation for excellence in innovative science and engineering. To maintain this position it needs to be a part of the global research community, which is increasingly relying on advanced network connections to work collaboratively both within countries and around the world.

To advance these objectives, the Higher Education Bandwidth Advisory Committee (HEBAC) has examined the short to medium term bandwidth requirements of universities and research institutions that are disadvantaged by their current level of access to affordable bandwidth. HEBAC has recommended that an Australian Research and Education Network (AREN) be established as a collaborative venture between the Commonwealth, state and territory governments and the higher education sector. AREN would be collaboratively funded by those stakeholders. The report identifies regional Queensland, the Northern Territory, north eastern New South Wales and Tasmania as high priority areas needing improved bandwidth. If the Government accepts HEBAC's recommendation there should be a strong link between AREN and the National Broadband Strategy Implementation Group.

The Government has made an important contribution towards the provision of advanced network infrastructure for high-end research and development in Australia through the Advanced Networks Program (ANP). The Centre for Networking

Technologies for the Information Economy (CeNTIE) and the GRid And Next GGeneration Network (GrangeNet) will provide Australia with intercapital research capacity comparable with the US and Europe (up to 10 gigabits per second).

It is important that the Government build on the successful projects supported through the ANP. AREN could extend this network to include regional universities.

The need to advance Australia's participation in global research and learning networks is very important. It is essential to Australia's continued reputation and involvement in international science and engineering. At present Australia's international research capacity is limited (currently 0.31 gigabits per second) when compared to the capacity enjoyed by researchers in North America and Europe, where international capacity is at similar levels to national backbone capacity (approaching 10 gigabits per second).

Australia will not be able to participate competitively in certain areas of research without adequate international connectivity to support collaborative research. High capacity international links are necessary for Australian scientists and researchers to effectively access expensive or unique research facilities located in other countries, where there is no prospect of such specialised facilities being built in Australia (for example in high-energy physics).



Australia will need to assess whether its current international research connectivity is sufficient for its scientific and research community to effectively collaborate with their international counterparts and look at ways to increase this capacity should the current levels be deemed inadequate.

Implementation of initiatives in relation to research should be designed to reflect the following priorities:

- High capacity international research network connectivity to major international centres, equivalent to northern hemisphere publicly funded initiatives to interconnect national research backbones such as Internet2 Abilene, CANARIE CA*net and GEANT
- Internationally coherent grid architecture and applications to support international and multidisciplinary research and engineering
- New international networks to promote competitive pricing on overseas routes, particularly in the Asia-Pacific to provide competition to US networks
- Continued diplomatic efforts to address asymmetrical international pricing associated with tier 1 peering arrangements
- The development of applications to provide for advanced networks within the Australian Economy (including the health and education sectors), as well as software to provide strategic applications such as visualisation and 3-D mining data.

In addition to enabling Australia's growing involvement in international research, improved international capacity would augment the redundancy of Australia's critical cyberinfrastructure, enhance Australia's tourism and education export markets, reduce the impact of unfair international traffic pricing with the US and improve the international competitiveness of Australian digital content industries.

5.4 Health

RECOMMENDATION

Health

12. The Government, in cooperation with state and territory governments and industry stakeholders, should develop an implementation plan for connectivity infrastructure to achieve improved health outcomes and efficiency of the health system by eHealth initiatives such as teleradiology, telehealth applications and electronic patient health records.

BAG consultations with stakeholders in the health sector demonstrated that compelling content and applications already exist and that there is considerable potential demand for broadband services. There are three main drivers of broadband take-up in health: clinical applications, education and professional development, and electronic transfer and management of patient records. There are over 600 sites¹⁸ across the nation currently delivering technology-enabled health services, although few are using broadband.

Transformational benefits are possible in the health sector through a networked system with infrastructure capability across the full range of clinical, educational, professional development and administrative applications. One of the Government's recently announced four research priorities is promoting and maintaining good health¹⁹, which will be enhanced by national broadband connectivity.

¹⁸ These include locations such as metropolitan and regional hospitals, area health services, and GPs' rooms.

¹⁹ Howard, John, Prime Minister of Australia, Research Priorities for Australia's Future Prosperity Media Release, 5 Dec http://www.pm.gov.au/news/media_releases/2002/media_release2018.htm

Commonwealth, state and territory governments are discussing the formation of a national coordinating body with responsibility for mapping and implementing a long-term strategy for connectivity in the health sector. It will be essential for any such coordinating body to have strong connections to the National Broadband Strategy Implementation Group whose proposed role will be to oversee the national strategy and infrastructure planning mechanism.

Continued investment in improved networks would help health institutions to improve service delivery, particularly in regional areas, and would enable them to deliver health services more efficiently. The brokers discussed in Section 5.1 and implementation teams could be used to support demand aggregation in health and to advance priority projects that demonstrate the benefits of connectivity.

The connectivity strategy should include the entire health sector: hospitals; general practitioners; pharmacies; allied health professionals; community and rural health care centres; home and community care services and health laboratories. The coordinating body could also assist in aggregating demand beyond health services by facilitating e-procurement and supply chain reform in health.

The formation of a health coordinating body that would devise and implement a strategic plan for connectivity in the health sector is supported. Given the complexity of the health sector full connectivity is a long-term proposition, but it is an essential step to develop a strategic implementation plan for the health sector.



It is possible to generate significant savings within the health sector from integrated carriage of voice and data while at the same time delivering improved health services and outcomes. The network established by the SouthWest Alliance of Rural Hospitals (SWARH) in Victoria is a good example.

SWARH built its own microwave-based network with a wireless or fibre optic local loop providing the last mile solution. Services include: internet, email, IP based videoconferencing and the replacement of nine hospital telephone systems with a single IP telephony system located at the hub of the network. The network has generated significant savings for the hospitals and other health sites connected to the network in the region (33 sites in all). Practitioners can also record patient information on a hand held device at the bedside and the record can be accessed anywhere in the network. The network costs for videoconferencing between the sites is minimal. There have also been considerable benefits for patients, including trials of remote visiting via videoconference.

SWARH has now moved from a hospitals only solution to an 'all of Health' model which includes local government. The success of this model will make the SWARH network sustainable by the agencies without additional Government supports.

Source: Broadband in Health: Drivers, Impediments and Benefits – A paper prepared by NOIE for the Broadband Advisory Group 2002.

Available at:
<http://www.noie.gov.au/projects/framework/Priorities/BAG.htm>

5.5 SMEs

RECOMMENDATIONS

SMEs

13. The Government, in cooperation with industry stakeholders and state and territory governments, should ensure the availability of independent and statistics on SME broadband take-up trends, intentions and influences.
14. The Government should encourage increased take-up of broadband by SMEs to deliver improved economic growth and employment levels. The Government should encourage industry associations to develop industry-based or regionally-based broadband business case workshops for SMEs.

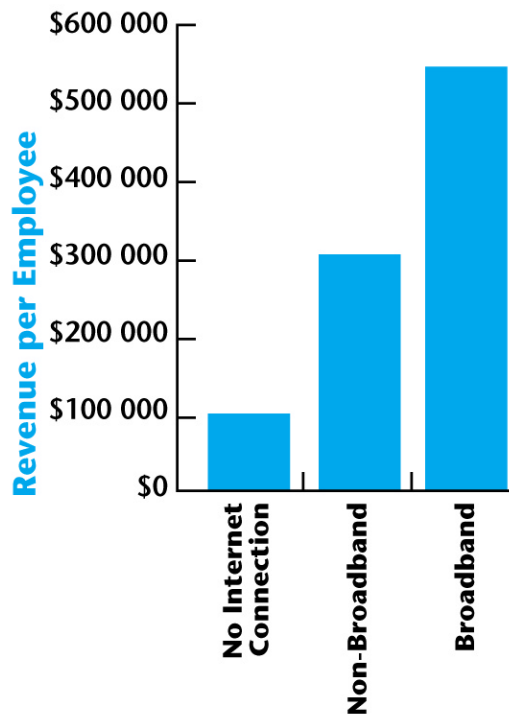
SMEs collectively are the largest employer in Australia and therefore growth in that sector has direct benefits to the economy through an increase in available jobs and productivity. There may be scope for industry associations to ensure that their member organisations fully appreciate the potential benefits of broadband.

One of the difficulties lies in owners/managers of SMEs not having access to the best information about the value proposition for broadband. Migrating existing services, in particular voice, from discrete narrowband links to a broadband environment is likely to result in both telecommunications and operational cost savings of around 30 per cent.²⁰ At the same time as supporting existing applications, the broadband solution provides high speed access to the internet and other data services. However SMEs are often suspicious of inflated vendor marketing claims, and there is a strong need for targeted independent information about the business case for broadband to be made available via industry associations and trusted intermediaries, particularly on a sectoral or regional basis.

In addition, in many sectors of the economy productivity growth and industry e-business initiatives depend on connecting SMEs more effectively into business networks and supply chains, but the immediate payoffs from SME connectivity are harvested by the wider industry, and individual SMEs making the investment experience the returns indirectly and over a longer time-frame. There is therefore an additional public interest benefit in promoting more rapid adjustment of SMEs to the broadband e-business environment.

