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**Centre for International Research on
Communication and Information Technologies**

**National Approaches to Meeting the
Communication Needs
of Rural and Remote Users**

**Report to
Multimedia Victoria**

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1. Introduction

Throughout the developed countries, and to a lesser extent those with developing economies, a number of forces are influencing the provision of communication services to rural and remote users. These include the emergence of, and demand, for new services, increased competition in the telecommunications industry, changes in technology and the globalisation of markets for products from rural areas.

Historically, the communication needs of rural and remote users have been met in a “retroactive” manner by government-owned telecommunications carriers. National carriers and usually those with dominant market share are typically subjected to “universal service” obligations as part of their licence conditions. Invariably, such obligations involve cross-subsidisation at least within the industry and invariably also within the carrier’s total customer base. The advent of competitive carriers is generally instrumental in re-visiting the basis for such cross-subsidisation and national priorities for service provision to affected users.

Rural and remote users, together with other users deemed to be in socially significant or perhaps disadvantaged categories, have also been the target for various public policy initiatives that facilitate access to new telecommunications services, for example access to the Internet and video conferencing.

This paper surveys the national or regional approaches taken, in a number of developed and developing countries, towards meeting the communication needs of rural and remote users.¹ These approaches are found to mainly constitute a mix of policy initiatives from central governments that deliver basic telephone service in a universal manner as well as various initiatives to broaden access for selected users to new services. Where the efforts of the dominant carrier have been inadequate to achieve such public policy goals, the paper also examines some interesting instances of state governments, local governments, community groups and/or the private sector successfully cooperating to advance access.

Issues of relevance to Australia are then discussed in the context of current policy, industry and service developments.

¹ The paper complements more extensive studies by CIRCIT into the use of and demand for general information and communication services, and the role of wireless in extending the universal reach of broadband interactive services in particular.

2. Review of National Approaches

The following summaries examine these issues in some developed countries (United States of America, Canada, the European Union, UK and Japan) plus a developing country (South Africa). Most of these countries have long appreciated the concept of the universal delivery of a basic telecommunications service and in the main that obligation applies to much of their individual rural and remote areas. However, in many countries the distinction may not always be clear between policies that ensure the delivery of universal service (primarily for basic telephony) and policies directed to widening access to new technologies (primarily the Internet).

The chosen examples are by no means exhaustive and are presented here to both highlight and contrast the common issues being considered. The United States of America assessment is more detailed as it also provides an insight into the multiplicity of organisational and funding mechanisms for supporting certain access initiatives.

2.1 United States of America

Although the concept of “universal service” has long been a part of the telecommunications industry in the United States of America, its meaning has changed over time. Harking back to the 1910s, AT&T spoke of creating a widespread, interconnected telephone network wherein every user of the network could connect with every other user. However, there was originally no requirement for telephone service delivery to rural and remote areas to be at affordable rates. The Communications Act of 1934 rectified this situation, where the traditional telephone companies (Inter-exchange Carriers or IXC, and Local Exchange Carriers or LECs) contributed support payments to the rural telephone companies. In general, the prices paid by customers – business and residential, urban and rural – for telephone service were based on two practices:

- ***Rate and cost averages***
Rate and cost averaging was intended to achieve reasonable rates for broad geographic areas regardless of high cost communities within the area. Within a group of customers, some would pay rates that exceed their cost of service, while others would pay rates below their cost of service. In a monopoly environment, this benefited all customers by allowing companies to recover their overall costs, by providing services to all customers at reasonable rates, and by providing all customers with interconnection to one another.
- ***Targeted support for high-cost areas***
Through various mechanisms, IXC customers’ prices included support payments to cover LEC high-cost areas. IXC prices also included support to LECs for installation and for services to low-income households.

However, such subsidy mechanisms were considered inconsistent with the developing competitive environment, as some new telecommunications players commenced service provision to rural and remote areas and existing players merged with related telecommunications, broadcasting and information companies. In addition, as rural schools, libraries and hospitals tended to be located in centres of population not necessarily qualified as being high-cost areas, new arrangements were considered necessary to promote the universal availability of new services such as the Internet.

The Telecommunications Act of 1996 addressed these deficiencies, at least in policy terms, by declaring the following principles:²

- Quality and rates;
Quality services should be available at just, reasonable, and affordable rates.
- Access to advanced services;
Access to advanced telecommunications and information services should be provided in all regions of the Nation.
- Access in rural and high cost areas;
Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services. These include inter-exchange services and advanced telecommunications and information services, that are comparable to those services provided in urban areas and that are available at comparable rates to those charged for similar services in urban areas.
- Equitable and non-discriminatory contributions;
All providers of telecommunications services should make an equitable and non-discriminatory contribution to the preservation and advancement of universal service. The vehicle for this became known as the Universal Service Fund (USF).

Those telecommunications carriers designated as providing universal service are then eligible to draw upon such a fund to provide, maintain and upgrade the necessary facilities and services.

- Specific and predictable support mechanisms;
There should be specific, predictable and sufficient Federal and State mechanisms to preserve and advance universal service.
- Access to advanced telecommunications services for schools, health care, and libraries;
Elementary and secondary schools and classrooms, health care providers, and libraries should have access to advanced telecommunications services.

Furthermore, these providers are to attract the following preferential treatment, viz.

- health care providers in rural areas should be charged for telecommunications services at rates reasonably comparable to charges for similar services in urban areas within the same State and any shortfall by the carrier can qualify for universal service support, and
- educational providers and libraries should be charged at rates less than the amounts charged for similar services to other parties and the resulting difference could be offset against that carrier's universal service contribution. Such discounted rates have become known as the "E-Rate".
- Universal service is an evolving level of telecommunications services; Periodic review should take into account advances in telecommunications and information technologies and services.

