Telecommunications Services in the Bush: Are Rural Consumers Getting a Raw Deal?

A Comparison of Fixed Telecommunications Service in Rural Australia with Urban Levels of Service an with Service Levels in Canada, New Zealand, the United Kingdom and the United States.

A Report Prepared by the
Network Economics Consulting Group

Tony Warren
Jane Thorn
Henry Ergas

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A. Introduction

1.1 In a country as large and as sparsely populated as Australia, the issue of affordable services for rural consumers is a matter of ongoing concern. Significant additional costs defrayed over a small customer base mean that unit costs are almost always dramatically greater in rural areas. Yet equity and political considerations have played a significant role in demands for many 'essential' services to be provided to rural consumers at prices and a standard of service that is broadly equivalent to that obtained by urban consumers.

1.2 Universal service has traditionally been attained in Australia through a combination of government ownership and the imposition of statutory universal service obligations. The first time the goal of universal service was explicitly articulated in Australian telecommunications was with the 1960 Community Telephone Plan. Since that time, a standard telecommunications service (variously defined over the years) has been made available to almost every household in the country (see Figure 2.1 below).

1.3 However, despite having achieved near universal penetration of the basic telecommunications service, there is still a high degree of concern within Australia over the level of service that is afforded to rural consumers. The following quotes illustrate these concerns:

> While access to services in metropolitan areas and the larger provincial centres is fairly satisfactory, people living in smaller communities and remote areas do not have ready access to high quality government and business services. Improved communications, greater mobility and a general increase in awareness of social and economic options have increased rural people's expectations for good quality, well delivered services. These expectations in many instances are not being met.[1]

> Present digitalisation investments are not closing the telecommunications gap between the urban customer and the rural producer. FSN may widen it.[2]

1.4 Specifically, the concerns seem to be that rural and remote consumers encounter a lower level of service in terms of:

- Access to both standard and advanced telecommunications services;
- Quality of service, particularly in terms of maintenance levels; and
- Higher prices for service.

1.5 The aim of this report is to examine the available data to see if the evidence supports these presumptions. To begin with, data comparing telecommunications services in rural and urban Australia are examined. Specifically, penetration rates for both standard and advanced services and available price and quality data are detailed. The following conclusions have been drawn from this evidence:

- While other services have increasingly been withdrawn from rural Australia, the gap between rural and urban Australia in terms of standard

[1] 'Delivering service to rural areas—the way ahead', Report and papers from the symposium held at the Warrnambool Institute of Advanced Education, Victoria, 15 & 16 Feb 1989, pp. 4 & 41.

[2] R. Buckeridge, *Rural Australia Online*, Rural Industries Research and Development Corporation, May 1996, p.36.

telecommunications services has continued to close over the past decade. The latest Australian Bureau of Statistics (ABS) estimates suggest that household penetration levels for telephony are now greater in areas outside the capital cities;

- The prices levied rural consumers for standard and most advanced telecommunications services are broadly comparable with those levied their urban counterparts, despite significant differences in the costs of providing these services;
- While there have been declines in service quality to some parts of the population, there is no evidence that these are related to a shift in resources by Telstra from areas where competition is less intense to areas where it is more intense. Rather, the data are consistent with the hypothesis that service quality variations are primarily due to weather conditions and to network life cycle effects; and
- Data on the take-up of advanced services indicate that while rural consumers do somewhat lag their urban counterparts, the gap is not due to disparities in network access, but rather to lower incomes, higher average ages and lower education levels in country areas.

1.6 To further test the widespread assumptions of rural disadvantage in telecommunications services, the second part of this report contains a comparison of Australian service levels with those in Canada, New Zealand, the United Kingdom and the United States. These countries were chosen because of their socio-economic and regulatory similarity with Australia and the availability of appropriate data. This comparative analysis indicates that Australia:

- has among the highest level of network connections per household in terms of both standard and advanced telecommunications services and is slightly ahead of the United States in terms of penetration of the PSTN in rural areas;
- has among the lowest prices for rural access to the standard telecommunications network and is unusual in not charging rural consumers significantly more than their urban counterparts for most telecommunications services. The subsidy to rural consumers inherent in these access prices shows up in higher charges that all Australians pay for STD and IDD calls;
- is almost alone in maintaining objective national quality of service measures that distinguish between rural and urban consumers, with Canada only recently instituting such a system; and
- is unusual in terms of not charging the vast majority of rural consumers significantly more than their urban counterparts for Internet access. Rural consumers in Australia also have far greater access to high-speed Internet connections than their counterparts overseas.

1.7 Appended to the report is a detailed overview of the available data on rural telecommunications in each of the countries examined in the comparative analysis (see Appendices A to D). Also appended is a statistical analysis, relied on in the main body of the report, of the effects of weather conditions on fault rates in Telstra's network (Appendix E).

B. Rural and urban service levels in Australia

2.1 The explicit policy goal of a universal telecommunications service, first detailed in Australia with the adoption of the 1960 Community Telephone Plan, has continued in subsection 288(1) of the *Telecommunications Act 1997*. This requires, *inter alia*, that 'the standard telephone service is reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business'. Consequently, the definition of 'the standard telephone service' is a critical component of the Universal Service Obligation (USO). At present Telstra is required to provide a standard telephone service that includes the following features:

- connection from the network boundary at the customer premises to the carrier local exchange;
- access to the public switched telephone network (PSTN) which is part of the multi-vendor national integrated telephone network;
- the ability to make and receive automated national and international voice grade telephone calls 24 hours-per-day;
- 24 hours-per-day access to an emergency number, which when called by the customer, gives the customer access to emergency services, free of charge;
- 24 hours-per-day access to operator assistance for directory assistance, national and international call connection and reporting of service difficulties;
- a unique telephone number, allocated in accordance with the National Numbering Plan and an appropriate directory listing, except where the customer requests otherwise, for that number;
- a level of privacy and security to enable users to conduct business and personal communications with confidence;
- monthly billing where requested by the customer;
- itemised billing for all calls, other than local calls (although local call itemisation can be provided to over 96% of customers today with 100% customer availability by June 1999);
- where technically feasible, calling number display, for use by the called party, transmitted at the discretion of the calling party; and
- a level of service meeting voice grade service, in accordance with best international practice, and meeting the relevant voice grade recommendations of the International Telecommunications Union, including those covering transmission quality, network availability and congestion.