The graph below shows the potential economic gains from increased broadband connectivity in the SME sector. Examples of savings accrued to SMEs and improved productivity based on case studies are included below.

The graph below shows that broadband enabled SMEs earn on average almost double the revenue per employee compared with narrowband.



Source: 'Built for Business II: Beyond Basic Connectivity, The Allen Consulting Group, Sept 2002

Techbooks stocks specialised and unique books, on subject categories such as automotive, computers, engineering, aviation, electronics, business and military. In 2001 through migrating to broadband it achieved cost savings of \$43 740 largely through no longer printing brochures and by banking online. Significantly, the website has generated an additional revenue stream with online sales totalling \$120 000. Taking into account the ongoing e-commerce costs of \$24 438 and the additional sales, the operating benefit was \$64 902. The establishment costs were \$18 072.

So Design provides creative product development and design to marketing managers involved in the production of fast moving consumer goods. Cost savings from changing to broadband amounted to \$72 880 in 2001 through use of the compositor for the approval and submission of work, reduction in courier costs and physical storage savings. The total ongoing e-commerce costs were \$10 738 therefore the operating benefit from e-commerce was \$62 142. The total establishment costs were \$17 993.

Source: *Advancing eCommerce Case Studies*, NOIE

Available at http://www.noie.gov.au/projects/ebusiness/Advancing/case_studies.htm



Gemenix sells retail workwear and achieved cost savings of \$40 217 in 2001 through migrating to broadband. This was largely due to reduced staff time in handling telephone inquiries and in automatic distribution of purchase orders. The ongoing operating costs were \$3 355 resulting in an operating benefit of \$36 862. The establishment costs for e-commerce were \$7 300.

Grosvenor Pirie Management provides superannuation and investment management services and achieved cost savings of \$122 500 in 2001 through migrating to broadband. This was largely due to the increased use of email which saved staff time. Grosvenor Pirie also generated \$30 000 in additional revenue through clients contacting the company as a result of the website. The operating benefit from e-commerce was \$64 080 taking into account the ongoing e-commerce costs of \$68 420 and the additional profit from increased sales. The establishment costs were \$99 680.

While personal computers have been available for decades, it is the transforming power of the internet and increased capabilities of software and broadband to transfer information that have allowed small business to use technology productively. This has allowed value chains to function more efficiently as firms transform their business operations from paper-based to electronic systems. More readily available eBusiness tools have allowed firms to integrate orders with their back-office processing, fulfilment and invoicing so there is seamless integration between front-office functions and back-office systems. This is all about improving business operations and proving real business value by removing unnecessary costs out of the value chain. As an SME's customer base grows, eBusiness tools typically require greater communications and computing capacity. Broadband communication can remove bottlenecks to business efficiency, boosting microeconomic growth in the SME sector's profitability and employment.



Broadband also supports SMEs' growth through international competitiveness. As more of the developed world joins the knowledge economy, the ability of the internet to eliminate the tyranny of distance becomes a double-edged sword. Our export-capable SMEs can reach customers across the nation and much of the world. However, many will also be competing with overseas businesses in the same industry sectors that are also keen to use the internet to reach the same customers. Broadband communication when empowered by relevant software becomes a powerful tool in the vendor's toolkit, as it can provide a more compelling 'look and feel' in sampling the vendor's products. This can be a video tour of an apartment to rent or a whole leisure resort; a sample tutorial on an e-learning course; a preview of a range of fashion garments; or a PC-enabled video link with a personal consultant. Broadband has raised the bar for e-Commerce, and Australia cannot afford to be left behind.

NOIE is conducting a study to identify impediments, drivers and trends in SME uptake of broadband and will use this as a key tool in its e-business strategy. This study is welcomed, as information on this sector's uptake of broadband is generally inadequate. Preliminary results point clearly to the need for ongoing monitoring and reporting – not only about the number of SMEs taking up broadband but also usage data, for example applications used and benefits achieved. This links directly with the national vision that it is essential to be a leader in the effective use of broadband, and not simply take-up. It will require a collaborative approach calling on Government-held information (for example, the ACCC and the ABS) as well as industry data collection mechanisms (for example, the SPAN BroadbandXchange).

The work that industry associations and NOIE are doing to gather data and spread awareness will become more important in 2003 as the focus moves to working with particular industry and occupational groups and their associations to maximise the benefits of broadband applications. There will be a need for ongoing public/private partnerships.

5.6 Information Economy Environment

RECOMMENDATION

Information Economy Environment

15. The Government should implement initiatives to develop a culture of security and authentication to encourage market confidence in broadband applications. The BAG supports the Government's recently announced initiatives designed to protect Australia's critical infrastructure.

e-Security and Critical Infrastructure Protection

The Global Advisers highlighted the relevance of improved e-security in the broadband environment, particularly in terms of consumer confidence and national security in the light of recent world events.

The Government recently announced initiatives²¹ aimed at protecting Australia's critical infrastructure in response to recommendations of the Business-Government Taskforce on Critical Infrastructure Protection²². These include the:

- Establishment of a new communications network or 'one stop shop' through which governments will share security information with the private sector on critical infrastructure protection
- Establishment of a Critical Infrastructure Advisory Council of state and territory and business representatives to oversee the network and report to the Attorney General on critical infrastructure.

21 Williams, Daryl (Attorney-General) and Alston, Richard (Minister for Communications, Information Technology and the Arts), *Protecting Australia's Critical Infrastructure Joint News Release 29 November 2002*
<http://www.ag.gov.au/www/attorneygeneralHome.nsf/Web+Pages/E078BAC9BA04FEBCCA256C800012C461?OpenDocument>

22 *Business-Government Task Force on Critical Infrastructure Report May 2002*
<http://www.ag.gov.au/www/CriptHome.nsf/HeadingPagesDisplay/Meeting+Report?OpenDocument>

The new network will allow the owners and operators of critical infrastructure to share information on important issues such as business continuity, consequence management, information systems attacks and vulnerabilities, e-crime and protection of key sites from a range of risks. It will involve a number of advisory groups for different business sectors.

A link should be established between the Critical Infrastructure Advisory Council advisory groups and the National Broadband Strategy Implementation Group.

Standards and protocols to promote Interoperability

Common standards and protocols are an essential component of a nationally coordinated approach to broadband. Any to any connectivity would facilitate multidisciplinary and international collaboration, particularly in e-science and engineering. Appropriate standards would also help to develop an integrated network in the health sector, where issues such as unique patient signifiers are required to address security concerns. It is also important to develop appropriate digital rights management systems that are interoperable. The National Broadband Strategy Implementation Group could have a coordinating role in the area of interoperability.

Input should be sought from industry representatives and leaders from key sectors such as media and banking to coordinate and develop standards and protocols. It will be important to monitor international initiatives in these areas. This would build on work already underway in the Australian Communications Industry Forum and the Investment and Financial Services Association.

Home Users and Small Businesses

Education and training for SMEs and home users about information security issues and strategies is necessary to create a culture of confidence in the information economy. Poor security practices of SMEs and home users can lead to vulnerabilities in the national information infrastructure, particularly through distributed denial of service attacks. In the absence of corrective action, increasing rates of broadband connectivity in this sector will increase vulnerabilities. The Government should encourage Internet Service Providers (ISPs) to inform their customers about better information security management tools and practices.

The Australian Internet Industry Association is developing a range of initiatives on information security issues, and the Attorney-General's Department is working with the Australian Computer Emergency response Team (AusCERT) to ensure wider dissemination of information on threats and protective measures.





6 STRATEGIES TO PROMOTE BROADBAND CONTENT , APPLICATIONS AND TAKE-UP

RECOMMENDATIONS

Content

16. The Government should give high priority to stimulating the digital content industries in Australia through:
 - (a) Supporting research and development in the application and design of interactive broadband technologies and content
 - (b) Working with industry stakeholders to develop an effective digital rights management regime
 - (c) Ensuring that the Federal Government's Intellectual Property (IP) policies are not acting as a barrier to the development of digital content industries. This may include encouraging a more flexible approach for Government agencies in dealing with Crown copyright
 - (d) Improving access to international distribution channels for the output of Australia's digital content industries.

6.1 Supporting and developing content industries

Broadband take-up and availability of compelling content are inextricably linked. The level of broadband take-up is likely to remain relatively low unless there is sufficient compelling content available. Since the majority of content is generated overseas it is essential to promote local content that reflects Australians' values, identity and character. It is also important that distribution channels work effectively with Australia's content industries.

All signs point to Australia's future as a high-tech nation being driven by on-demand interactivity in a broadband environment. Advanced broadband content is interactive, requires a broadband infrastructure for effective use and is integrated in its structure

and functionality across media. While current technologies offer the end-user an array of delivery platforms, take-up is unlikely to expand unless consumers are presented with content that fully embraces the functionality that the infrastructure can provide.

Despite this knowledge, traditional media enterprises have been reticent to take the risks associated with developing broadband content – it is a high-risk medium and resource intensive, requiring large up-front investment with uncertain rates of return. Government investment in innovative broadband content is helping to bridge the gap between the current shortfalls in the market and growing demand for creative and intelligent product which caters to an Australian audience. Such support assists Australian practitioners to undertake the necessary research and development that will allow them to compete in what is increasingly an international market for broadband content.



