

## Link to South Australia's Strategic Plan Objectives

Improved access throughout the state to reliable, high-speed telecommunications infrastructure will contribute to the achievement of the following targets:

### Objective 1: Growing Prosperity

**Strategic Infrastructure** Increase investment in strategic areas of infrastructure, such as transport, ports and energy to support and achieve the targets in South Australia's Strategic Plan. (T1.16)

**Performance improvement in the South Australian public services - productivity** Lead the nation in cost effectiveness of government services within 5 years. (T1.18)

### Objective 4: Fostering Creativity

**Creativity** Achieve a ranking in the top 3 regions of Australia in Richard Florida's Creativity Index within 10 years. (T4.1)

**Internet usage** Increase the level of internet use in metropolitan and regional South Australia by 20% within 10 years. (T4.7)

**Creative education** Improve the connections between educational institutions and industry to enhance creativity and innovation. (T4.10)

### Objective 5: Building Communities

**Regional Infrastructure:** Build and maintain infrastructure to develop and support sustainable communities in regions. (T5.11)

## Background

The accelerating power and convergence of computer and telecommunications technologies since the mid-1990s has brought about major changes in the way people live, learn, work and operate their business. Information and communications technology (ICT) infrastructure is essential for the delivery of modern digital services of all kinds, from simple telephone calls to supercomputing. Infrastructure developments that support the adoption of wireless computing and new mobile telephone services are also important.

Most legislative and regulatory powers regarding communications rest with the Australian Government. The market has been progressively deregulated since the late 1990s and there are more than 100 licensed carriers, although Telstra is still by far the largest and dominant player in most market segments, especially in regional areas. Market forces and commercial imperatives largely determine decisions governing the building of new infrastructure. Given the current rate of technological change in the industry, services can be expected to continue to improve in quality and fall in price.

While the national legislative framework has aimed to promote competition, limited competition has developed in the local access market (the so-called 'last mile' connection into homes and businesses).

South Australia presents a relatively small market to telecommunications carriers. While a number of national carriers have a presence in the state, their networks are generally concentrated in major population centres where there is sufficient traffic to justify infrastructure investment.

South Australia's ICT industry comprises manufacturers and service providers in the fields of IT, telecommunications and electronics. According to a 2004 report by the South Australian Centre for Economic Studies, the state's ICT industry (excluding retailing) employs more than 17,500 people and generates some \$850 million in exports annually. The future growth and development of this industry will contribute significantly to a further strengthening of the state's ICT capabilities.

The South Australian Government has, over time, made a significant investment in ICT infrastructure in Adelaide and regional areas. The major elements include computing hardware and software, telecommunications, internet-based technologies and the applications that process the government's business and its delivery of services. ICT is now permanently woven into the fabric of government service delivery and requires a long-term approach to investment.

The South Australian Government is a dominant user of ICT infrastructure and services in the state and can use its market power to influence the provision of best practice ICT infrastructure for the benefit of industry and the community. The government has taken a number of steps to improve access to telecommunications infrastructure and to promote the uptake of telecommunications services in key regions and sectors.

#### **Recent State Investments in ICT Infrastructure**

##### **Broadband Development Fund**

The Broadband Development Fund (BDF) provides \$7 million in 2003–07 to fund new broadband infrastructure in regions and metropolitan 'black spots', focusing on 'last mile' projects that deliver economic benefits to the state. This \$7 million will leverage funding from the Australian Government and the private sector.

##### **SABRENet**

The South Australian Broadband Research and Education Network (SABRENet) is a joint venture of the State Government, the three South Australian universities, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Defence Science and Technology Organisation (DSTO) to construct a fibre optic broadband network linking Adelaide's major research sites to the national and global research network. The network will also be available for government and educational use.

##### **EduConnect**

The State Government has just completed a major procurement to upgrade broadband services to schools, which will provide significant increases in bandwidth to all schools. The government's expenditure also attracted a significant new second tier telecommunications carrier (Soul Pattinson Telecommunications) into the South Australian market.

##### **CineNet**

The government provided financial assistance toward the establishment of a privately operated broadband network, CineNet Systems, which is used by the growing film post-production and multimedia industry. It is planned to make the commercially funded stage two of the network available to other industries.