In accord with the Communications Act, the Federal Communications Commission (FCC) announced its plan for establishing a system of universal service support for rural, insular,

² United States Code Title 47, Chapter 5, Sections 214 and 254; refer to:
<http://www4.law.cornell.edu/uscode/47/index.text.html> (Accessed 14/5/1999)

and high cost areas that would replace the existing high cost programs and the implicit federal subsidies with explicit, competitively-neutral federal universal service support mechanisms.³ This new arrangement was justified by the need to achieve a support system sustainable in an increasingly competitive environment. For example instead of support being generated exclusively through charges on long distance carriers, the new universal service rules would require equitable and non-discriminatory contributions from all telecommunications carriers and even other providers of interstate telecommunications service where the public interest so required.

Such competitive neutrality would ensure that there would be no advantage or disadvantage awarded to one carrier or service provider over another, nor to one technology over another, and would apply to both the collection and distribution of universal service funds. The FCC saw this key guiding principle being consistent with congressional intent and necessary to promote “a pro-competitive, de-regulatory national policy framework”.

In practice, telephone services in rural areas are provided by a mix of commercial and independent/co-operative telephone companies. In order to maintain high quality service, the latter receive loan finance from the Rural Utilities Service (RUS) which is an agency of the US Department of Agriculture, and achieve economies of scale through certain strategic alliances. Approximately 675 telephone companies are recompensed through the USF, which is administered by the National Exchange Carrier Association (NECA) and funded, according to the Communications Act, by a charge against long-distance carriers. The fund subsidises customers in high-cost areas (due to factors such as remote geography, low population and low growth rates) with the aim of keeping local rates affordable.

Apart from the RUS and USF, other sources of subsidies to consumers effectively include lifeline programs for low-income households; financial assistance targetted off-shore; pre-provisioning requirements arising from the declaration of a “carrier of last resort”; and financial assistance for disabled persons.⁴ In July 1997, the FCC ratified a NECA proposal for the establishment of three separate corporations to run the universal service program, viz.⁵

- a) the Universal Service Administrative Company (USAC) to collect funds from USF providers and to re-imburse them for discounts;
- b) the School and Library Corporation (SLC) to manage applications for school and library discounts (the “E-Rate”); and
- c) the Rural Health Care Corporation (RHCC) to operate the rural health care discount program.

The E-Rate arrangement offers a two-tiered approach through which, firstly, a basic package of services is made available (for example Internet access with sufficient bandwidth to support educational needs, brought into the school or library) and, secondly,

³ “Report & Order in the Matter of Federal-State Joint Board on Universal Service”, FCC, May 1997; refer to http://www.fcc.gov/ccb/universal_service/fcc97157/97157.html.

⁴ “Overview of Universal Service” by Carol Weinhaus, 6 December 1995; available on the Publications link at <http://www.tiap.org> (Accessed 14/5/1999)

⁵ “Overview of the Universal Service School and Library Discount Program”; refer to <http://www.erate.org/erateinfo.html> (Accessed 14/5/1999)

additional services such as inside wiring or networking capabilities.⁶ All non-profit public and private K-12 schools and non-profit libraries are eligible for E-Rate funding even though they may not be in rural and remote locations, however the poorest institutions would attract up to 90 per cent discount rates.

Rural carriers and other providers of telecommunications services are recipients of grants from a wide variety of sources, mainly to facilitate improved access to non-telephony services. The United States of America has a long history of providing government grants only in conjunction with monies from other levels of government and/or private enterprise. The telecommunications sector is no exception.

The National Telecommunications and Information Administration (NTIA) within the US Department of Commerce has operated the Telecommunications and Information Infrastructure Assistance Program (TIIAP) since 1994. In the form of 'seed money', matching grants are provided to non-profits and public entities that are using new technologies in innovative ways to reach those in rural, low-income and traditionally underserved areas. In its first five years, the NTIA provided approximately \$US118 million that was matched by more than \$US180 million in non-federal funds (ie. from private, State and local sources). Sixty-five per cent of the projects involved rural areas. An independent evaluation of the first two years of TIIAP confirmed that a majority of the funded projects were sustaining themselves beyond the federal grant period through expanded service provision, commercial operation and further investments.⁷ Project examples include geographic information systems for fire departments, Internet connectivity for hospital patients and video-conferencing for schools.

In 1991, the General Assembly of the State of Colorado instructed that the Colorado Advanced Technology Institute (CATI) develop "advanced technology industries in locations severely depressed as a result of the decline in traditional agriculture and natural resource industries".⁸ In response to this mandate, CATI inaugurated the Colorado Rural Technology Project (CRTP) in July 1992 with the goal of increasing economic activity in rural Colorado through the use and application of existing and planned telecommunications infrastructure. Through the CRTP, first technical assistance and later implementation assistance are provided to projects that endeavour to become financially sustainable. Supporting funds have been typically obtained from the NTIA, the State Public Utilities Commission and the major state carrier US West. For example, since its inception in 1992, CRTP funding of only \$US371,600 has leveraged a range of projects, valued at over \$US1.6 million, in 10 rural communities. Many of them were recognised and rewarded with over \$US2 million in highly competitive federal and private grants in the fiscal year 1996.⁹ Project examples include teleradiology links between rural and urban hospitals, distance

⁶ "Clinton Administration Moves to Ensure Rural Information Superhighway for Education", Washington, DC, October 10, 1996; refer to <http://www.usda.gov/rus/telephone/fcc-pr.htm> (Accessed 14/5/1999)

⁷ "Testimony of Larry Irving, Assistant Secretary for Communications and Information, NTIA, US Department of Commerce on Reauthorization of NTIA before the Subcommittee on Telecommunications, Trade, and Consumer Protection, Committee on Commerce, US House of Representatives", 11 May 1999; refer to <http://www.ntia.doc.gov/ntiahome/congress/reauthtestimony51199.htm> (Accessed 28/5/1999).

⁸ "Colorado Rural Technology Project"; refer to <http://bcn.boulder.co.us/aerie/crtp/index.htm> (Accessed 28/5/1999)

⁹ "Impact of CRTP – FY 1993-96"; refer to <http://bcn.boulder.co.us/aerie/crtp/other/impact.htm> (Accessed 28/5/1999)

learning links, tourism kiosks and optical fibre cables. All program activity is monitored, documented and evaluated.