Stage 2 of the Creative Industries Cluster Study has underlined the critical importance of distribution arrangements and access to overseas markets for the development of creative digital content industries. This is especially so for interactive games, an industry whose global market is already equal to, if not greater than, the film industry. Given the expected growth in interactive multi-player games, cost-effective access to broadband networks both within Australia and internationally will become critical for the local games industry's future growth and ability to capture international market share. Other barriers to growth for local digital content producers include difficulty in accessing equity funding and working capital, asymmetries in market power, resistance by incumbent industries and a lack of broadband penetration for online markets. Equally, intellectual property issues are critical to these industries, which are affected by the growing complexity in rights management and cross-territory licensing, and increasing transaction costs in rights management.

6.2 Digital Rights Management

Market and technical uncertainties surrounding the management of digital rights are inhibiting content owners from making rich content available to broadband networks. This uncertainty is constraining the take-up of broadband and therefore, the revenue growth that drives investment in broadband infrastructure. A low-investment pattern is established until a positive cycle between investment and take-up occurs. Appropriate digital rights management (DRM) systems will result in greater access to content and act as a major driver for increased broadband adoption.

Early adoption of global interoperable rights management standards by Australian content production and distribution industries would enable them to explore other channels, develop export markets, and compete with sophisticated content emanating from overseas markets, particularly the US.

There are several activities already in progress in digital rights management. For example, the Commonwealth Government made a number of significant amendments to copyright laws through the passage of the **Copyright Amendment (Digital Agenda) Act 2000**, which reflected the impact of digital and online technologies on copyright. Since then, the Department of Communications, Information Technology and the Arts (DCITA) has engaged a consortium led by the Australian Interactive Multimedia Industry Association (AIMIA) to develop a concise, practical and easy-to-use DRM Guide.

The DRM Guide will raise awareness of these changes among copyright creators and users. The DRM Guide will assist in the development of DRM solutions by providing a focus for communication and exchange on issues to advance trade in the content industries involving multimedia developers, online education and content creators.

6.3 Access to Government intellectual property

The Commonwealth owns the copyright in a range of intellectual property produced under its direction and control. The Commonwealth is generally the owner of copyright where material has been produced by its employees or has been commissioned or first published by the Commonwealth.

A more flexible approach for Government-produced content designed for broadband platforms could provide greater incentives for repurposing the content for other uses. For example, the Commonwealth would generally assert ownership of copyright on works that it has funded, such as the development of a piece of online educational material. A more flexible approach may enable the developers of this material to repurpose it for overseas markets or for other educational markets in addition to its original intent. This would provide the scope for digital content industries to leverage Government funding to explore growth in other sectors, both domestically and internationally.

6.4 Encouraging Take-up

RECOMMENDATION

Encouraging Take-up

17. The Government, in cooperation with state and territory governments and industry stakeholders, should develop and provide detailed information to key sectors about the benefits of broadband applications, such as educational opportunities, improved health care, business process improvement, productivity gains and better government services.

While the Australian economy generally would benefit from accelerated diffusion of broadband-related innovation, some Australian consumers, SMEs and even larger organisations lack awareness about the capabilities and benefits of broadband connectivity and associated applications. Industry associations are encouraged to develop initiatives for the dissemination of information about effective innovation, building on existing programs. There are fundamental differences between the way businesses with a broadband connection access the internet, for example. They are much more likely than businesses with a narrowband connection to use it for both purchasing and sales. Live trials and demonstrations are well-accepted methods for the diffusion of innovation, allowing people to experience, touch and feel broadband applications, helping to establish a clear business case for broadband-powered e-business tools in SMEs and new business models such as the application service provider (ASP) model.

The OECD has identified effective diffusion of innovation as one of the key objectives for governments wishing to promote economic development and productivity growth in the 'new economy'.²³ This was the rationale for extending the Information Technology Online program in the Government's 'Backing Australia's Ability' initiative.

As a result, some initiatives are already in place to promote understanding of broadband and to encourage the development of innovative content. These initiatives should continue to emphasise the benefits of using broadband in key sectors. These should not focus on selling the technology but should provide decision makers with evidence about how using broadband will have a positive impact on business and on people's lives.

²³ *The New Economy: Beyond the Hype*; OECD 2001, p 22



7 FLEXIBLE REGULATORY REGIME AND POLICY SETTING

RECOMMENDATIONS

Flexible regulatory regime and policy setting

18. The Government should:

- (a) commit to refine the regulatory regime as required to ensure that it continues to advance the 'long term interests of end users' and to promote facilities and services based competition
- (b) require the ACCC to monitor and report on progress in ensuring an open, competitive and interoperable broadband market
- (c) request the ACCC to investigate and report on industry concerns regarding domestic internet peering arrangements and provide the Minister for Communications, Information Technology and the Arts with recommendations on how this matter may be appropriately addressed.

The current telecommunications regulatory framework has as its primary objective the promotion of the long term interests of end users of communications services. This objective remains highly appropriate as the focus of communications regulation and policy moves towards broadband technologies and services. However even with the same objective, fulfilling the objective requires continual assessment and, where necessary refinement or amendment of the regulatory regime.

In advancing the long term interests of end users, the regulatory regime should continue to create effective pro-competitive market arrangements that encourage investment in infrastructure and applications.

7.1 Role of Government

A year ago United States Federal Communications Commission Chairman Michael Powell made the following pertinent observations in a major speech on broadband policy:

'The government sometimes acts like an indignant customer demanding to be served, but who has no intention of paying. We place orders for public policy widgets and expect them to be delivered at provider expense... We have to recognise that a supplier at the end of the day is going to do very little to fill the order if it does not have an economical way of doing so and getting paid... in setting out our (broadband) policy goals, we must simultaneously attempt to support an economic environment that will allow the supplier to get adequately compensated, or we will have many years of dissatisfaction because the supplier will rarely fully perform. In short, we must be much better at trying to pursue public policy objectives that align provider incentives, rather than act at cross-purposes with them.²⁴

²⁴ National Summit on Broadband Deployment, Washington D.C., October 25, 2001.

The Government plays a vital role, through its policy settings, leadership and by establishing the regulatory framework, in supporting the ongoing development of the broadband market in Australia.

To date, competition in telecommunications has delivered substantial benefits to consumers in the form of lower prices, improved quality of service, greater choice of products and services, and more flexibility. However, the development of competition has been uneven across different sectors of the communications market, although there is clear evidence of competition emerging in the delivery of broadband services. For example:

- There are now multiple providers of retail ADSL services
- Telstra, Optus, TransACT, Bright Telecommunications and Neighbourhood Cable all own cable networks offering cable modem access services. Cable services are now available in most capital cities and regional Victoria
- There are over 20 providers of high speed data services to corporate users – utilising a variety of services including ATM, frame relay, and managed IP networks.

If the broadband market is going to continue to develop, the regulatory framework must focus on encouraging efficient market outcomes, sustainable competition and removing barriers to entry. This will necessitate a lean regulatory regime that provides incentives for ongoing investment and innovation in broadband infrastructure and services while advancing the long term interests of end users.

For investment to occur on a large scale there is a need for regulatory certainty. This is particularly important in a market where investors have to heavily discount future returns especially as in the current telecommunications environment, the financial markets tend to class investments in next-generation infrastructure as speculative. At the same time regulation needs to be flexible enough to be adapted to address emerging bottlenecks and issues arising from continued technological

development. In supporting a dynamic environment for the supply of broadband services, regulatory policy needs to concurrently consider both the short-medium term and longer term objectives. In the short-medium term attention should be on effectively utilising existing infrastructure. Over the longer term the focus needs to recognise the potential for new services and technologies to lead to the provision of qualitatively different services.

7.2 Recommended approach

Regulatory regime

There are several strategies that the Government can adopt in order to support the development of a dynamic environment for the supply of broadband. The combination of strategies and the emphasis on particular strategies will need to change as the market develops.

The principal strategy for the Government is, as far as practicable, to rely on the private sector and market interactions as the primary vehicles for investment decisions and innovation. It is recognised internationally that contestability and competition at both the retail and infrastructure level are likely, as long as they are sustainable, to be a major spur to the take-up of existing services and innovation and the development of new services. In 2001 the OECD concluded that the most fundamental policy available to governments to boost broadband access is infrastructure competition and, where this is not possible, competition would be assisted by policies designed to promote access to networks.²⁵

However, the Government should be willing to intervene where there are clear cases of market failure, in a way which as far as possible does not distort the future market development.

Accepting the fundamental policy principle of market driven investment decisions, the regulatory framework established by government needs to encourage efficient market entry as a primary lever for fostering competition and competitive pressure. There are a number of elements that are necessary to encourage efficient market entry:

- appropriate spectrum policies which allow new wireless technologies to emerge
- appropriate licensing policies
- technology neutral regulation
- access arrangements which take account of the network benefits enjoyed by incumbent operators
- technical regulation favouring interoperability between networks and systems
- an access regime which as far as practicable neutralises the network benefits to incumbent carriers of bottleneck infrastructure and services
- reducing information asymmetries facing new entrants
- avoiding taking decisions that could embed inferior technologies.

It is also critical to ensure that there are timely and soundly-based processes in place for identifying and dealing with abuses of market power. To assist in the early identification of anti-competitive cross subsidies, it is important to have mechanisms that allow transparency of cost structures within incumbents.