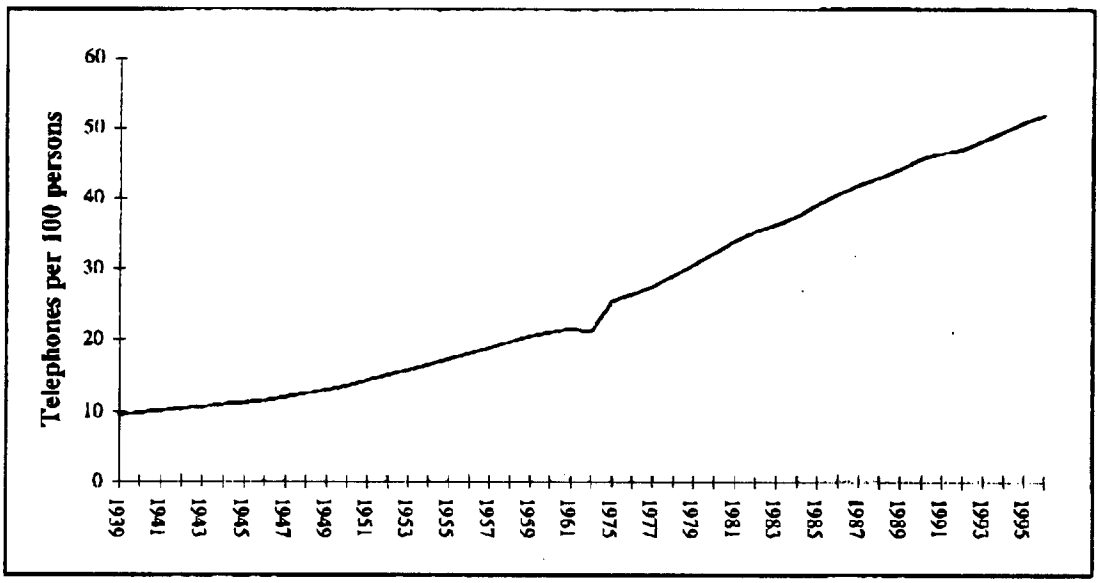
2.2 A common assumption in the ongoing debate over telecommunications policy in Australia is that these USO objectives have not been met. Rural consumers are seen to be disadvantaged in the level of service they receive in comparison with their urban counterparts. Specifically, it is commonly assumed that rural consumers have access to fewer services, with many communities in rural Australia said to be missing out on the advanced telecommunications services deemed necessary for participation in the "information economy". It is also assumed that the services rural consumers do receive are of a lower level of quality than those provided to urban consumers and are provided at a higher price. This section of the report compares the available data on service levels in urban and rural Australia to investigate whether the available evidence supports these widely held presumptions.

B.1 Access to standard services over the PSTN

2.3 Access to the public switched telecommunications network (PSTN) is the most fundamental element of the universal service obligation. There is not a consistent, publicly available, data series that can be used to directly test whether this commitment has been met. However, data from several sources indicates that PSTN access has indeed become ubiquitous in Australia.

2.4 Figure 2.1 plots the Australian data on telephones per hundred persons for the period 1939 to 1996. These data are drawn from Post Master General annual reports from 1939 to 1961 and from the International Telecommunications Union data base from 1970 to 1996. What they reveal is a steady increase in telephone penetration particularly after the mid-1960s.

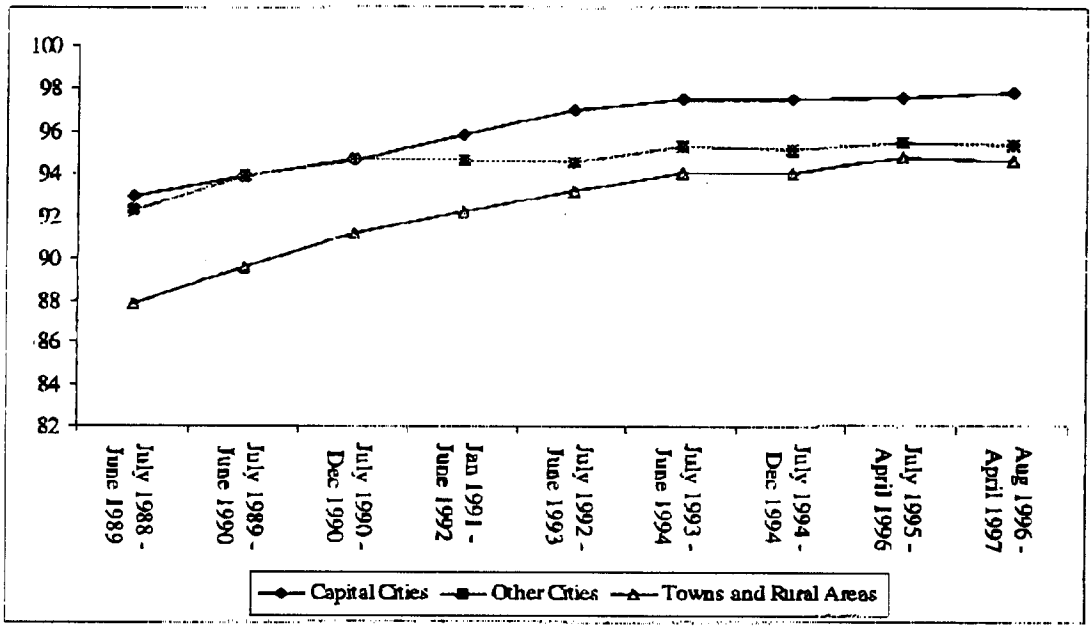
Figure 2.1: Telephones per 100 persons, Australia, 1939–1996



Source: Post Master General Annual Reports, 1939 to 1961 and the International Telecommunications Union, Stars Data Base.