##### **Advanced Computing**

The State Government provided financial assistance to the South Australian Partnership for Advanced Computing to upgrade the state's advanced computing capability, centred on the purchase of a new Silicon Graphics Altix supercomputer ('Aquila'). The state assistance package also provided for technology transfer and skills development programs, and a major broadband upgrade, aligned to SABRENet, which will ensure world-class connectivity to the international advanced computing network.

##### **Fibre optic Cable Rollout**

Optus has commenced a \$5 million rollout of fibre optic cable in Adelaide, which will promote the development of competitive broadband services for business in the metropolitan area.

## Challenges and Opportunities

### Technological Change

From an overall state infrastructure perspective, some of the greatest ICT challenges and opportunities are in the area of telecommunications, and in particular, broadband. Broadband is a naturally shareable resource. A single broadband link can support many users simultaneously. The number of users is limited only by the transmission speed (or 'bandwidth') of a broadband link. Today's high-speed inter-capital links can support millions of simultaneous users.

Until comparatively recently, the telecommunications industry has comprised two distinct elements: voice telephony and broadband data services. By far the greatest share of telecommunications traffic and revenue has been, and remains, voice telephony, with the majority delivered to end-users in the form of analogue (i.e. not digital) telephone lines. Even conventional (non-broadband) home and small-business internet access works by converting digital signals into voice-like sounds transmitted across telephone infrastructure. However, the continually falling price-performance ratio of digital technology makes it increasingly attractive for telecommunications carriers to convert ('digitise') voice signals into digital data, which can then be transmitted across data networks like any other, removing the need to build and maintain separate voice and data infrastructure. Telecommunications carriers around the world, including Telstra, have begun the task of converting their entire networks to broadband data networks.

In the long-term, all telecommunications networks will be broadband. This 'convergence' of voice and data is not yet complete, however, and carriers must balance current revenues derived from voice infrastructure against the future benefits to be gained from investment in a single converged network. In the meantime, the world's telecommunications markets are likely to be characterised by dramatic technological change and shifting market dynamics.

### Industry Structure

Telstra is dominant in most segments of the Australian telecommunications market. South Australia is home to several successful medium-sized telecommunications carriers, which are active nationally. Nonetheless, the focus of industry investment remains firmly concentrated on the Eastern seaboard. Consequently, South Australia consistently lags the Eastern States in the deployment of new (that is, cheaper and faster) technologies, which is in turn reflected in generally lower usage and adoption rates.

Telstra owns essentially the entire customer access network linking customer premises to telephone exchanges. About 30% of Australian residential broadband customers subscribe to Telstra's BigPond service. Furthermore, Telstra is required by law to allow its retail competitors wholesale access to Telstra infrastructure, with the result that nearly all of Telstra's retail competition actually arises through resale of Telstra's own wholesale services. Widespread infrastructure-based competition to Telstra exists only in the mobile telephone market, where Telstra services 45% of the market, and, to a lesser extent, in the provision of corporate data services in and between the major capital cities.

Pricing for telecommunications services is often structured around the technical limitations and assumptions of Telstra's pre-internet switched telephone network, despite the fact that much of this infrastructure has long since been replaced. As a result, Telstra's pricing in regional areas, for example, often reflects distance and administrative boundaries that no longer have a corresponding effect on Telstra's actual costs.

### Basic Telephone Services

A telecommunications 'safety net' exists to ensure that all Australians have access to a basic, utility telephone service. The universal service obligation (USO) is the obligation placed on universal service providers to ensure that standard telephone services, payphones and prescribed carriage services are reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business. Telstra is currently the nominated universal service provider (USP). A central object of the USO regime is that the losses that result from supplying loss-making services in the course of fulfilling the USO are to be shared among carriers. It is important to note that the USO does not, at present, include mobile telephony, broadband internet access or other advanced services.

In recent years there have been two major Australian Government inquiries conducted into the telecommunications industry and the state of telecommunications services. The Australian Government has responded to these inquiries by directing significant funding to programs to improve services, especially in rural areas.

In most areas of South Australia, the quality of telecommunications, except for broadband access, is reasonable. In general, the telecommunications infrastructure in South Australia is sufficient to meet most everyday needs, aside from broadband, for most of the populated centres.

### Mobile Telephony

Mobile phone coverage has improved markedly in the last few years, due in part to heavily Australian Government-subsidised deployment of mobile phone base stations. All South Australian towns above 500 people now have Code Division Multiple Access (CDMA) mobile coverage and continuous coverage now exists along most of the major highways in the state.