As well as contributing to a policy environment which encourages market entry and deals with abuses of market power, regulation must also be forward looking and remain appropriate to market conditions as convergence continues to evolve.

Most of the elements listed above already exist but it is important to ensure that the regulatory regime continues to be responsive to changing market conditions. It must maintain the existing regulatory philosophy while improving its ability to deliver timely, efficient and transparent outcomes for the industry. The recent key changes are:

- encouraging further investment in telecommunications infrastructure required for broadband and other key communications services, by enabling potential investors to obtain up-front certainty, through undertakings to the ACCC about access prices and terms and conditions that will apply to their future investments
- providing greater certainty and more timely access for access seekers, by removing merits review of ACCC arbitrations, requiring the ACCC to produce model terms and conditions for 'core' telecommunications services, encouraging voluntary undertakings and ensuring the effective operation of the standard access obligations
- improving the operation of the anti-competitive conduct regime under Part XIB by enabling the ACCC to issue advisory notices before a competition notice is issued and requiring the ACCC to consult with affected parties before issuing a competition notice
- requiring the preparation and publication of regulatory accounts to provide greater transparency of Telstra's wholesale and retail operations, particularly in relation to the 'core' interconnection services provided over Telstra's network.

Internet peering

The current arrangements for international and domestic internet traffic charging between networks, in particular the system generally known as peering whereby charges are levied on the basis of the relative amount of traffic exchanged between networks, is a significant issue for Australian broadband providers.

International connectivity costs form a large component of the costs of providing internet services in Australia. Under the current international peering arrangements, Australian ISPs typically pay for the full international carriage costs for data moving between Australia and the United States. In addition, Australian ISPs have to pay an access charge if they are connecting to one of the large United States internet providers. ISPs in the United States pay neither of these costs when sourcing data for their customers hosted in Australia. Telstra's enhanced peering status in the US creates an opportunity for a reduction in international carriage costs for the company.

With around 80 per cent of Australian internet traffic being sourced from the United States, the cost of international connectivity is one of the reasons why Australian broadband service providers have chosen to impose per megabit charging in their pricing plans.

The Government should use all available means to push for reform of international charging arrangements, continuing to seek reform through multilateral as well as bilateral processes.

Within the Australian market, the apparent discretionary nature of internet traffic exchange arrangements between various internet service providers has also been raised as adversely impacting on the price at which broadband services can be offered by competitors. Commercial arrangements have been struck by a number of providers that allow for the free exchange and carriage of data between networks in recognition, at least in part, of the similarity in the load of data transferred between each network. However, concerns exist that similar arrangements have not been extended to other like networks thereby favouring certain operators to the detriment of the overall competitiveness of Australia's internet market.

8 MEASUREMENT , MONITORING AND EVALUATION

RECOMMENDATION

Measurement, monitoring and evaluation

- 19 The Government should monitor and evaluate the implementation of the national strategy to ensure effective outcomes. This should include measurement of Australia's international position in relation to the availability and effective use of broadband in key sectors. The Government should also encourage the OECD to introduce mechanisms that measure the effective use of broadband and not merely take-up.

It is essential to monitor our progress towards achieving the vision and goals for Australia established as part of the national strategy. A key role for the National Broadband Strategy Implementation Group will be to determine the appropriate mechanisms to measure success. It will also be important to establish an evaluation regime for the initiatives and components of the national strategy.

In terms of assessing Australia's performance internationally, there is an additional problem because no international benchmarking relates to the type of goals being envisaged in Australia. The Government should encourage the OECD, through appropriate diplomatic channels, to develop this issue and provide an international comparative study of the effective use of broadband.

The Findings Against the Terms of Reference on Measurement of Success and Take-up in Appendix 1 provides more detail on current measures used to determine Australia's international position and levels of success.



9 COORDINATION WITH OTHER INQUIRIES

9.1 Estens Regional Telecommunications Inquiry

The Estens Regional Telecommunications Inquiry report, **Connecting Regional Australia** was released on 8 November 2002. The inquiry was established to review the adequacy of telecommunications services, including higher bandwidth services, to regional, rural and remote Australia and to examine whether additional arrangements are required to ensure all Australians share in the existing and future opportunities presented by telecommunications.

The Inquiry found that broadband communications are becoming vital for the economic development of regional Australia, but users in some areas pay more for certain services than their metropolitan counterparts.

There is consistency between the finding of the Estens inquiry and the recommendations of this Report.

It is essential that any initiatives to be implemented in regional, rural and remote Australia are coordinated with the proposed National Broadband Strategy and the national strategic plan for the deployment of broadband infrastructure.

9.2 Wireless Inquiry

The House of Representatives Communications Committee report **Connecting Australia! Wireless Broadband** tabled on 11 November 2002 reports on the current and potential use of wireless technologies in delivering broadband communication services to Australia, including regional locations.

The Inquiry found that wireless solutions have considerable potential for providing 'last mile' technologies, especially in regional areas. It is increasingly widely recognised that wireless technologies have an important role in the deployment of broadband services, particularly in regional areas. This highlights the necessity for wireless ISPs to connect seamlessly to the internet backbone. Consistent with one of the Inquiry's recommendations, the possibility of carrier licensing arrangements being a barrier to entry should be investigated.

While developments in wireless technologies are emerging as significant, it should be recognised that wireless technologies are just one solution to the national broadband infrastructure and should be considered as such in strategic investment decision-making.

9.3 ICT Framework for the Future

An important element of the Federal Government's ongoing strategy for the ICT sector in Australia is the development of an ICT Framework for the Future. The Framework will result in a shared Government-industry understanding of the challenges facing Australia's ICT sector, and a context for identifying strategies to address these challenges. The Framework will build on existing innovation initiatives, such as the recently established ICT Centre of Excellence and other initiatives announced in **Backing Australia's Ability**

The Framework's development has been overseen by a high level Steering Committee established in March 2002, chaired by the Minister for Communications IT and the Arts. The Committee is due to report to the Government in the near future. The Committee includes leading members of the ICT industry and other areas critical to the future development of



Australia's ICT sector, such as the research and academic communities. The Steering Committee has received a wide range of input from industry stakeholders through a variety of mechanisms, including a series of public industry forums in all state and territory capitals.

The Steering Committee, with the assistance of two working groups, has mapped the domestic ICT industry and examined major global technology, business and social trends relevant to the ICT sector. This process was supported by a study by McKinsey & Company into key sectoral trends within the global ICT industry and the implications of these trends for Australia.

Initial findings of the Steering Committee confirm that an effective ICT capability is imperative to our future economic growth, as it is a key enabling technology for all industries and for innovation. Clear potential exists for Australia to develop global ICT specialists in a number of areas on a focussed innovation base. With the right infrastructure, including broadband, the industry could capture opportunities where ICT intersects with other technologies such as biotechnology, nano-and materials technologies, and in emerging application areas.

10 CONCLUSION

Although still in the early stages of development, broadband technologies represent the next wave of communications tools that will help drive productivity growth and improve the way Australians interact and receive key services.

It is therefore essential that Australia acts to maintain its current high standing in the global information economy as it moves into an interconnected broadband environment.

Recent signs are very encouraging. Broadband take-up has increased dramatically in the last 12 months in both residential and business sectors. More commercial players are entering the broadband market and offering a variety of products utilising a range of innovative technologies.

Commonwealth, state, territory and local governments are increasingly active in this area and are committing significant funds to improve broadband take-up in key sectors such as health and education, as well as in rural and regional areas.

Notwithstanding Australia's steady progress, there remain challenges to be tackled if Australia is to derive the full economic and social benefits from the rapid adoption of broadband technologies.

The principal challenges are geographic considerations, technological limitations and availability, perceptions about price and the value proposition of broadband and the need for a national strategic approach to broadband rollout.

An important step in tackling these challenges is the adoption of a National Broadband Strategy with a defined vision and goals. Such a strategy is essential if Australia is to become a world leader in the effective use of broadband technologies.

This Strategy needs to be supported by ongoing monitoring and better co-ordination of current and future initiatives across all levels of government and the private sector.

The Commonwealth Government's catalytic role with respect to national broadband adoption would be best served by focussing on areas of key public sector interest.

Specifically, recommendations have been developed to improve outcomes in the areas of education, health, national security, and research. Moreover, there is a public interest basis for a government role in promoting effective use of broadband within the SME sector and the digital content industries.

The Government should promote investment in those areas of Australia that are likely to remain underserved purely by the private sector. As identified in the Estens Inquiry, rural and regional areas are a priority. The development of demand aggregation strategies should be used to assist in this process.

Progress in these key areas will be enhanced through the Government's continued commitment to maintaining a regulatory regime that promotes competition, is technologically neutral, and is flexible enough to respond to emerging challenges and new technologies.

The Commonwealth Government, working in partnership with the state, territory and local Governments and the private sector, should commit to achieving the national goal of making Australia a world leader in the effective use of broadband technology. The achievement of this goal will ensure that Australia remains at the forefront of the global economy and that all Australians will thrive in a more connected community.