2.5 Since June 1989, first Telecom and then its successor organisation, Telstra, have commissioned the Roy Morgan Research organisation to undertake nine surveys of telephone penetration . Figure 2.2 plots these Morgan estimates of PSTN penetration from June 1989 through to April 1997. The data suggest that the ever-higher levels of penetration, shown in Figure 2.1, have been associated with a steady closing of the gap in telephone access between rural and urban areas. While rural penetration rates were 5.1% less than those in the capital cities in 1989, by 1997 the gap had shrunk to only 3.2%.

Figure 2.2: Roy Morgan Research estimates of percentage of households with connection to the PSTN, June 1989–April 1997



Source: Roy Morgan Research

2.6 Other relevant data are available from the Australian Bureau of Statistics (ABS). As part of its survey of *Household Use of Information Technology*, the ABS has recently published figures on fixed telephone connections for February 1996 and 1998 (see Figure 2.3). These data reveal a lower penetration rate than the Morgan research, with capital-city penetration actually falling over the two years covered by the survey.[3] Importantly, the ABS data indicate that penetration of the PSTN is now greater in the remainder of Australia than in capital cities. Rural and regional Australia appears not only to have converged with the capital cities, but also to have overtaken them in terms of connections to the PSTN.

2.7 This record of convergence in telecommunications compares favourably with other basic services such as transport, banking and post, many of which have been withdrawn from rural Australia over the past two decades. For instance, about 100 bank branches have closed in South Australia in the past five years.[4] Around Australia the Commonwealth Bank and the National Australia Bank have closed approximately 15% of their non-metropolitan branches over the past three years. This process of bank withdrawal from urban areas seems to be gathering pace. According to the Reserve Bank, 386 bank branches were closed in 1997, more than double the number of closures for 1996.[5]

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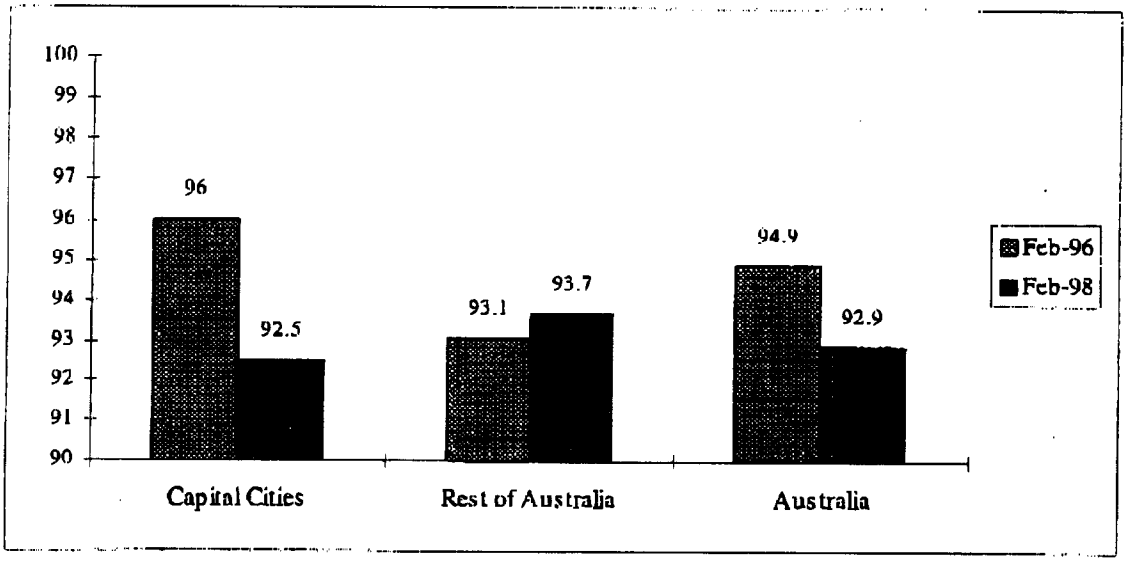
[3] Given the relatively small size of the sample, it is possible that the estimates of changes in the penetration rates are less reliable than the estimates of the differences between rural and urban levels in each period.

[4] 'Give Us A Fair Go, Angry Residents Tell Bank', *The Advertiser*, 10 June 1998.

[5] D. Luff, 'Bank Admits Axing One Branch A Week', *Courier Mail*, 29 May 1998.

Figure 2.3: Australian Bureau of Statistics estimates of percentage of households with connection to the PSTN, February 1996 and 1998.



Source: ABS, *Household Use of Information Technology*, 8128.0, February 1998, Table 12.