Other providers of grants have been the US Department of Education, the National Science Foundation, US Department of Health and Human Services, various regional commissions and authorities.¹⁰ Major philanthropic funders include the Ford Foundation, the Kellogg Foundation and the Rockefeller Foundation. Many major US corporations, particularly those involved in high technology, also operate philanthropic funds.

It is not uncommon in the United States of America for rural communities to be serviced by municipal utilities bodies that traditionally reticulated water, gas and perhaps also electricity. There have been a few notable examples of such bodies also providing telecommunications services, including optical fibre cabling to deliver municipal area-wide networks and cable television services, either by themselves or in partnership with private companies.¹¹ In these instances, the municipal authorities argue that through such arrangements they are in a better position to address the needs of their constituents.

However, despite the Telecommunications Act of 1996 and above initiatives, concern remains that the “digital divide” is not being adequately addressed. For example, some U.S. senators recently called upon the FCC to “consider subsidizing high-speed Internet and data services via satellite services, raise the technical requirements for phone lines, and encourage cellular companies to serve remote areas and Indian reservations where there is little existing phone service”.¹² The senators said that farmers, rural businesses and small-town health-care facilities need access to high-speed Internet services for transmitting graphics and large amounts of data; farmers would often use satellite imaging to decide how much fertiliser and pesticide to use in their fields.

2.2 Canada

Historically, the provision of telephone services throughout Canada, both long-distance and local, has been the province of monopoly companies – predominantly privately owned large corporations. Since the less profitable rural and northern areas tended to be bypassed by these companies, many geographically distant communities instead started up locally owned independent telephone companies.

Nowadays, both the independent companies and the large corporations are regulated by the Canadian Radio-television and Telecommunications Commission (CRTC). For many years, the CRTC permitted long-distance and urban prices to be set at levels that effectively subsidised the higher costs of providing telecommunications services in rural and remote areas. It was considered to be in the national interest that such “high-cost serving areas” (HCSAs) should be subsidised so as to achieve universal provision of the basic telephone service.

¹⁰ “Foundation Resources: Community Networks, Telecenters and Televillages”; refer to <http://www.aspeninst.org/dir/rural/foundres.html> (Accessed 28/5/1999)

¹¹ Concerning Harlan, Iowa: “The Little Town That Could ... Did!”; refer to <http://muntelecom.org/v1i1/Quick.html> (Accessed 28/5/1999) and concerning Glasgow, Kentucky: “Affirmative Government and Public Power: A Model for Democratizing Bandwidth”; refer to <http://muntelecom.org/v1i1/Wray.html> (Accessed 28/5/1999)

¹² “FCC urged to subsidize rural Net access”, USA Today Tech Report, 21/5/99; refer to <http://www.usatoday.com/life/cyber/tech/ctf228.htm> (Accessed 28/5/1999)

As telecommunications in Canada moved from a monopoly situation to a competitive marketplace from 1992 onwards, in accordance with the competition provisions of the *Telecommunications Act*, the CRTC has progressively rebalanced telephone rates to more closely reflect actual costs. Nevertheless, another aim of the *Telecommunications Act* has been for reliable, affordable, high quality telephone services to be accessible in all regions of Canada.¹³ In accord with these possibly conflicting requirements, the CRTC has been publicly examining since end 1997 all high cost areas served by telephone companies.¹⁴ At these public hearings, key questions asked include:

- Should telephone companies and their competitors be required to provide telephone service to HCSAs?
- Should there be subsidies for HCSAs, and if so, what services should be eligible, and how should the subsidies be financed?
- Are there more appropriate technologies for serving isolated HCSAs, such as satellite or wireless technology?

In its 1997 final report, the Information Highway Advisory Council (IHAC) noted that whilst Canada was among the world leaders in providing citizen access to basic telecommunications networks and services, there were limitations to these becoming universally available platforms to the Internet and other electronic information services, viz.¹⁵

- The absence of a national access strategy;
- The need to upgrade existing service to certain underserved areas (for example by getting rid of multi-party lines);
- The need to extend service to unserved areas;
- The availability of preferential tariffs on telecommunications services for non-profit educational and health service entities.

The IHAC further noted that Internet access has lagged significantly in rural and remote regions, more than likely due to the lack of ISPs within users' local telephone calling areas. The Canadian government was urged to develop ways for making available Internet access in all rural and remote parts of Canada without the necessity of long distance telephone charges. Even technology, such as Telesat Canada's DirecPC that delivers Internet downloads by satellite, still requires users to communicate with their ISP via a terrestrial line.¹⁶

The Community Access Program (**CAP**), administered by the federal government, has been recognised as singularly effective in accelerating access to the Internet by facilitating the creation of public access points in small rural communities. The 1997 Budget further

¹³ Subsection 7(b) of the Telecommunications Act identifies as a policy objective the need "to render reliable and affordable telecommunications services of high quality accessible to Canadians in both urban and rural areas in all regions of Canada".

¹⁴ For example, see "CRTC to hear final arguments on telephone service to high cost areas"; refer to <http://www.crtc.gc.ca/eng/news/releases/1999/r990121e.htm> (Accessed 14/5/1999)

¹⁵ "Preparing Canada for a Digital World, chapter 4"; refer to <http://strategis.ic.gc.ca/SSG/ih01650e.html> (Accessed 14/5/1999)

¹⁶ Under the Canadian Space Agency's Advanced Satcom program, Nortel and Telesat Canada are being funded to develop communications services to regions not covered by terrestrial systems.

extended the program to the 5,000 rural and remote Canadian communities with populations between 400 and 50,000. The program goal is for these communities to have affordable public sites for Internet access by 31 March 2001. CAP co-funds with communities the start-up costs of a public access Internet site, up to 50 per cent of the total costs and not exceeding \$40,000 per application.¹⁷ Through this program, the federal government also offers to enter into agreements with all provincial and territorial (ie. state) governments to share co-funding and so expand the number of sites. All successful CAP proposals must be planned to be financially self-sustaining within three years. Income would typically come from paid advertising, Internet services (for example, home pages) to local businesses and provision of education and training courses. The minimum of 50 per cent community contribution can be attributed to first-year revenues, cash from individuals or organisations as well as in-kind resources. The sites for establishing an Internet presence are commonly schools, public libraries or local centres.