APPENDIX 1:

TERMS OF REFERENCE AND FINDINGS

1. Membership, Terms of Reference and Consultations

1.1 Membership

The Broadband Advisory Group (BAG) was formed in March 2002 by Senator the Hon Richard Alston, Minister for Communications, Information Technology and the Arts to provide high-level advice on the development of the broadband market in Australia. It was chaired by Senator Alston with secretariat support provided by NOIE.

The members of BAG were: Bronte Adams, Ros Hill, Tom Kennedy, George McLaughlin, Mike Miller, Rosemary Sinclair, Phil Singleton, Ziggy Switkowski, Jeffrey Tobias and Terry Walsh (see Appendix 2 for titles and organisation names). The Group met on four occasions.

The Group has been assisted by a team of eight Global Advisers based in Canada, France, Sweden, the United Kingdom and the United States (see Appendix 2). These individuals have been consulted by the BAG through a series of group video conference sessions, meetings with Senator Alston and through the Members' Website.

1.2 Terms of Reference

The Broadband Advisory Group's Terms of Reference were as follows:

The Broadband Advisory Group is an expert advisory body on broadband issues. Its role is to assist the Government to ensure that the broadband policy framework optimises the economic and social benefits that Australia derives from broadband services. The BAG will provide a vehicle for fostering communication between stakeholders on both the supply-side and demand-side of the broadband issue.

The Broadband Advisory Group will provide advice on:

- Appropriate ways to measure broadband take-up and success;
- Current impediments to, and likely drivers of, broadband take-up, particularly in key productivity sectors such as small business, education, health and community services
- Possible policy solutions to current and emerging challenges on both the supply-side and demand-side of the broadband issue
- Market based strategies for raising broadband awareness, particularly in key productivity sectors
- Strategies to encourage the development of marketable applications that will facilitate broadband take-up in key productivity sectors
- Emerging technologies and new business models for delivering broadband services, as requested
- Issues that are likely to emerge as the Australian broadband market develops.

In providing this advice, the BAG will have regard to current ACCC activities in relation to the development of a competitive broadband market in Australia.

1.3 Consultations

To address these issues, the BAG also held two Consultative Forums in Sydney and Melbourne on 25 July and 26 July 2002, respectively. These meetings provided an opportunity for key stakeholders from across the Australian broadband industry and user community to provide input. A total of 52 stakeholders attended the two meetings and a report of proceedings is

available on the NOIE website (see <http://www.noie.gov.au/projects/framework/Priorities/BAG.htm>).

NOIE also invited public submissions to the BAG, receiving 64 written submissions by the 12 August closing date. These came from a wide range of sources across Australia, including telecommunications companies and other broadband service providers; state, territory and local governments; business and consumer advocacy groups; higher education institutions; community groups; networking hardware manufacturers; communications analysts; and individuals. Full copies of submissions and a summary report are available through the NOIE website. state and territory governments were also consulted.

2 Measuring Broadband Take-up and Success

'Broadband is new technology for the whole world – no country has a special advantage. Australia has an opportunity to be a leader – there is no reason that it could not be. Yet, there is evidence that Australia is falling behind the eight ball.' Bob Bishop, Chairman CEO, Silicon Graphics Inc.²⁶

The perception outlined by Bob Bishop that Australia is lagging behind other developed nations is pervasive, it was raised frequently during consultations. However, it raises questions about the mechanisms used to measure success and whether they collect the most useful information.

2.1 The OECD 'League Table'

This perception seems to stem primarily from the OECD's report of broadband access in OECD countries which provides a status ranking (or 'league table') based on penetration rates. The OECD table suggests that some countries, most notably South Korea, are forging ahead with broadband connectivity while other countries, including Australia, seem to be making only moderate progress and are ranked around the middle.

It is essential that progress towards achieving our stated vision and goals can be measured. While the OECD 'league table' provides a source of international comparison in terms of overall take-up, it does not help to determine Australia's progress in relation to effective use and availability of broadband services in key sectors.

2.2 NOIE INDEX

In April 2002, the new composite NOIE Index was published measuring Australia's progress against 23 indicators relating to 'Readiness' and 'Intensity'. Indicators in the Index were chosen because they satisfy two criteria:

- They provide a meaningful measure of relative progress in the information economy
- Sufficient data of sufficient quality is available to make comparisons between countries and Australia is ranked third in terms of readiness.

Future NOIE benchmarking work will focus on measuring the impact of increased participation in the Information Economy, particularly the benefits of more intensive use of the Internet in terms of productivity gains, growth in economic output and increased flexibility in how and where Australians undertake key day-to-day activities.

2.3 ACCC

The ACCC compiles quarterly reports on broadband adoption based upon voluntary collection of information from a number of carriers and carriage service providers. The Minister for Communications, Information Technology and the Arts has also signalled an intention to use the powers in Division 12A of the Trade Practices Act 1974 to require the ACCC to provide quarterly reports on take-up and availability of broadband services. Thus carriers would be required to provide this information to the ACCC. A draft Ministerial Determination under Division 12A has been released for consultation. The BAG supports the proposed action as a way of increasing the level of information available about the market and to measure the take-up of broadband in Australia.

2.4 Limitations

The current mechanisms used to measure success have limitations because they focus solely on the number of people connected. The **NOIE Index** attempts to shift the focus from the simple number of connections to some measure of the type of use.

However, the most useful measure of success would be one that is outcomes-oriented and provides

a measure of outputs in terms of sectoral productivity benefits. In order for progress towards the stated goals (expressed in Recommendation 2) to be measured it is necessary to develop some new measures that might be used to develop a composite indicator of effective use and availability. Given the nature of the goals this involves more sophisticated measurement of the use and different types of usage of services by particular sectors. The proposed Ministerial Determination will certainly increase the amount of available information about particular sectors, but it needs to be supplemented by additional processes to enable measurement of the 'effective use' of services.

In terms of assessing Australia's performance internationally, there is an additional problem because no international benchmarking relates to the type of goals being envisaged in Australia. The Government should encourage the OECD, through appropriate diplomatic channels to address this issue and provide a comparative study of the effective use of broadband.

Additionally, no comprehensive economic modelling exercises have yet been undertaken in Australia which estimate the sectoral economic benefits of an accelerated broadband rollout nor predictions about economy-wide gains. There has been a study that identified lack of affordable broadband Internet access as a barrier to increased participation in the information economy and estimated the cost to the economy of that lack of participation.²⁷ During the BAG process, NOIE commissioned a study of the economic benefits in key sectors of increased broadband take-up and the results will be available in the second quarter of 2003.

3 Impediments and Drivers

During the consultations much attention was given particularly to the impediments to broadband take-up. The key question facing Government and industry is how to achieve the balance between removing impediments and stimulating demand.

3.1 Drivers

Broadband infrastructure, services and devices are interdependent. Unless services and compelling content are developed, the demand for broadband infrastructure will not grow and the incentives for broadband investment will be undermined. Digital entertainment, particularly music and computer games, has been a key driver of broadband take-up in the consumer market. Once appropriate digital rights management systems are in place, digital entertainment will be a major driver in the future.

Ideally, the development of compelling broadband services will drive the new investment in broadband infrastructure that will bring these services to new groups. This will then trigger a virtuous cycle of investment and innovation in broadband services and infrastructure.

With this in mind, 'leader' markets that are today demonstrating the demand for and the potential benefits of broadband have been identified. In line with the focus of this paper these are in sectors with high levels of public sector involvement – education, government services, health – but it should be noted that there are other key leader groups in the consumer market such as the financial services industry, video post-production and online computer games.

3.1.1 Driver: Education

There are some basic characteristics of education, throughout the different education sectors of schools, vocational training and higher education, that drive a need for broadband and will encourage broadband take up. The desire for richer content in course materials may increase demand for broadband delivery. Broadband communications opens up

27 Allen Consulting Group Australia's Information Economy: The Big Picture April 2002.



possibilities for effective research collaboration requiring the transfer and analysis or sharing of large amounts of data. Broadband also provides the possibility for all educational sectors to offer a wider range of courses through aggregation of demand. This should allow smaller schools, and regional and remote schools or universities, to pool student demand to make a wider range of classes viable.

Australian governments have recognised the importance of the development of appropriate on-line content as a key driver in education and have established The Le@rning Federation. This is a \$68 million initiative of the state, territory and Commonwealth governments of Australia and the government of New Zealand. Over the period 2001-2006, it aims to create online curriculum content and the infrastructure (The Exchange) for procurement, storage and distributed access of the content specifically for Australian and New Zealand schools.

Lifelong learning will require new and innovative methods of education delivery. People will require flexible access to high quality education materials. In order to provide this, institutions will increasingly rely on online solutions to provide rich content material. The full multimedia capabilities of online presentation will be utilised, driving the demand for broadband take-up.

3.1.2 Driver: Government Services

Electronic government services are a means of improving the quality and efficiency of services and information provided by government. In many ways, e-government services can be seen as a prescription for the transformation of government. An effective vision and strategy will not only focus on government agencies using information and communication technologies, but will also entail maximising the use of the Internet to engage more effectively with members of the community. Electronic government services create the means to put the needs of the citizen foremost, allowing them to shape the delivery of the online services they require.

While the implementation of a large range of government services online has driven the take-up of broadband within government itself, it also encourages the take-up of broadband by businesses and individuals by providing services for online use.