2.8 It is important to note that limitations on the reach of the Telstra network are seldom an explanation for households not connecting to the PSTN—although, for very remote customers seeking new access, delays in connection can be significant.[6] The absolute number of consumers with deferred applications in 1998 was 24,000, out of a total customer base of approximately 10 million, with 187,000 new connections per year. Half of the deferred applications were deferred because the customer put a hold on the process (eg. because the customer was moving house). The other half were not connected because of 'network matters' (eg. the infrastructure was not yet available). However, these 'network matters' are not restricted to rural and remote customers, with only 1,000–1,200 of the customers whose applications have been deferred living in remote areas.[7] This compares with the 1982 Davidson report, which found that 96 percent of deferred applications (beyond three months) were in rural areas and 83 percent of those were due to a lack of available lines.[8] In short, the evidence suggests that supply constraints, which were once a major cause of non-connection, are no longer the primary factor at work.

2.9 Rather, the failure of some households to be connected to the PSTN is primarily a function of demand, with income levels being the major determinant. In 1991, an ABS survey found that the majority of respondents (55%) gave 'cost' as the main

[6] The ACA has recently reduced the maximum connection times permissible under the universal service obligation for the most remote consumers from 27 months to 12 months, see 'ACA—Improved Telephone Service Delivery Standards as a Result of New Universal Service Plan', *M2 Presswire*, 20 May 1998.

[7] Data supplied by Telstra.

[8] *Report of the Committee of Inquiry into Telecommunications Services in Australia*, 1982, volume 1, p. 25 and volume 3 p. 196 (Canberra: AGPS).

reason for non-connection (see Table 2.1). A similar pattern emerges from the data contained in a 1996 ABS survey, which found that the most common reason (49%) for non-connection among the 3.6% of households that did not have a telephone at that time was still cost. With the possible exception of a perceived lack of need for a telephone, each of the additional reasons for non-connection also appears to be highly correlated with income.[9]

Table 2.1: Reasons for non-connection to the PSTN

Reason for not connecting	1991 survey	1996 survey
Expensive to connect and/or operate	55%	49%
Do not need a telephone	23%	22%
Access to alternative telephone	7%	..
Waiting for connection	3%	8%
Live in short term accommodation	5%	5%

Source: ABS. 1991, Telephone Connections Survey [cited in Austel, 1992, Final Report to the Minister on the Extent of Unmet Needs in Rural and Remote Areas for the Standard Telephone Service. Canberra: AGPS] and Australian Bureau of Statistics, cited in Austel. Carrier Performance Report, 1996-97.

2.10 It is unsurprising that rural communities, with lower income levels than their urban counterparts, have traditionally recorded lower telephone penetration rates. This is particularly the case for rural aboriginal communities that consistently record significantly lower income and telephony penetration levels than other sections of the population.[10]

2.11 Table 2.2 evidences the relationship between relative income and penetration. It details the Morgan data on fixed telephone penetration rates for various Australian regions and compares this with the most recent median weekly income figures in these regions. In general, regions with higher median incomes have higher penetration rates. The capital cities have a median weekly income of $490 and an average penetration rate of 97.7% of households. On the other hand, the rural and regional median weekly income is $407 and the average penetration rate is 94.7% of households. The major exception to this pattern occurs in Western Australia, where rural incomes are boosted above urban levels by the mining industry, but penetration rates are relatively low, mainly reflecting the large number of remote aboriginal communities.

[9] The increase in 'waiting for connections' may reflect the network dimensioning and saturation effects discussed below.

[10] The Government is seeking to address this issue with specific programs for aboriginal communities. For example, as part of a $3.2 million pilot scheme, the Electronic Outback project will give 14 aboriginal communities in the Northern Territory broadband telecommunications services using satellites. It will deliver 128Kbps access to each location. The project is part of the Government's regional telecommunications infrastructure fund. See, J. Hilvert, 'Satellites Saturate Remote Centres', *The Australian*, 7 April 1998, p.64.

Table 2.2: Household telephone penetration rates and income

Regions	Penetration Rates April 1997	Median Weekly Income 1995–96
Adelaide	98.3%	$450
South Australian Country & Northern Territory	95.5%	$367
Brisbane	96.2%	$477
Queensland Country	92.4%	$408
Melbourne	98.3%	$49
Victorian Country	96.3%	$415
Perth	98.0%	$465
Western Australian Country	90.1%	$479
Sydney	97.7%	$498
NSW Country North	97.1%	$400
NSW Country South	96.0%	$400
Tasmania	95.5%	$44
City average	97.7%	$490
Rural and regional average	94.7%	$407

Source: Penetration rates drawn from Roy Morgan Research and Median Income data drawn from ABS *Income Distribution 1994–95*, 6523.0

B.2 Prices for standard telecommunications services

2.12 In a fully deregulated telecommunications market, the prices levied rural consumers for services would be greater than urban prices, reflecting the significant differences in costs between rural and urban areas. However, in Australia successive Governments have implemented policies designed to limit price differentials between rural and urban Australia.

2.13 Specifically, Telstra is obliged to provide most rural consumers with access and local call services on the same basis as is available to their metropolitan counterparts. Hence, the vast majority of residential consumers in both rural and urban areas obtain an access line for $11.65 per month ($20 per month for business consumers) and are levied a flat fee of 25 cents for all calls to destinations in the same or adjoining 'standard charging zones'. Furthermore, most rural consumers are routinely levied the same price as urban consumers for other telecommunications services such as STD and IDD and are generally eligible for various optional calling plans and 'specials'.