Other related federal government programs, also developed in conjunction with other levels of government, local community groups and the private sector (but not restricted to rural and remote users), include:

- **VolNet:** providing access for voluntary organisations to computer equipment, the Internet, new information technologies, network support and guidance;¹⁸
- **SchoolNet:** interconnecting all elementary and secondary schools as well as to the Internet;¹⁹
- **Computers for Schools:** providing at least one computer for every classroom.²⁰

In addition to the above, a few economic development initiatives involving the federal, provincial and municipal governments have funded upgraded communications infrastructure and services for remote communities in Northern Ontario and the northern part of British Columbia.

2.3 European Union

The launch of full telecommunications competition across the European Union from 1 January 1998 has meant that legislation has been enacted to guarantee and extend provisions on universal service. At the same time this ensures that any national measures taken in support do not distort effective competition. The scope of universal service in the European Union and the financing of any costs emanating from universal service obligations is underpinned by Community legislation, in particular the Voice Telephony Directive²¹ and the Interconnection Directive.²² The former implies an obligation to provide access to the

¹⁷ "CAP Info"; refer to <http://cap.unb.ca/aboutcap/info/> (Accessed 14/5/1999)

¹⁸ "Connecting Voluntary Organizations to the Internet"; refer to <http://www.volnet.org/> (Accessed 14/5/1999)

¹⁹ "Canada's SchoolNet"; refer to <http://www.schoolnet.ca/> (Accessed 14/5/1999)

²⁰ "Canada's Computers for Schools"; refer to <http://www.schoolnet.ca/cfs-ope> (Accessed 14/5/1999)

²¹ "Directive 95/62/EC of the European Parliament and of the Council of 13 December 1995 on the application of open network provision (ONP) to voice telephony"; refer to <http://www.ispo.cec.be/infosoc/legreg/docs/9562ec.html> (Accessed 14/5/1999)

²² "Directive 97//EC of the European Parliament and of the Council on Interconnection in Telecommunications with regard to ensuring Universal Service and Interoperability through application of

public telephone network (including a facsimile or modem service, as well as the provision of operator assistance, emergency, directory enquiry and public payphone services) and to deliver an affordable telephone service to all users reasonably requesting it. However, affordability is a matter determined at a national level.²³

In the telecommunications sector, it is generally assumed that market forces will determine the development, roll-out and take-up of new services and the technologies on which they are based. Effective competition will be the key driver of improvements in service quality, penetration and prices and through these means the benefits of new services and technologies will eventually spread throughout the European Union.

No requirement is imposed on Member States to set up national schemes to share the cost of universal service provision amongst market players. However, where it is decided to establish an appropriate financing scheme, non-discrimination requires that the net cost of USOs should be recovered across the broadest base of industry participants that EU law permits. To date, only France and Italy have established a national universal service fund from the beginning of 1998, although France will also employ a system of supplementary charges (added to interconnection charges) until the year 2000. This will in addition cover access deficit charges.

As effective competition develops in the European Union, it is argued that greater choice in local access, as well as long distance facilities, is likely to further stimulate growth and development. In some cases, the spur to provide interactive services to residential customers will come from entirely new directions. For example as the transition to digital broadcasting gets under way (underpinned by European legislation on standards and conditional access), it is claimed that new interactive services are likely to develop in parallel to traditional television services.

Community programmes throughout Member States are already supporting a wide range of initiatives and support mechanisms in the context of the Action Plan on Learning in the Information Society.²⁴ Public and “community” access are seen to be of particular importance in less favoured regions (for example certain areas within Greece, Spain, Portugal and Scotland) or for less favoured users, where there may be a risk of delay in accessing advanced services if left to market forces.

In the context of the implementation of full telecommunications liberalisation, the Commission encourages special tariffs for schools for Internet access and usage, in particular by publicising and making transparent the different tariffs available in Europe so as to stimulate and spread good industry practice. National Regulatory Authorities have been requested to encourage new operators to offer special tariffs to schools (as soon as competition emerges and without requiring them to provide nation-wide service) and take the necessary steps to encourage and permit incumbent or dominant operators to offer special tariffs to schools. This will involve defining the special category of ‘schools’, assessing schools’ needs in collaboration with educational institutions, indicating the limits

the principles of Open Network provision (ONP)”; refer to <http://www.ispo.cec.be/infosoc/telecompolicy/en/d1-en.htm> (Accessed 14/5/1999)

²³ “Universal Service for Telecommunications in the Perspective of a Fully Liberalised Environment”; refer to <http://www.ispo.cec.be/infosoc/legreg/9673.html> (Accessed 14/5/1999)

²⁴ “Learning in the Information Society: Action Plan for a European Education Initiative”; refer to <http://www.ispo.cec.be/infosoc/educ/learn.html> (Accessed 14/5/1999)

of permissible pricing and dealing, where necessary, with matters such as interconnection arrangements so that annualised flat rate tariffs can be provided. Where special tariffs are provided for schools, they are not to distort competition. National Regulatory Authorities are urged to ensure that operators do not abuse their dominant position through means such as predatory pricing.

On the basis that universal service is recognised as a dynamic and evolving concept and must respond to changes in the needs and expectations of Europe's citizens. The EC is required to undertake a regular review of the scope, quality, level and affordability of the universal service experienced in Member States.^{25 26}

2.4 United Kingdom

The UK has been closely involved in the development of all European Community legislation and has stated that they will comply with any Directives on Universal Service as and when they are agreed. According to British Telecom (BT), its recently computed universal service costs were as follows:²⁷

	Universal service cost (£ million)	Uneconomic lines as proportion of total
Uneconomic areas	10 - 15	Less than 0.5 per cent of UK lines
Uneconomic customers	45 - 55	6 - 7 per cent of UK lines
Uneconomic public call boxes	10 - 15	About 20 per cent of BT public call boxes

Those areas considered uneconomic to serve with wireline technology constitute remote rural areas, mainly in Scotland and the north of England. Although comprising less than 0.5 per cent of all UK telephone lines, these areas account for as much as 20 per cent of the total land area of the UK. Due to their low density of population, BT is now exploring the application of fixed radio access to serve these areas in the future.