In 1997, the Commonwealth Government made a commitment to have all appropriate government services online by the end of 2001. **The Government Online Strategy** and **the Commonwealth Electronic Procurement Implementation Strategy** were released in April 2000. The aim of these strategies was to provide a strategic framework to assist agencies in meeting key online commitments and to encourage government business operations to go online.

Under the framework, four reporting rounds have been held revealing significant whole-of-government progress. There are now in excess of 1600 government services and information sources available online and all agencies report that they met the important target of having all appropriate services online by December 2001. The Prime Minister announced this significant achievement at the World Congress on Information Technology on 27 February 2002.

The Government recently launched its eGovernment strategy **Better Services, Better Government** that will build on the enormous gains made in the first stage of online service delivery across the Commonwealth sector.

State, territory and local government authorities have also made commitments to delivering services online, with significant progress apparent across the board. Access to government services online is now a significant component of internet use by Australians, and will be one of the drivers for broadband connectivity.

3.1.3 Driver: Health

The push for better methods of service delivery in the health sector is being driven by increasing costs and the demands of an ageing population. Pressure to reduce costs, the need to offer services when and where they are required, and possibilities for innovative new services to improve

health outcomes, all support the take-up of broadband by the health sector.

Access to specialists for a second opinion can assist a regional health worker in treating someone within their local community, saving transport costs and additional stress to the individual concerned. Systems that monitor the vital signs and activity of the elderly at home, and report them via broadband to care givers in real time, can keep people out of hospital while offering quality care and support. Electronic health records can provide up to date patient information for any individual wherever and whenever it is needed, improving health outcomes with reliable information. Decision support systems can assist practitioners to make better diagnosis and treatment decisions.

These examples will not only deliver better health outcomes but will also improve the retention of skilled personnel in rural and remote areas and drive the take-up of broadband.

3.1.4 Driver: Supply

The activities of broadband suppliers in promoting the benefits and availability of broadband has a positive impact on take-up. Availability of a greater range of services, and positive marketing of the broadband value proposition, are both factors associated with the significant recent growth in broadband utilisation in Australia.

For example recent advertising campaigns by Telstra have stimulated take-up by focussing on the price comparison and value proposition between narrowband and broadband services. In the ACT the local carrier TransACT has waived connection fees as infrastructure is rolled out into new suburbs and bundled services to demonstrate a business case that is more compelling than a narrowband connection. Carriers are also developing managed services targeted at the SME market.

The broadband xchange project was initiated by the Service Providers Industry Association (SPAN) in 2001 to co-ordinate an industry-led, collaborative program to promote the value and take-up of

broadband. Since then the broadband xchange has undertaken significant work in disseminating information on the broadband value proposition to potential users, particularly to the SME market.

Government initiatives to support the development of broadband content have been identified in section 2 and section 6. The Broadband Content Fund administered by the Australian Film Commission provides seed funding for Australian content producers to pursue opportunities in new broadband applications. In 2002 Telstra established a Telstra Broadband Fund to provide grants to stimulate and fast track the development of new and innovative broadband applications, tools or technology with wide appeal for broadband delivery to Australian businesses and consumers.

Aggressive and targeted marketing of value propositions which strike a chord with potential customers will continue to be one of the significant drivers of broadband uptake.

3.2 Impediments

Two key impediments to broadband adoption are the affordability and availability of broadband services. The Estens Regional Telecommunications Inquiry report identified cost as the major impediment to take-up in some regional areas²⁸ and recommended incentives for certain rural and regional customers.

These impediments are complex and interrelated and therefore it is difficult to determine how best to deal with them. The characteristics of technologies coupled with Australia's geographical conditions mean that availability of infrastructure in different areas can vary greatly. A range of technical and economic factors can inhibit accessibility even when infrastructure is available.

28 *Op cit* p 221.

3.2.1 Availability

There are both longer term and short term issues associated with availability. The short term issue is that not all current generation services are available in all areas, largely due to geographic considerations. This is compounded by significant differences in the capability and reliability of current technologies. For example, the types of applications and uses that can be delivered over an ADSL service cannot necessarily be provided over a one-way satellite service.

In the longer term access to next generation services will be a major issue and relates to where and when investment in new networks will occur. New innovative technologies with lower rollout costs, especially emerging wireless technologies, may mean that next generation services can be made widely available. However, providing consumers with the full range of service types requires a choice of technologies, including fibre optic technologies for particular needs but these next generation fibre based networks may not be ubiquitously deployed.

There is a range of technologies offering potential broadband access in Australia. For example cable modem services are available to around 35 per cent of homes, ADSL is available to over 70 per cent of the population, ISDN services are available to over 96 per cent and satellite services are available nationally. Of these, both ISDN and satellite services have been around for some time while ADSL and cable modem services are more recent and are still being deployed.

There is sufficient, high quality, backbone capacity in Australia – this was supported both in the BAG consultations and by the conclusions of the Estens Inquiry.²⁹ However availability of 'last mile' or CAN infrastructure is a more critical issue. The lack of infrastructure competition in CAN networks has the potential to limit the competitive pressure on providers to continue to deploy new broadband services. Therefore, regulatory intervention has been necessary to provide access to existing telecommunications infrastructure through the unbundling of the local loop and more recently through line sharing. In addition,

access regulation has been required to ensure that competitors can access backbone capacity in areas where it makes little economic sense to duplicate infrastructure, primarily in rural and regional areas.

As a full range of services is not available in all areas, there are cases where customers with specific bandwidth needs or specific service quality requirements may not have any choice of provider, or any access to the type of service they require. In particular health and education institutions that require high bandwidths and greater reliability than residential consumers can have difficulty accessing these services in some areas.

There may be a case for public sector involvement to encourage the widespread and more equitable availability of broadband services across Australia. However this needs to be balanced against the fact that the market is still developing and new services and technologies continue to be developed and deployed, and interventions will need to be targeted to specific instances of market failure.

3.2.2 Pricing

While there remains debate about exactly what impact price – as opposed to other factors such as awareness and availability of worthwhile content and applications – has on adoption of broadband services, it is clear that if services are not affordable, customers will not use them.

The Estens Regional Telecommunications Inquiry Report concluded in chapter 6 that 'price rather than availability is the major impediment³⁰ to the take-up of higher bandwidth services in regional, rural and remote areas'. These geographic differences in pricing reflect the different costs associated with various technologies, and the fact that not all technologies are available in all areas. The primary concern in these areas is that where lower priced higher bandwidth services such as ISDN and ADSL are not available, users can only access comparable services at a significant price premium using satellite technology.

²⁹ *Op cit* p208.

³⁰ *Op cit* p 221.

Current price levels and current broadband pricing strategies (notably per megabit usage charges) are often raised as potential barriers to greater take-up of broadband services.

The inclusion of download limits in most broadband service plans is seen to be dampening demand for bandwidth intensive applications such as audio/video streaming and participation in online computing environments. It also impacts on take-up of SMEs with large bandwidth demands, such as those with a requirement to exchange architectural drawings, images or 3D mining data and maps.

Within the education sector, excess download charges are often seen as much of a challenge as securing broadband connectivity. Download limits are also considered to be potentially retarding the online games market in Australia compared to markets such as the US where there are currently no download limits on residential broadband plans.

Megabit usage charges can work against consumers, particularly SO/HOs and SMEs who want a high level of pricing certainty for the services that they contract. The size of the penalty imposed for exceeding the usage limit combined with a lack of awareness of what type of usage patterns constitute reaching a usage limit, contribute to uncertainty about the size of the monthly broadband bill. This may mean that consumers might prefer to remain with dial up access until such time as there is a compelling requirement to move to broadband.

However, there are valid reasons for usage based charging. For a service with a significant variable cost component from high international internet charging arrangements, properly tailored usage based charging may be the most economically efficient pricing option for both providers and consumers. It is interesting that in the current environment almost all providers have some mechanism for rationing excess demand. If usage based charging is justifiable on efficient pricing grounds, a competitive broadband market should contribute to ensuring that the size of charges or penalties reflects the costs of delivering the service. The potential that a lack of competition may

contribute to the introduction and maintenance of inefficient usage based charging is of concern.

Whilst there are significant risks associated with any pricing intervention, the Government should continue to monitor closely the range and evolution of broadband pricing structures in Australia. Work to achieve reform in international internet charging arrangements should be continued. The Government should ensure there is a robust regulatory framework that can address concerns if it becomes apparent that usage based charges are resulting in anti-competitive behaviour.

Sustainable competition plays a major role in encouraging the development of efficient pricing structures. Therefore strategies to further encourage the development of competition are supported, in particular removal of potential barriers to entry for new wireless technologies. In this respect, Australia is already leading the world in terms of technological neutrality in regulation of spectrum allocation and use.

3.2.3 Lack of understanding of key benefits of broadband-related innovation

Another impediment to broadband take-up, particularly in the SME sector, is the lack of knowledge on the part of key decision makers about the potential benefits of new activities and business innovation using broadband services. This report noted earlier in section 5.5 that an SME that is broadband-enabled has twice the revenue per employee compared with an SME that has narrowband. Yet this is not widely understood. Key decision-makers have not been convinced about the business case for broadband – they do not have a value proposition that they will buy. The lack of independent ‘vendor neutral’ information is a major barrier to take-up.