2.14 By and large, local calling zones in country areas contain significantly fewer customers than calling zones in more densely populated parts of the country. So as to reduce the effects of this differential, Telstra has established extended charging zones in remote areas under a scheme called 'Countrywide Calling'. As a result of

this scheme, some calling zones in country areas are greater than 100,000 square kilometres compared with an Australian average of 400 square kilometres. In these zones, intra-zone calls can extend over a distance of up to 600-700kms (compared with a distance of approximately 32kms in urban areas). Calls between customers within these zones and between these customers and their Community Service Towns are charged at so-called 'pastoral call rates', whereby charges for calls of a standard duration are equivalent to urban local call rates. For example, the pastoral rate for a 4.5-minute call is 25 cents. Since 1980, Telstra has also had in place the STD Community Call system, under which STD rates are discounted in rural areas for calls to each rural client's local community service centre. While these schemes do not entirely offset the effective disparity in the number of customers that can be reached by a local call, they do significantly temper its impact on call charges.

2.15 There are, however, about 17,000 telephone users in isolated areas of Australia without access to untimed local calls. These consumers' interests are specifically addressed by the *Telecommunications Act 1997*, which requires that the Minister must make all reasonable attempts to provide the same financial benefits to isolated users as received by customers with access to untimed local calls by 1 January 1998.[11] As a result of these provisions, compensation measures have now been put into place, with the result that the users at issue will receive a rebate comparable to the savings which customers with an untimed calling option derive from that particular calling type. Most recently, the Government has announced that, should the full privatisation of Telstra proceed, some part of the proceeds would be used to extend untimed local calling to those subscribers who currently lack untimed calls.

2.16 Some rural consumers are also likely to reap the benefits of lower prices arising through greater competition, at least for long distance and international services. Optus, for example, has been in a position to offer STD and IDD services to more than 99% of the Australian population since September 1996.[12] New carriage service providers, such as AAPT, also claim to be offering services to an expanding number of consumers in rural and regional Australia.

2.17 However, many rural consumers continue to miss out on the benefits of facilities-based competition. Regulation of rental and connection charges means that Telstra currently provides access services to all but the most centrally located consumers at prices well below the costs that providing such access entails.[13] This in turn greatly reduces the incentive for competitive entry by alternative providers of facilities.

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[11] Department of Communications and the Arts, 'Comparable Untimed Local Call Benefits For Telecommunications Customers In Isolated Areas Outside Standard Zones: Discussion Paper And Request For Submissions', September 1997. http://www.dca.gov.au/policy/untimed.html

[12] Australian Communications Authority, *Telecommunications Performance Monitoring Bulletin*, Issue 3, December 1997, p.5.

[13] R. Albon, A. Hardin and P. Dee, *Telecommunications Economics and Policy Issues*, Staff Information Paper, 1997, Industry Commission, Canberra.

Without significantly lower costs than those faced by Telstra, entrants could not levy prices that simultaneously attract customers and provide them with an adequate return on their investment.[14]

2.18 It is important to note that the bulk of the loss Telstra makes on rural access (and on access in many urban areas) is not offset by any formal universal service funding mechanism. The current USO funding mechanism, designed when Telecom had a monopoly, only takes effect when the revenues secured in an area—adding in all the PSTN services supplied in that area—fall short of the costs that would be avoided were that area not served. As a result, the mechanism offsets all of Telstra's PSTN revenues in an area against the costs incurred in serving that area. In other words, the USO mechanism only comes into effect when the profits from Telstra's supply of local, STD and IDD calls are fully exhausted.

2.19 Such arrangements mean that the loss Telstra incurs in supplying PSTN access in country areas is far greater than the USO payment it receives. In 1997–1998, Telstra made an economic loss of well over $1 billion from the supply of PSTN access. In contrast the USO payment for 1996–1997 was $252 million, some 90 percent of which was paid by Telstra itself.

B.3 Quality of telecommunications services

2.20 The quality of telecommunications services is an issue of major concern in rural areas. Opponents of competition and/or of the privatisation of Telstra argue that service quality in the bush has declined over the 1990s, in direct response to the introduction of competition and to Telstra's partial privatisation. This problem, they believe, will be exacerbated by the full privatisation of Telstra. As Colin Cooper, President of the CEPU communications division, recently claimed:

> Telstra remains the only provider of basic services in most non-metropolitan areas. It is likely to stay that way for the foreseeable future. That means regional and rural Australians can be held hostage to the privatisation process.
> You can see what [job shedding as a result of the privatisation of Telstra] means for services.... Evidence that we are getting from the field suggests the picture is not getting any better.[15]

2.21 Opposition Industry and Regional Development spokesperson, Mr. Simon Crean, has made a similar point:

> the figures [from the latest Telecommunications Performance Monitoring Bulletin] showed that country Australians have borne the brunt of reduced Telstra services under a one-third privatised Telstra, despite the 'guarantees' in place to protect country users of Telstra services.[16]

2.22 In response to concerns about quality levels, successive Australian governments have put in place some of the world's most stringent quality of service requirements. A new system of 'Customer Service Guarantee' benchmarks was

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[14] Such a reduction in costs may occur in the future through satellite technology. Satellite systems such as VSAT and Optus Mobilesat are already able to serve rural areas and are reducing in cost. See M. Rocke, 'The USO After 1997—Meeting User Needs In An Open Market', , Telstra. Forum, November 1996, http://www.dot.gov.au/programs/btce/forum/papers/usoaf97.htm

[15] Quoted in M. Taylor, 'Service to suffer in Telstra sale—Union' *Canberra Times*, 29 May 1998, p.3.