### Strategic Priorities

- Seek to influence developments in national telecommunications policy and regulatory arrangements in the interests of South Australian consumers.
- Ensure that South Australia receives its fair share of funding for telecommunications facilities under Australian Government programs, which appropriately reflects the state's size and population distribution.

### Broadband

The next major telecommunications development will be the widespread delivery and use of services requiring access to broadband infrastructure.

'Broadband infrastructure' is the equipment needed for high speed transmission of digital information either through the air (e.g. satellite, terrestrial radio) or along a physical carriage medium (e.g. optical fibre, copper wire), and includes both the transmission equipment and the carriage medium (e.g. cables). Licensed radio spectrum may also be considered as broadband infrastructure.

Australia ranks poorly among developed nations (22nd out of 31 countries) in terms of the uptake and use of broadband and the cost of broadband services. This comparatively poor performance is often attributed to the structure and regulation of the Australian telecommunications industry.

On a state basis, accurate and up-to-date figures are not available; however, in line with national trends in the general uptake of the internet, it follows that South Australia is likely to be at the tail end of the states and territories in broadband use.

There are still major cost and infrastructure barriers to the delivery of broadband services, particularly in much of regional South Australia, which is limiting the take up of these services. Fewer than 20% of households outside of metropolitan Adelaide have access to Asymmetric Digital Subscriber Line (ADSL) broadband services of the type available in the metropolitan area. Broadband capability is generally lacking in all but the major regional centres and while optical fibre now connects most of the populated centres, access to affordable broadband services by business and residential users outside of these towns is currently inhibited. This is due to inadequate infrastructure deployment and lack of a commercially viable level of demand, except for relatively costly satellite connections. Significant 'black spots' also exist throughout metropolitan Adelaide, particularly in new housing and business developments.

### Satellite

In principle, broadband and mobile telephony is available everywhere in Australia using geostationary satellite technology. However, satellite equipment is more expensive than terrestrial equivalents. As well, the quality of both voice and data services is generally lower, largely because of the 'latency effects' of signals having to travel hundreds of kilometres up to a satellite and back again.

Nonetheless, satellite is often the only viable solution in the more remote parts of Australia and thus plays an important part in the overall telecommunications environment.

Whereas satellite services have been successfully deployed in the more populous parts of the state (including metropolitan Adelaide), it is unlikely that satellite technology will play more than a niche role.

### Wireless broadband

Broadband transmission through the air by means of radio waves is known as 'wireless broadband', and falls into two broad categories:

- Mobile broadband services, such as 3G using wideband CDMA technology
- Fixed wireless broadband (FWB) services that serve essentially the same function as a physical cable, transmitting data from one point to another ('point-to-point' or 'point-to-multipoint').

Mobile broadband services are today slower and more expensive than either fixed wireless or conventional cable-based broadband. Users pay a premium price for mobility and applications that exploit it.

The next stage in the evolution of mobile communications will be the continued emergence of 'rich media' services capable of delivering music, images and video to advanced mobile phones and other devices. The Adelaide based m.Net industry consortium is seeking, with Australian and State Government support, to develop Australia's mobile broadband content and services industry, servicing national and overseas markets.

Fixed wireless broadband (FWB) services, on the other hand, offer genuine alternatives to ADSL and other forms of cable-based broadband infrastructure. However, the current problem is that it offers too many alternatives—today's FWB market presents a daunting array of competing proprietary products and conflicting standards, which drives up prices and adds risk to investment decisions.

### Strategic Priorities

- Implement South Australia's Broadband Strategy to support development and use of broadband services.
- Coordinate deployment and use of ICT infrastructure, including broadband, with the state's physical infrastructure priorities, including transport, new housing and industrial developments and other built infrastructure.
- Make maximum use of the opportunities presented by the State Government's purchasing of broadband services to stimulate investment in broadband infrastructure and take-up rates across the broader community.

### Advanced Computing

The government has made significant investments in developing a highly advanced ICT infrastructure capacity within the state. (The most prominent examples to date are SABRENet and advanced computing investments.) While this has been driven in the first instance by the needs of the research sector, forward planning anticipates broader use by industry and the education sector. Examples of this broader use include modelling complex manufacturing processes, genomics and large-scale investigation of data.