This is beginning to be addressed through industry associations, such as SPAN and professional groups such as the Independent Chartered Accountants of Australia.

4 Strategies to promote broadband awareness and applications

4.1 Consultations

One of the recurring themes during the consultations was the lack of awareness among Australian consumers, SMEs and even larger organisations about the capabilities and benefits of broadband connectivity and associated applications.

Initiatives are already in place to promote understanding of broadband and to encourage the development of innovative content. However, initiatives to disseminate best practice models are needed to build on existing programs, including NOIE's e-business initiatives. There are fundamental differences between the way businesses with a broadband connection access the internet, for example. They are much more likely than businesses with a narrowband connection to use it for both purchasing and sales. Live trials and demonstrations would allow people to experience (touch and feel) broadband applications, helping to establish a clear business case for broadband-powered e-business tools in SMEs and new business models such as the application service provider (ASP) model.

4.2 Technology Diffusion

Physical infrastructure is not the only requirement for the availability and effective use of broadband connectivity in Australia. Innovative services and applications for the emerging broadband communications environment are the fundamental drivers, but these are also inherently risky and need to be encouraged by public and private sectors coordinated action to establish the basis for broadband market take-off.

Government initiatives might be directed towards developing the broadband market in key sectors, where potential demand has been demonstrated and there are clear productivity benefits from accelerated broadband take-up. This might involve initiatives to remove impediments and to promote take-up, in order to ensure that

Australian industries and key sectors such as SMEs can access global markets and supply chains.

In particular the Government could promote the use of Australian-produced digital content. This would build on the work undertaken in the Creative Industries Cluster Study, the \$2.1 million Broadband Content Fund and the ongoing work in digital rights management.

5 Possible policy solutions

The BAG's findings about possible policy solutions are reflected in its recommendations.

APPENDIX 2:

MEMBERSHIP OF THE BROADBAND ADVISORY GROUP

The Membership of the
Broadband Advisory Group is:

Senator the Hon Richard Alston,
Minister,
Communications, Information Technology
and the Arts

Dr Bronte Adams,
Principal, Dandolo Partners

Ms Ros Hill,
Manager,
eHealth Planning Unit, Department of
Health and Human Services, TAS

Mr Tom Kennedy,
Managing Director,
Beyond Online Ltd

Mr George McLaughlin,
Executive Director,
Australian Academic and Research Network
(AARNet)

Prof Mike Miller,
Chair,
Board of Directors, mNet Corporation Ltd

Ms Rosemary Sinclair,
Managing Director,
Australian Telecommunications Users
Group (ATUG)

Mr Phil Singleton,
Chairman,
Service Providers Industry Association Inc.
(SPAN)

Dr Ziggy Switkowski,
Chief Executive Officer,
Telstra

Dr Jeffrey Tobias,
Director, Caltra Pty Ltd

Mr Terry Walsh,
Managing Director,
Cisco Systems Australia/New Zealand





APPENDIX 3

INPUT FROM GLOBAL ADVISERS

A team of Global Advisers was established to bring an international perspective to the deliberations of the BAG. They participated in meetings via videoconference where possible and the Minister for Communications, Information Technology and the Arts met with several of them individually. The Global Advisers raised the following principal issues:

Role of Government

A key question that the Global Advisers considered was the extent to which Government should, or needs to, directly invest in the development of broadband infrastructure.

While there was today less enthusiasm for investment in IT or Internet initiatives, the life sciences had become an area of large and active investment. For example, the high-speed CANARIE network was seen to be a key component in Canada's research capabilities in this area. (CANARIE is a not-for-profit corporation supported by members, partners and the Canadian Government). In particular, it had enabled the Canadian Foundation for Innovation to locate research centres in a number of regional areas. Similarly, much of the life sciences activity in the US involved a mix of public and private sector support.

A key role of government is to ensure a competitive framework for the provision of broadband services – especially at the level of the local access network. The OECD's forthcoming 'Communications Outlook' report would find that the global telecommunications industry is still growing in terms of revenue and as a share of member country GDPs. In turn, it remained central to economic performance. However, governments needed to be careful not to over invest in any one generation of technology such as today's broadband systems because 'there's always something better on the horizon'.

Where there was genuine demand, it would tend to be fulfilled by market participants.

The UK has seen a significant rationalisation of alternative network providers during the past year, leaving British Telecom as the nation's major broadband provider. However, innovation is still occurring in areas such as wireless networking (including WLANs and 3G) and the insertion of broadband communications chips in TV set top boxes.

Some Global Advisers suggested that if left to its own devices market forces will continue to develop existing technology and that building different technology requires a national vision.

International Connectivity

The Australian Government could be instrumental in the area of international connectivity. Any intervention here would help to better integrate Australia as a creative content producer with the rest of the world, and better enable it to access information from overseas. Global advisers observed that Australia appeared to pay a high rate for connectivity and it would be more effective for the Government to concentrate on Australia's small number of international links than trying to supply high-speed connections to every home. The BAG should make it an explicit goal to 'equalise the playing field' in terms of the cost of bandwidth between Australia and the rest of the world.

Educational Requirements

The experts working on Canada's broadband strategy felt their activities should be considered a 'failure' if they did not succeed in providing broadband connectivity to institutions such as schools. Canada had set the goal of providing a 10Mbps connection to each school to

support the growth in general network traffic being generated by modern students. This had been achieved in many urban locations, with some larger schools using up to 100Mbps links, but was yet to be the case in all parts of Canada.

Even 10Mbps was low for a whole school, compared to the speeds business people enjoy on local area and corporate networks. The demands of school and tertiary students were comparable and that the most important applications for students of all kinds were email and faster Web access for research purposes. Email and access to the Web may only be a starting point for the use of Internet in education and the massive potential for other online learning should not be overlooked.

Security

Another significant area, and one in which the Government could play a role, was security. The 'always on' nature of broadband networks raised significant security concerns for individual users and organisations. Global Advisers observed that NOIE Chief Executive Mr John Rimmer had told a recent conference in Singapore that the Australian Government saw the promotion of online security as key to ensuring business confidence in broadband networking. The US had also released a national security policy paper that has some relevance for the Australian situation.

Broadband and Innovation

Innovation was seen to be a key part of the broadband debate in Canada and that the enabling of innovation was a goal shared by most countries. In the US universities had invested millions of dollars in research into advanced network applications but there was as much, if not more, value in solving many of the problems still plaguing already available applications such as videoconferencing. A key goal should be to make the current generation of technologies easier to use and more widely accessible.

Competitive Frameworks

Discussion of competitive frameworks led to questions about whether facilities-based competition remained the best approach in the broadband environment.

The adoption of broadband had tended to be strong where there was facilities-based competition in the supply of cable or DSL services. However, the growth of cable connectivity appeared to be slowing in Australia with the introduction of DSL services.

There was no reason why fibre to the home networks have been a natural monopoly and similar arguments have been put forward for earlier network technologies. Within any competitive framework, it was important to retain contestability at the access level.

It is a decision for infrastructure providers whether to duplicate networks but there are equivalents to 'line sharing' technology that meant multiple operators could compete within one physical fibre network. The OECD recognised that in some situations it can make sense to exempt new entrants from such conditions in the interests of developing a more competitive market in the long run.

Establishing Targets

Global Advisers considered that setting concrete targets is useful and gave regulators key points of reference. A good example is the proposed 2010 phase out of analogue television in the UK because it is creating pressure and focusing the activities of regulators and industry.

The Government could set targets for broadband use in its areas such as education and health that it has some direct control over. A key goal here could be to help SMEs access the equivalent of corporate leased data lines. Global Advisers commented that the vision to be 'a leader' in the OECD in terms of broadband uptake and effective use was a realistic and commendable goal.

The Global Advisers to the
Broadband Advisory Group are:

Jonas Birgersson,
CEO,
Framfab Labs, Sweden

Andrew Bjerring,
President and CEO,
CANARIE Inc., Canada

Bob Bishop,
Chairman and CEO,
Silicon Graphics Inc., USA

Martin Cooper,
Chairman, CEO and Co-Founder,
ArrayComm, USA

Janice Hughes,
Founding Partner/Managing Director,
Spectrum Strategy Consultants, UK

Michael McRobbie,
Vice President for Information Technology
and CIO,
Indiana University, USA

Craig Mudge,
Managing Partner,
Pacific Challenge, USA

Sam Paltridge,
Communications Analyst,
OECD, France



APPENDIX 4: NATIONAL BROADBAND STRATEGY IMPLEMENTATION GROUP

This report recommends that the Australian Government adopt a National Broadband Strategy and that a National Broadband Strategy Implementation Group (NBSIG) be formed to oversee the implementation of the actions in the national strategy and to review and evaluate its progress.