[16] L. Dodson, 'Coalition MPs attack Telstra service standards' *Australian Financial Review*, 1 April 1998, p.4.

introduced in January 1998, whereby all holders of a carrier license can be fined for not providing adequate services, as defined under the regulation. Specifically:

- In metropolitan areas, failure to repair a reported fault by the end of the next working day can result in a fine. In rural areas, carriers have two working days and, in remote areas, three working days to repair a fault. However, in remote and rural areas, if the fault was caused by an administration error or the fault can be repaired without attending the customer premises, the carriers have only one full working day to fix the fault.
- A system of Agreed Commitment Dates (ACD) has been put in place for customer connections. Until recently when a customer applied for a new or in-place service, Telstra negotiated an ACD which took into account both Telstra's resources and demands at the time of the service request, in conjunction with the customer's requirements. The percentage of services connected on or before the ACD showed the extent to which Telstra met its own commitments in respect of connecting customers. Since the introduction of the Customer Service Guarantee (CSG) Scheme in January 1998, maximum connection times have been specified for the connection of new and in-place services.
- Carriers are liable to be fined $25,000 if found to have breached the guarantee.
- The Australian Communications Authority (ACA) has the power to direct all carriers to take remedial action to correct any systemic problems, which arise in meeting customer service guarantee performance.
- Failure to comply with a direction from the ACA attracts a penalty of up to $10 million.[17]

2.23 The current public debate on the quality of telecommunications services seems to start from the premise that the grade of service standards set down first by AUSTEL and then the ACA represent achievable and desirable levels of performance. It follows from this premise that policy initiatives aimed at ensuring compliance are in the public interest. However, there is no evidence that these standards are achievable under the conditions prevailing in Australia. No less importantly, these standards are not based on any systematic cost-benefit analysis, in which the cost of the resources needed to achieve these goals is weighed against the benefits their achievement would provide. Rather, the standards have been set on the basis of administrative and political considerations, with no obvious link or reference to broader efficiency goals.

2.24 Rigidities in the regulations can aggravate the resulting inefficiencies. In particular, there is little practical scope under the regime for carriers and consumers to "contract out" of the regulated service standards. Thus, a carrier could not readily discharge its obligations by offering consumers lower prices for service standards lower than those mandated by the regulator, or by proposing insurance-like contracts in which stipulated payments would be made when specified contingencies (say, a prolonged outage) had occurred. As a result, carriers are forced to provide consumers with a service standard that may bear no relation to their needs.

[17] R. Alston and J. Fahey, 'Government to Get Tough on Telecommunications Services Standards' *Joint Media Release*, 41/98, 30 March 1998.

2.25 However, even if these standards are taken as given the alleged relationship between increasing competition and decreasing service quality that underpins much of this debate has not been substantiated. The argument seems to be that as Telstra has come under competitive pressure in urban areas, it has shifted resources from the maintenance of its rural network to combat this competition. Implicit in such an argument is the assumption that Telstra will not come under competitive pressure in rural Australia. As noted above, price distortions caused by regulation do reduce the incentives for new entrants to enter the rural market. However, the possibility of competitive entry by satellite operators into rural Australia will see Telstra lose market share in lucrative, quality-sensitive, market segments if it fails to maintain service levels in country areas.

2.26 Even putting aside what may happen in the future, the empirical evidence provides little support for the proposition that increased competition and the part-privatisation of Telstra has resulted in declining service quality . Subsequent paragraphs examine this evidence first with respect to connection times and then with respect to delays in the clearance of faults.

B.3.1 Connection Times

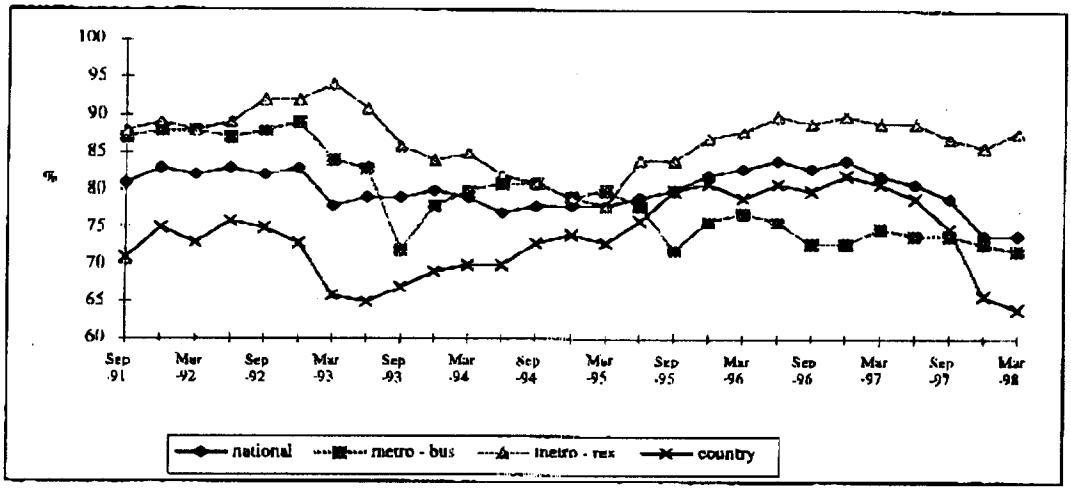
2.27 Much of the current public debate has focused on some very recent ACA figures comparing Telstra's installation of new services with the agreed commitment date (ACD). These data indicate a decline in performance each quarter from December 1996 to March 1998.

2.28 Figure 2.4 places Telstra's performance in the provision of new services into a historical context, detailing the full data set back to September 1991, when Austel first commenced the collection of such figures. These data highlight several trends in Telstra's performance in the installation of new services. In particular:

- After recording record performance levels in the period September 1995–March 1997, Telstra's performance levels in rural Australia have declined back to a level consistent with the lows of mid-1993;
- Since 1991, Telstra's performance levels for business customers in metropolitan areas have steadily declined;
- After a fall in 1994–1995, Telstra's performance levels for residential customers in metropolitan areas have remained relatively constant;
- The recent falls in rural and metropolitan business performance mean that Telstra's national performance, after reaching its highest level in 1996, is now at the lowest levels recorded; and
- When the period is viewed as a whole, the fall in performance is more acute in respect of metropolitan businesses than in respect of customers in rural areas.