Any consideration of universal service, however, goes beyond that of serving remote rural customers. Since 1984, BT has had obligations in its Licence (Condition 1) which state that:

“The Licensee shall provide to every person who requests the provision of such services at any place in the Licensed Area:

(a) voice telephony services; and

²⁵ “First Monitoring Report on Universal Service in Telecommunications in the European Union”; refer to <http://www.ispo.cec.be/infosoc/telecompolicy/en/ip98182.html> (Accessed 14/5/1999)

²⁶ “The Future of Universal Service in Telecommunications in Europe”; refer to <http://www.ispo.cec.be/infosoc/promo/pubs/uniserv/httoc.htm> (Accessed 24/5/1999)

²⁷ “Universal Telecommunication Services: Proposed arrangements for Universal Service in the UK from 1997”, Table 6.1; refer to <http://www.oftel.gov.uk/uniserv2/contents.htm> (Accessed 14/5/1999)

(b) other telecommunications services consisting in the conveyance of Messages.”

In addition, the Office of Telecommunications (OFTEL) has required of BT that they charge a geographically-averaged tariff for services provided under Condition 1. Consequently, these services are available to all UK customers at the same price regardless of location. Although there is provision within BTs Licence for competing carriers to contribute a portion to the cost of BT providing universal service, to date BT has footed the entire bill.

In its 1994 review of the universal service obligation imposed upon BT, OFTEL enunciated three governing principles:

- basic telephony services should be available to all who reasonably request it regardless of where they live;
- basic telephony service should be reasonably available for consumers who have difficulty in paying the standard price; and
- reasonable measures should be put in place to give customers with special needs or disabilities access to basic services.

However, OFTEL recognised that the definition of universal service could change over time, particularly when addressing different groups of customers. Specifically, it has suggested that a higher level of basic service might be appropriate to meet economic and social objectives for certain public institutions such as schools or other public access points.

The minimum basic entitlement for schools could comprise:

- reasonably affordable access to a wide-band or broad-band network;
- reasonably affordable and predictable network access and usage charges; and
- dedicated external high speed network links.

BT's offer of providing preferential rates for PSTN or ISDN2 access to any Internet service provider chosen by a school was subsequently examined by OFTEL who paid particular attention to ensuring that BT could not exploit its market dominance to act anti-competitively.²⁸

Other public access points that could become contenders for a higher level of service include public libraries, community centre, hospitals, clinics and GP surgeries. These and educational users would naturally include, but not be restricted to, those located in remote areas. With the increasing expansion of competition impacting upon BT's market share, various assessments have been made of how to fund ongoing universal service obligations.

In its 1997 review, OFTEL further proposed the following changes to the basic level of service to be made universally available in the UK upon reasonable request:

- a connection to the fixed network able to support voice telephony, low speed data and fax transmission;
- the option of providing a more restricted service package at low cost; and
- reasonable geographic access to public call boxes across the UK

²⁸ “Access to the Internet for schools: Consultation on BT's proposal”, OFTEL, July 1997, Chapter 5; refer to <http://www.oftel.gov.uk/consumer/intacc.htm> (Accessed 24 May 1999)

Although OFTEL also proposed that service provision to uneconomic areas could be put out to tender, the UK government has made no decision in that regard. Instead, this aspect of public policy appears now to await developments within the European Union.

2.5 South Africa

The responsibility for deploying South Africa's telecommunications system, originally that of the Department of Posts and Telecommunications, was transferred in 1991 to a newly-created state corporation, Telkom South Africa Limited. For a number of years thereafter, Telkom would have no competition for the provision of basic telephony services or infrastructure. As a legacy of Apartheid rule, these services had become grossly skewed in favour of the white population of South Africa. To the extent that in 1995, white urban areas enjoyed telephone penetration rates of 25 per 100 people whereas the figure was as low as 0.1 telephones per 100 people in rural black areas.

With the change to a more representative government, two key studies of future telecommunications policy were undertaken into future liberalisation of the South African telecommunications market, viz. the Green Paper on Telecommunications Policy²⁹, which was later re-drafted to become the White Paper on Telecommunications Policy.³⁰

The Green Paper identified that a primary objective of the new telecommunications policy should be a rapid increase in telephone penetration rates, particularly in black urban and rural communities. Although the long-term goal should be universal service, ie. a telecommunications line in every household at affordable prices, the pragmatic and medium-term aim should be the achievement of universal access, typically realised through shared community or public telephones placed within walking distance of people's houses. Furthermore, it was recognised that new technologies would eventually undermine the monopoly of Telkom, resulting in cross-subsidy mechanisms (to finance universal service) not being maintainable in the long term and thereby necessitating a re-balancing of rates.

The subsequent White Paper, being a binding policy document, attempted to reconcile what it called "two seeming opposites" of providing universal service to disadvantaged rural and urban communities, as against the delivery of the high-level telecommunication services required by South Africa's sophisticated business, finance and industrial sectors. It recommended that legislation be drafted to ensure an initial Telkom monopoly over basic services during an exclusivity period in order that the roll-out of universal access would be funded through internal cross-subsidisation. With the eventual introduction of competition and the consequent re-balancing of basic service tariffs, Telkom's monopoly revenues would decline over time and thereby reduce its ability to cross-subsidise continued network expansion. The White Paper proposed a mechanism to fund an ongoing universal service objective, drawing contributions from both Telkom and its new competitors.