### Government Communications Networks

ICT in government comprises telecommunications infrastructure (optic fibre, telephone cables, mobile phone towers etc.), internet (web) infrastructure (internet search engines, web sites/portals etc.), telecommunications and computing hardware (PABXs, telephones, PCs etc.), software (operating systems, databases etc.) and applications (email, word processing, registration systems, justice systems, health systems). This infrastructure features a high degree of consolidation and standardisation.

The redevelopment of a number of government websites, including SA Central and Bizgate has enabled the government to extend and improve access to services to cater for changing community expectations.

The South Australian 'Generational Health Review' highlighted the need for systemic reform. Achievement of this reform requires support from modern ICT systems and practices. ICT connectivity and use of central applications are essential for schools and pre-schools to achieve educational outcomes. ICT connectivity also plays a fundamental role in the state's law and order and emergency services.

The government's plan for use of ICT in the public sector, 'ICT Directions', focuses on managing ICT across government as a strategic asset for the delivery of services to the community.

### PABX Network

South Australia has an extensive shared telephony and PABX infrastructure underlying the operation of government and delivery of services. Historically, the state has owned and operated its own PABX network, comprising in excess of 100 PABX systems and more than 28,000 telephone handsets. This has resulted in economies of scale that rival any other state government.

### StateNet Data Network

The government StateNet Data network consists of a core network and associated agency access networks which underpin the government's daily operation and delivery of services. StateNet's data networking environment provides government agencies with secure, reliable and cost effective access to critical business systems, other central data processing environments, messaging services (via SAGEMS), shared directory services and the State Government's shared internet gateway.

### E-Government Integrated Service Delivery

Electronic service delivery assists in meeting community expectations for convenient access to services and information outside of normal office hours and from remote or isolated situations. It also allows for a seamless and transparent integration of government services across agency and government boundaries.

There will be an increased demand for e-government services over the next 10 years. The underlying infrastructure will need to offer a high level of redundancy, availability, scalability, capacity and security to meet these requirements.

### Government Radio Network

The Government radio network incorporates around 180 dedicated transmitting sites state-wide that provide mobile, hand portable, and paging services to government emergency services personnel. The network is designed to support around 12,000 mobile and portable radio users and up to 50,000 paging devices. A dedicated independent data network is also operated from the state radio network transmitting sites that bound the Adelaide CBD and extended metropolitan areas.

### Future ICT

The Future ICT Service Arrangements program relates to the strategic procurement of ICT equipment and services for State Government agencies. The aim is to establish strategic approaches to ensure value-for-money for government, which will also create opportunities to improve broader state-wide access to telecommunications services.

The future service arrangements will replace current across-government contracts, which are due to expire in the next one-to-two years.

### Strategic Priorities

- Institute a purchasing policy requiring aggregation of demand by government agencies to leverage opportunities for infrastructure development, particularly in regional South Australia.
- Establish enhanced governance arrangements to ensure strategic and coordinated management of the State Government's ICT assets.
- Ensure the State Government's ICT infrastructure supports improved access and efficiency in the delivery of government services.

## Projects

| Project  | Priority # | 2005/6–<br>2009/10 | 2010/11–<br>2014/15 | SASP<br>Targets |
|--|------------|--------------------|---------------------|-----------------|
| Construct the SABRENet 80+km fibre-optic research and education broadband network in metropolitan Adelaide<br>* <b>Lead – research sector, State Government</b>  | U/way      | *                  |                     | 4.10            |
| Support customer-driven broadband infrastructure development through the state's Broadband Development Fund and targeted project development support<br><b>Lead – State Government, local government, private sector</b> | U/way      | *                  |                     | 4.7             |
| Rollout fibre optic cable to encourage competitive broadband services for businesses in metropolitan Adelaide<br><b>Lead – private sector</b>  | U/way      | *                  |                     | 4.7             |
| Progress major ICT procurement across government to deliver improved public services<br><b>Lead – State Government</b>   | 1          | *                  | *                   | 1.18            |

\* Lead – lead responsibility for promoting, developing and evaluating the project.

# Priority – preliminary rankings. Priority numbers do not represent a final commitment by the State Government or other lead entities. See the Delivering the Plan section for further details.



# Information And Communications Technology