2.29 Two conclusions can be drawn from this evidence. First, given that competition for metropolitan business customers is especially intense, the claim that Telstra's performance reflects a policy of moving resources towards areas of greatest competitive threat must seem poorly founded. Second, the change in performance does not affect country areas alone, although these have experienced performance levels that seem poor when compared to the recent past.

Figure 2.4: Percentage of new services installed by Telstra on or before the agreed commitment date, September 1991–March 1998

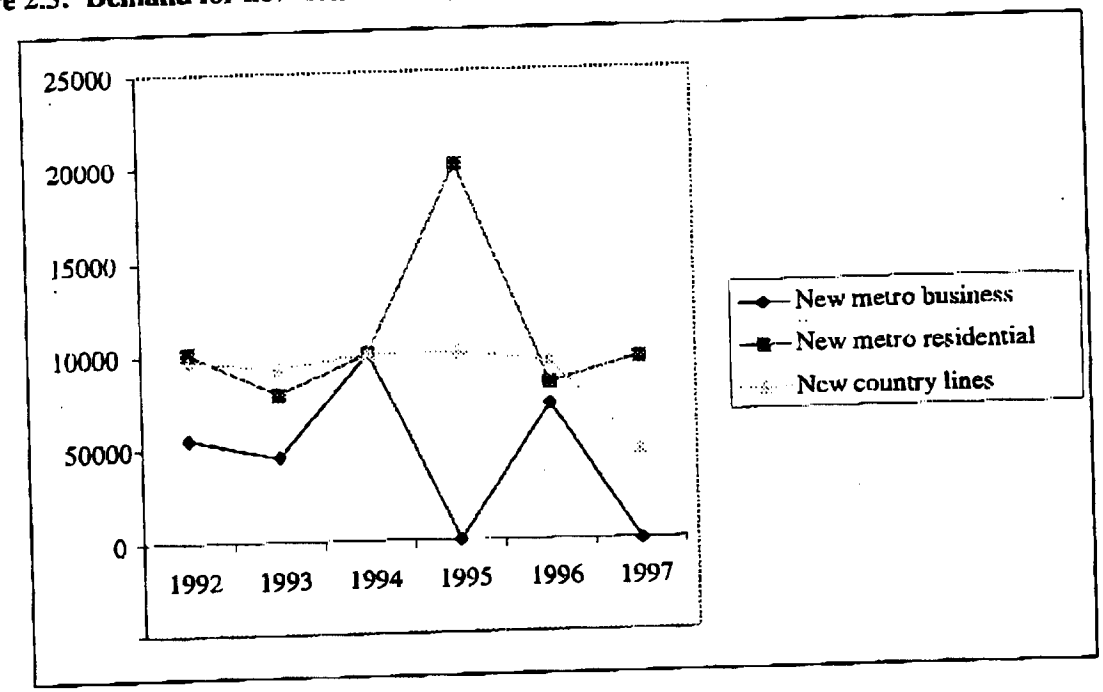


Source: Generated from ACA and Austel *Telecommunications Performance Monitoring Bulletin*, September 1991 to March 1998

2.30 A combination of short and long term factors appear to be primarily responsible for the recent increase in connection times for new services. With respect to short-term factors, there is some evidence to suggest that connection times have been adversely affected by unusually sharp changes in the pattern of demand for connections. Figure 2.5 plots ACA data on the number of new installations by Telstra for the period 1992–1997. In 1994, demand for new residential lines in metropolitan areas doubled from an average of approximately 100,000 per year to over 200,000. At the same time, demand for new business lines declined markedly. Sharp changes in demand patterns also occurred in 1997, with a fall-off in the demand for new country lines and another decline in the demand for business lines in urban areas.

2.31 It is unsurprising that connection times for new services declined during these periods. Sharp demand volatility across regions and customer groups can place great stress on internal resource management. Temporary mismatches between particular market requirements and the location of appropriately trained personnel are likely, resulting in increases in connection times. These problems are readily exacerbated by work practices which, despite substantial reforms, continue to reflect the legacy of many years of monopoly.

Figure 2.5: Demand for new connections, 1992–1997



Source: Generated from ACA and Austel *Telecommunications Performance Monitoring Bulletin*, September 1991 to March 1998

2.32 Longer-term factors are also at work. To begin with, recent years have seen strong growth in demand for second lines, mainly reflecting increased use of the Internet. The Telstra access network has not been well placed to meet this demand. The difficulties largely reflect the conditions that prevailed during the period of the network's rapid expansion. In particular:

- unit costs per connection were high, in part due to restrictive work practices;
- public sector capital constraints limited the funds available for expansion; and
- it was thought that demand for second lines would be limited for many years to come.