Accordingly, the Telecommunications Act of 1996 (the Act) was enacted. The first three objects in the Act are to –

²⁹ Republic of South Africa, *Green Paper on Telecommunications Policy*, Ministry for Posts, Telecommunications and Broadcasting, Pretoria, July 1995; refer to http://www.polity.org.za/govdocs/green_papers/telecomms.html (Accessed 1/4/1999)

³⁰ Republic of South Africa, *White Paper on Telecommunications Policy*, Ministry for Posts, Telecommunications and Broadcasting, Pretoria, March 1996; refer to http://www.polity.org.za/govdocs/white_papers/telewp.html (Accessed 1/4/1999)

- a) promote the universal and affordable provision of telecommunication services;
- b) promote the provision of a wide range of telecommunication services in the interest of the economic growth and development of the Republic;
- c) make progress towards the universal provision of telecommunication services.³¹

Section 58 of the Act establishes a Universal Service Agency to be responsible for encouraging, facilitating and offering guidance in respect of any scheme to provide ‘universal access’ to telecommunication services or the universal provision of telecommunication services (ie. ‘universal service’). Among other things, this agency is also to encourage certain telecommunication-related reconstruction and development projects, and foster the adoption and use of new methods of attaining universal access and universal service.

Most importantly, the Agency manages the Universal Service Fund to which obligatory contributions are made by licence holders such as telecommunication carriers. The basis and manner of these contributions are determined by the industry regulator, the South African Telecommunications Regulatory Authority. Payments from the Fund are exclusively for subsidies –

- a) to assist needy persons in purchasing and using telecommunication services;
- b) to finance the former monopoly national carrier, Telkom, and any other licence holders with such community service obligations, so that they may extend services of the public switched network to areas and communities either not currently served or not adequately served.

The Act further indicates that a date is to be fixed by the regulator after which the Fund money is to be solely utilised ‘to assist needy persons’, on the basis that Telkom’s rates would have been re-balanced to recover all of its costs associated with its universal service obligations. Such ‘re-balancing’ necessarily implies that higher cost services in rural and remote areas would ultimately be cross-subsidised by the lower cost services in urban areas, thereby obviating any continued finance from the Fund.

The Green and White Papers recognised that the roll-out of basic telecommunications to under-served areas may not be on a wired basis alone. Instead South Africa could become a leader in deployment of wireless telecommunications. Such “leap-frogging” technology has proved successful in practice. For example, it was reported that 520 projects using the Digital Enhanced Cordless Telecommunications (DECT) system were to be completed in under-served areas by the end of 1998, reaching more than 600 villages which previously did not have any access to telephony.³²

Telkom’s licences, issued in May 1997, set out its exclusive privilege period of five years (with an option for a sixth, on condition that approximately 85 per cent of the roll-out target is achieved by the end of Year 5), as well as the required roll-out, service targets and penalties. In the first five years of its licence, Telkom is required to install 2.81 million new lines, including 120,000 pay-phones, and convert any remaining analogue portions of its

³¹ “Telecommunications Act No. 103 of 1996 as amended by Telecommunications Amendment Act, No. 12 of 1997”; refer to <http://rtr.worldweb.net/1996telecomact.txt> (Accessed 14/5/1999)

³² “Address by Advocate Dikgang Moseneke, Chairman of Telekom, at the Sandfontein DECT Launch, 20 January 1998”; refer to http://www.telkom.co.za/news/article_73.htm (Accessed 14/5/1999)

network to digital. Telkom proposes to reach full network digitalisation by the year 2000. Priority customers such as schools and hospitals are to get 24,000 lines, and Internet access must be provided to 2,000 institutions serving historically disadvantaged South Africans. In total, some \$US10.3 billion is to be spent on the roll-out.

2.6 Japan

Before the strong trend towards urbanisation, particularly over the past 50 years, Japan had a significant rural population. As this has sharply declined, the remaining population has also aged and an increasing number of the elderly are living alone. Common to many other countries, rural areas have continued to suffer from cutbacks in the provision of governments services. These trends have been exacerbated by the existing poor transportation and general isolation from recent technological developments in the cities.

As at 1997, a total of 1,231 municipalities have been officially designated as ‘de-populated’. In addition, 1,195 were located in relatively inaccessible mountain areas, 962 in areas prone to heavy snowfall and 184 on isolated islands. According to a survey by the Ministry of Posts and Telecommunications (MPT)³³, citizens of these communities expressed a strong desire for local governments to provide more information services online. In particular, they wanted to have remote access to general administrative information and procedures, as well as information on, and support systems for, public health, medical treatment services and welfare. In addition, respondents wanted access to online methods for reporting emergencies (for example those arising from earthquakes).

A 1996/97 MPT study proposed targets for the establishment of broad access to multimedia in at least 300 of Japan’s municipalities by 2000, in a third of all municipalities by 2005 and all of them by 2010. It is not known whether these targets have been formally adopted. However, government initiatives directed in the main to rural communities include:

- the establishment of telework centres, particularly for elderly and disabled citizens;
- an increased emphasis on tele-medicine applications;
- a priority for the provision of online information by local governments;
- communication centres supported by the Ministry of Agriculture with the co-operation of local governments;
- a proposal for the network of Post Offices to be exploited further as a base for the provision of government information and access by community groups.

³³ “White Paper – Communications in Japan 1998”; refer to <http://www.mpt.go.jp/policyreports/english/papers/WhitePaper1998.pdf> (Accessed 14/5/1999)

3. Overview of Key Issues

Any assessment of how the communication needs of rural and remote users are being met, or should be met in the future, revolves around an appreciation of the following facets of the present situation confronting government, industry and society, viz.

- Previously dominant telecommunications carriers (and generally publicly-owned ones at that) are in transition to a more competitive environment;
- These carriers, invariably subject to an obligation to provide a telephony service across a whole region or nation, now find that the inherent cross-subsidy arrangements are being challenged by new entrant carriers;
- There is a growing demand from consumers for the future level of universal service delivery to exceed that of basic telephony;
- Physical or wireline telecommunications networks are being supplanted by radio or wireless means of service delivery;
- Rural and remote communities are becoming more skilled in voicing their concerns about being sidelined by city-centric economic and technological developments.