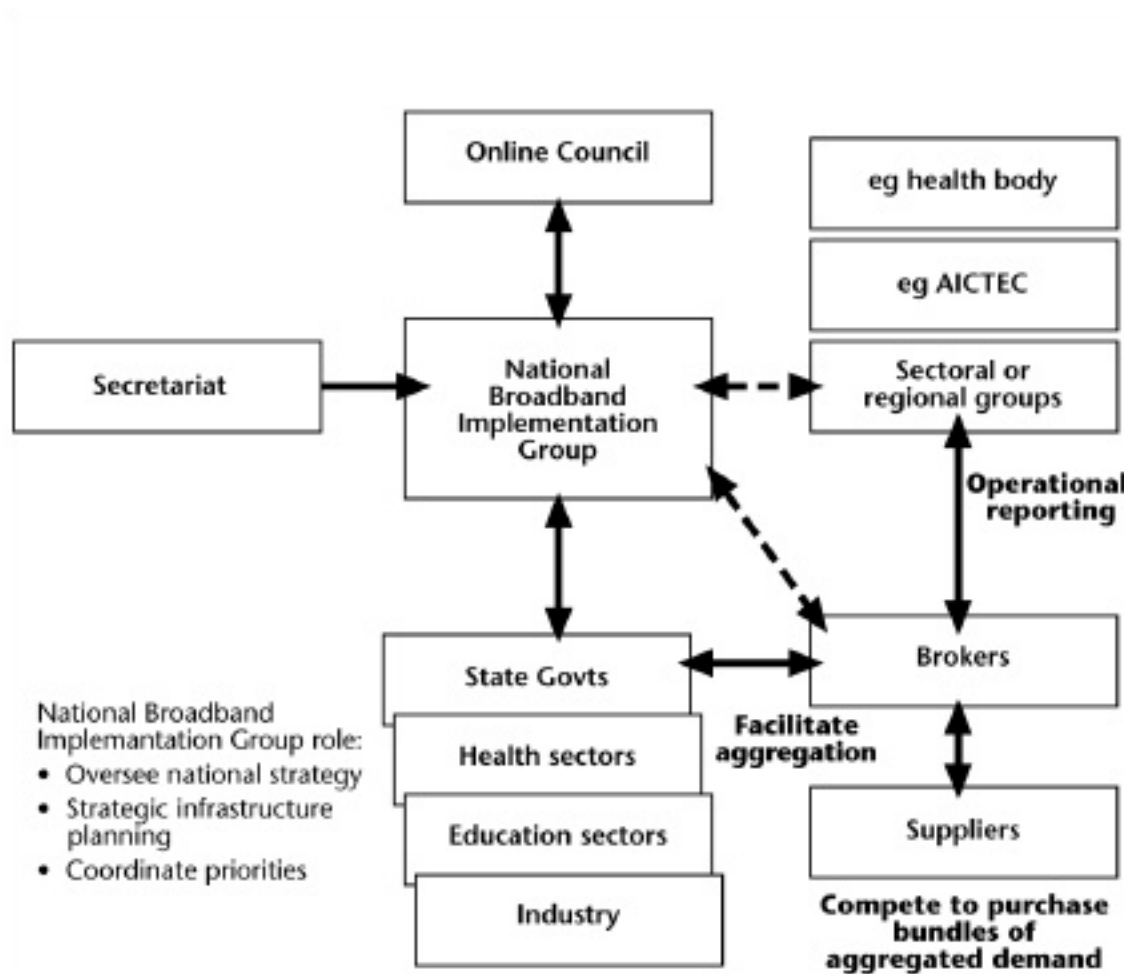
The NBSIG (see Figure 1) is envisioned as an independent advisory group made up of the key players throughout the broadband value-chain from public and private sectors, to help drive forward the National Broadband Strategy and inform its future development. The NBSIG would be responsible to the Minister for Communications, Information Technology and the Arts and would report to Online Council. It would be supported by a small secretariat from within the Communications, Information Technology and the Arts portfolio.

Representation on NBSIG would be from the Commonwealth and each state and territory, as well as the private sector. It would be preferable for this representation to include expertise in education, health and small business policy. A virtual forum is also recommended which would draw further experience and advice from a broader group of broadband industry specialists.

NBSIG would meet as required with the key objective being to ensure consistency among government funded broadband initiatives with agreed national principles and priorities.

It is suggested that the NBSIG may wish to form working groups tasked with looking at specific broadband issues. These could include demand aggregation strategies, strategic investments and the information economy environment.

Figure 1: National Broadband Strategy Implementation Group Operational Relationships





APPENDIX 5:

DEMAND AGGREGATION AND BROKERING

Demand aggregation initiatives should form an essential component of a National Broadband Strategy. Consistent with previous inquiries, it is recognised that pooling customer demand for broadband will attract cheaper pricing and new services into particular markets. Essentially, demand aggregation builds buying power among users in markets where suppliers currently have significant market power.

Demand aggregation can be a useful strategy to improve price and service levels in markets that lack competition. However, care is needed to ensure that a monopsony of demand does not replace a monopoly of supply. Demand aggregation strategies should be structured to reinforce other measures to promote vigorous infrastructure competition and thereby deliver improved market conditions for all market players.

This attachment considers the current and possible future application of demand aggregation in the Australian context. It focuses on structures to support demand aggregation to promote investment and on the related but distinct process of bandwidth brokering.

The National Broadband Strategy Implementation Group would oversee demand aggregation initiatives and report to the Online Council, which would have a 'watching brief' of progress across broadband programs.

Supply Side: Promoting investment

In areas where insufficient bandwidth exists, demand aggregation can act as a useful incentive for development of infrastructure. From the providers' viewpoint, demand aggregation can lower the commercial risk of infrastructure investment. An 'anchor tenant' guaranteeing a return for a period of time

allows providers to adopt a longer term planning horizon. As a result, revenue becomes more certain and more advanced infrastructure can be deployed with greater confidence. In regional areas in particular where broadband infrastructure is scarce, aggregating the demand of a sector or sectors may create a sufficiently attractive business case for new investment.

The Commonwealth has previously attempted to stimulate demand aggregation and collaboration between sectors, using seed funding, notably in the recent National Communications Fund process. Other programs such as Networking the Nation have also enabled communities to fund initiatives to gain access to better telecommunications services.

As an example, Networking the Nation funding was a catalyst for the Coorong Telecommunications Project in rural South Australia which aggregates voice and data demand from the local municipal council, small businesses and consumers for the purpose of achieving lower telecommunication charges and enhanced access to bandwidth compared to the usual commercial rates of Telstra. New broadband microwave infrastructure has been created by Agile Communications between Murray Bridge and Adelaide, and by the Coorong District Council within the region encompassing Meningie, Tailem Bend and Tintinara.

Demand Side: Bandwidth Brokerage

From the viewpoint of users, demand aggregation should lead to a better short-term price for the same bandwidth, or greater bandwidth for the same cost. Users are also interested in whether these benefits will be longlasting.



One viable tool for effecting demand aggregation would be to establish a 'broker' to bring together potential user organisations and information about their planned procurements. The role of the broker would be to identify demand patterns within the group and assess opportunities for collaboration and synergy. The broker would identify sources of supply, gain detailed information as to those offerings (in technical, pricing and geographic terms) and assess whether there is potential for group purchasing that would be more effective than if members sought individual solutions. This can work both where infrastructure capacity exists and where it needs to be developed. Technically, user organisations might experience no change to their existing telecommunications connectivity (apart from a more attractive commercial offering) but for sustained improvement over the coming years there may be a degree of network sharing.

The prime benefits of bandwidth brokering is earlier access to higher bandwidth and value-added services, and a lower price for those services, by providing suppliers with more certainty about demand. The compound benefit for users would then be the faster uptake of innovative applications and services that positively impact on business productivity or the ability to meet future goals. Risks facing a broker relate to an inability to realise group cooperation, satisfy supplier payment requirements or establish an appropriate contracting vehicle.

Successful brokering calls for a high degree of trust between group members and with the broker, but of greatest importance is the ability to aggregate sufficient demand, generally over a specific geographic area, that delivers members an offering of sufficient attractiveness that ensures their continued cooperation. In turn, the broker must be able to operate with authority in the market place in order to attract superior offers from suppliers and demonstrate independence from both commercial and political interference that would otherwise produce a less effective outcome.

A successful example of brokerage is AARNet Pty Ltd, which operates the second generation of the Australian Academic and Research Network. AARNet provides high-capacity Internet services for 37 universities plus research institutions across Australia and is a not-for-profit company owned by Australian universities and the CSIRO. With a staff of about a dozen persons, AARNet continues to design and manage the largest data network in Australia including overseas connections via undersea cables. This small team has brokered all of the necessary bandwidth connections both within Australia and internationally, achieving a 23 per cent unit cost reduction over the last year despite a 52 per cent increase in traffic – a clear demonstration of what can be achieved where there is a significant anchor tenant and a consensus between members of the group.

It would be open to other sectoral or regional groups to engage the services of a broker on their behalf. One possibility is that, as a part of a National Broadband Strategy, governments establish brokerage services to be used by sectoral or regional consumers of broadband in ways that best fit their needs. Commonwealth, state and territory governments will need to identify their respective roles and responsibilities.

While the initial establishment of a brokerage service might be a Commonwealth or state/territory initiative, it would be critical for a strong relationship to be established quickly between the broker and their clients in the sector or region involved.

The broker's objective would be to gain maximum leverage for their clients' aggregated demand, through smarter procurement practices, knowledge of the market and the industry structure and the capacity to explore a range of creative options, including direct investment in infrastructure. As the process matured, it would be ideal for the broker or brokers to be proactive in seeking collaboration between sectors and engage in awareness raising and best practice.