3.1 Role of Government

3.1.1 The USO - Funding and financing

Around the world, governments are traditionally wary of directly funding any telecommunications universal service obligation (USO) from general revenue. This is due to the desire to lower budget outlays and to avoid pressure for special treatment of community groups. Net USO expenditures have instead been financed predominantly, if not solely, by the national or dominant carrier within a region.

The advent of competing carriers raises the issue of what obligation the new entrants should have for serving users such as those in rural and remote areas or to what extent they should share the costs incurred by the incumbent carrier. This question leads to consideration of dimensioning the cost of the most efficient delivery of a specified level of telecommunications service and for what specified geographic coverage. Generally, the costs of old-generation or legacy technology employed by the incumbent carrier and the associated tariffs are threatened by the adoption of any new means of service delivery and the associated lead times for service connection.

In the United States of America for example, an independent body (the USAC) collects funds from the universal service fund carriers and administers approved refunds. Although the European Union imposes no universal service provision, it espouses the principle that the net cost of any USO should be recovered across the broadest base of industry participants. The South African USO regime is seen to adopt a mix of similar US and EU arrangements.

3.1.2 Social Policy - Beyond the USO

A commonly asked question in all countries with some form of universal service obligation (USO) for telecommunications is when, how and/or whether such an obligation should extend beyond that of traditional narrowband or telephonic access and service to a more enhanced capability. Historically, a new service capability was expressed as “broadband” but more commonly now in terms of a transmission rate higher than that of a telephony service, for more effective delivery of Internet-based services.

Another question posed, generally in terms of achieving a higher bandwidth USO in the longer term, concerns a policy change to one of a specified reach or accessibility of an enhanced service within only a certain user group, rather than universal availability of the enhanced service to all individuals. Examples of user groups may include rural and remote communities, hospitals, schools, libraries and community centres. Although different countries adopt different definitions, it is becoming increasingly common for such ends to be achieved by policy means other than by changing the USO.

3.1.3 Complementary Initiatives

Where a policy instrument by government, let alone an unfettered market solution, is unlikely to succeed in meeting the communication needs of rural and remote users, governments can nevertheless institute programs to encourage more targeted investment in telecommunications infrastructure and services for such user groups. Program mechanisms may include financial support for local community-based cooperative ventures as well as partnerships with industry where synergies can be identified.

Educational providers and libraries in the United States of America attract the discounted “E-Rate” to assist with the extension of Internet access within their constituencies, whilst the TIIAP provides federal ‘seed money’ in the form of grants that must be matched by other funds from state government, local government and private companies. In Canada, the CAP program likewise operates on a co-funding basis with other levels of government.

3.2 Service Developments

It can be very much a “chicken and egg” situation as to whether telecommunications infrastructure investment should only follow identified user needs or whether governments have a responsibility to be proactive in facilitating, if not promoting, service uptake through initiatives that demonstrate opportunities and exploit economies of scale. Examples of interactive and communication service applications that call for a higher than narrow transmission bandwidth, and may be of particular value to rural and remote users, include distance learning, government information dissemination, electronic transactions, telemedicine and data transfer. Programs such as that of the CRTP in the United States of America have successfully encouraged and funded a diverse range of information and communication applications. In Japan, surveys of user needs have led to government policies directed towards implementing tele-work centres and telemedicine applications in that country’s more remote regions.

Such service delivery need not necessarily be effected through governments alone, but opportunities may exist for a degree of private industry involvement perhaps with the attraction of subsidies or franchise fees.

3.3 Technological Approaches

With traditional delivery of telephony and like services, access for rural and remote users has been mainly via copper pairs with a small proportion utilizing fixed radio transmission means. To a limited extent, the bandwidth capacity of copper pairs can be enhanced by means of technologies such as ISDN or ADSL. An alternative approach is to extend optical fibre from telephone exchanges closer towards users.

However, rural and remote areas have very low population densities and commonly also legacy wireline infrastructure that may be too expensive to upgrade or extend. In such situations, wireless technologies may prove more attractive in terms of economics, speed of rollout and lead-time for service connection. Examples of such technologies include satellite delivery as discussed in the sections on the United States of America and Canada, and terrestrial delivery involving cellular or other wireless local loop means and discussed in the section on South Africa. All new technologies operating in isolated locations also have the potential to raise new issues of quality of service, emergency service availability, pricing equity and upgradability of bandwidth.

4. Relevance to Australia

The sample reviews of national approaches adopted in other countries are not meant to be exhaustive in scope or depth, but rather to serve as useful backdrops against which Australian issues can be viewed. As a result of this process, it should be possible to better appreciate whether current initiatives should be retained, strengthened or perhaps scrapped, and whether new initiatives should be entertained.

a) Even in the era when Australia's national telecommunications needs were otherwise being met by a monopoly carrier (now known as Telstra), the Federal Government was concerned that terrestrial infrastructure alone would be insufficient to adequately service all rural and remote areas.

Accordingly, another publicly owned carrier (Aussat) was established in 1981 to deliver television, data and telephony services to the Australian outback and commenced operations in 1985, later becoming part of Optus Communications. For much of the subsequent period, the regulatory regime protected Aussat/Optus from other national satellite competitors. Now that open competition prevails, new telecommunications services are being provided to rural and remote communities through both the Optus as well as foreign satellites. A notable example is the provision of interactive audio and visual communications within remote Aboriginal communities of the Northern Territory's Tanami Desert.³⁴

b) Under the Australian Telecommunications Act 1997, the provision of a basic telephone service is defined as part of the obligation to provide universal access. Around the world, there is a growing debate as to how, when and to what extent a future USO should be defined that mandates universal access (perhaps mixed with certain requirements of universal reach) beyond that of telephony.

Although such a new service obligation tends to be expressed nowadays in terms of the availability of Internet services, it still begs the question as to what transmission rate is acceptable to users for a given Internet service. Within the Australian context, this aspect has been partly addressed by the Australian Communication Authority's Digital Data Inquiry report³⁵, which came out against recommending a digital data carriage service as part of the USO. Instead, it favoured the targeting of key impediments that inhibit market growth for data services in rural and remote areas. Two particular barriers are the slower data rates for customer access and timed local call charges for ISP access, both being applicable to Telstra's terrestrial network. The ACA argued that extending the USO provisions to include data services may disadvantage other carriers from taking advantage of new developments, such as wireless local loop and satellite systems.

A useful discussion of many of these issues can also be found in separate work published by CIRCIT.³⁶

³⁴ "Rural and Remote Case Study"; refer to <http://www.aaptsattel.com.au/case02.htm> (Accessed 28/5/1999)

³⁵ "Digital Data Inquiry", Australian Communications Authority, 1998; refer to <http://www.aca.gov.au/publications/reports/digital/index.htm> (Accessed 14/5/1999)

³⁶ E. Richardson, "A Social Policy Framework for a Competitive Telecommunications Environment", Working Paper 1998/1, CIRCIT at RMIT; refer to <http://www.circuit.rmit.edu.au/publics/wp9698.html> (Accessed 14/5/1999)

c) As the arrival of competing carriers questions the basis for incumbents to shoulder the sole burden of funding any sort of USO, a number of countries either have adopted or are investigating the establishment of a universal service fund (USF). In both the USA and South Africa examples, such funds are to be managed by industry-financed agencies that are independent of government and whose operation is transparent to all parties.

Australia has yet to achieve a situation where new entrant carriers agree with either the USO formula or a satisfactory definition of its service specification and an acceptable cost of its physical implementation. Whilst the tendering of service delivery to uneconomic areas should prove a viable circuit-breaker to present disagreement, the federal government has yet to appreciate the fate of legacy infrastructure were Telstra to be unsuccessful at winning any USO tender. The chosen tender process and specification will be crucial in providing carriers with the right incentives to economically deliver the required services.³⁷

d) Most of the countries reviewed have concluded that it is desirable for their USO regime to be periodically reviewed. This is considered necessary in light of the ever-changing scene of telecommunications competition, delivery technology, new services, user needs, cost structures and relativities with urbanised areas.

Whilst the Australian regime is currently under review, there is no legislative requirement for this to be part of an ongoing process recognised as such by both industry and the community.

e) The high cost of progressing a universal service capability beyond that of telephony calls for interim or restricted measures to target the availability of more advanced information and communication services to specific user groups. These targetted groups typically include educational institutions, health care organisations, libraries and community access centres. Such groups in rural and remote areas usually attract priority attention within a nationwide program. The different approaches adopted vary between active programs that directly provide a desired capability (for example of infrastructure, service and end-user equipment) to more passive programs that merely offer such groups the opportunity to avail themselves of the services when desired, although perhaps at preferential rates.

Within Australia, such programs already exist and are mainly sponsored by State rather than Federal governments due to their different constitutional responsibilities. However, even within a given State, these programs are not yet coordinated across all target groups and so are less likely to achieve full economies of scale. Deficiencies of this nature would be more pronounced in rural and remote areas, particularly where the agencies involved are in different government jurisdictions.

f) Some of the countries reviewed have adopted special programs in rural and remote areas considered to have inferior telecommunications infrastructure. Depending on whether the infrastructure shortfall represents physical plant or a higher derivative infrastructure or service capability, some of these government-sponsored programs can be undertaken in conjunction with carriers, service providers, private companies, philanthropic bodies or community groups. From Japan came the interesting proposal for the existing network of

³⁷ R. Maddock, "Tendering for Universal Service Provision", Research Paper, January 1999, Communications Law Centre; refer to http://www.comslaw.org.au/research/Universal/19990526_MaddockUSO.html (Accessed 28/5/1999)

Post Offices to be exploited as hubs for the extended deployment of new services within remote regions.

In the Australian context, programs of this nature are represented by the *Networking the Nation* initiative.³⁸ *Networking the Nation* is designed to support projects that provide services over and above those already supplied through the USO. In fact, the overwhelming number of funded projects embody the provision of Internet services, often via establishment of new Points of Presence that overcome existing call charging impediments.

g) In all instances reviewed, the application of upgraded technology to rural and remote areas is seen to be fertile ground for the opportunity to replace wireline infrastructure with wireless or radio means of delivery. In this way, the legacy infrastructure can be geospatially 'leap-frogged' and more cost-effectively delivered in areas of low population density. Furthermore, radio delivery generally provides for significantly shorter connection lead-times than with physical infrastructure. These conclusions were also endorsed by a recent CIRCIT study that examined the issues in greater depth.³⁹

³⁸ Refer to http://www.dcita.gov.au/text_welcome.html, using the Easyfind search tool.

³⁹ Derek Rogers and Reginald Coutts, "Wireless Options for Extending Broadband Interactive Services", Research Report No. 20, CIRCIT at RMIT, June 1998; refer to http://www.circit.rmit.edu.au/publics/rr99_98.html#top (Accessed 14/5/1999)

5. Conclusion

Rural and remote areas of all countries tend to benefit the least from the introduction of new telecommunications technologies and the information and communication services, both from delayed implementation and restricted service scope. Australia has been no exception in this regard.

Of the sample reviews, the closest geo-political arrangement to that of Australia is that of the United States of America. Through an appropriate mix of federal and state policies and initiatives (as well as community and private sector initiatives in certain instances), it would appear that the tools and capability exist to meet future communication needs of rural and remote users. The political will to do so in a timely fashion, against the backdrop of legacy policies, infrastructure and market forces, is yet another thing.

Further work would be necessary to monitor and properly assess the actual effectiveness of Australian federal and state policies and initiatives in meeting the changing communications needs of rural and remote users, whether they are individuals, community groups, businesses, utilities or governmental agencies. Such a task could be initiated on an individual state basis (although taking into account possible factors impacting across state borders) and could assess aspects such as:

- Effective use across governmental, agency and sectoral boundaries within the one region;
- Appropriate utilisation of available technology and infrastructure;
- Exploitation of opportunities arising from the changing political and competitive industry scenes;
- The achievement of economies of scale, both within and across governmental jurisdictions.