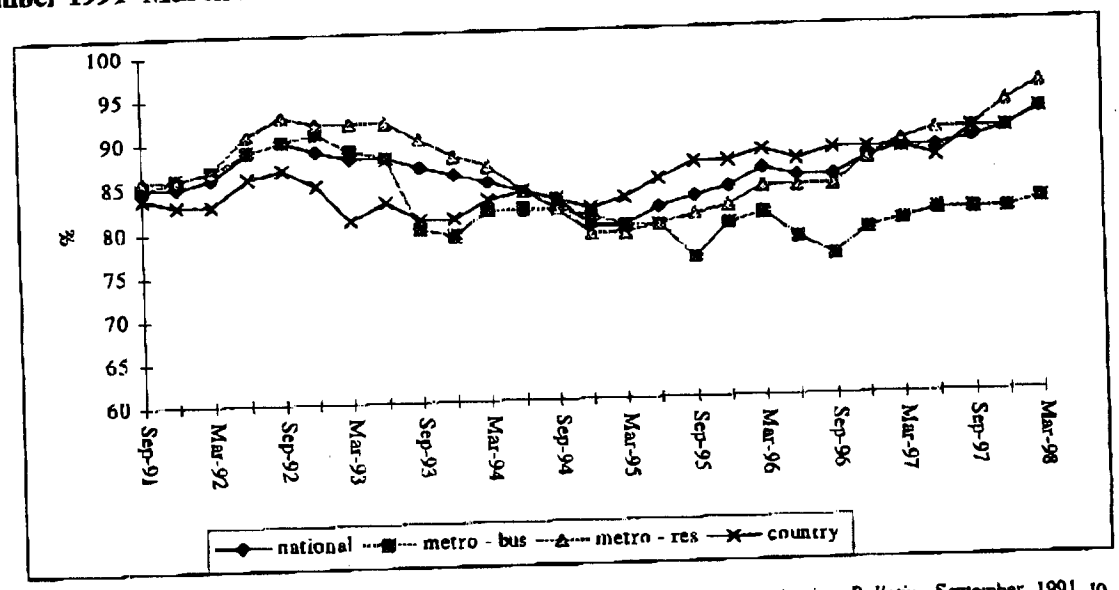
2.33 Priority was therefore given to increasing the number of households connected to the telephone system, while providing relatively little 'spare capacity' per working service. As a result, while internationally, it is not unusual for two or more copper pairs to be provided per service in operation, the Telstra network has only provided some 1.25. As these relatively scarce 'spare' lines have been brought into service, it has become increasingly difficult to meet the demand for new connections. The reduction in spare copper loops also has implications for fault clearance statistics, examined below, as there is now less scope for migrating customers from faulty to unused pairs.

2.34 The factors set out above seem to have been aggravated by network saturation effects. It would seem reasonable to expect that as the network reaches saturation, those remaining locations requiring entirely new connections would be the most difficult to service. To connect new subscribers in these locations with no greater delay than had been experienced by customers elsewhere would be extremely

costly, if not impossible. Under normal circumstances, connection times should therefore increase as network reach approaches ubiquity.

2.35 This explanation is supported by the data in Figure 2.6, which details the percentage of in-place services reconnected on or before the ACD. Reconnections of in-place services account for the vast bulk of connection services. If Telstra's quality of service were falling as a result of a specific corporate strategy to reduce resources devoted to less fiercely contested markets (ie. the rural and metropolitan residential segments of the market) then this measure should also be falling. However, as Figure 2.6 indicates, after reaching a low in late 1994, Telstra's performance levels in both rural and metropolitan residential segments on this measure are at historic highs.

Figure 2.6: Percentage of in-place services reconnected on or before the ACD, September 1991–March 1998

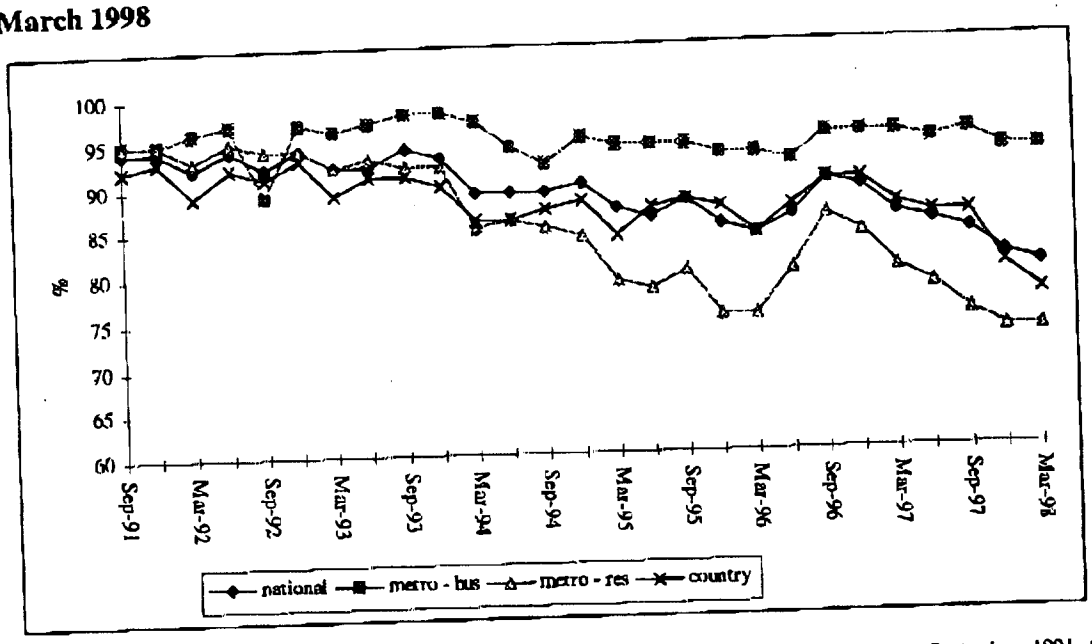


Source: Generated from ACA and Austel *Telecommunications Performance Monitoring Bulletin*, September 1991 to March 1998

B.3.2 Fault Rates and Fault Clearance

2.36 Another common complaint about declining quality standards focuses on Telstra's timeliness in clearing faults. Figure 2.7 sets out the available data on the percentage of faults cleared within two working days of notification, which is the average time required by the regulations. There is some evidence of a decline in performance, although as the pattern varies from that detailed in Figure 2.4. In this case, the performance in relation to rural consumers and business consumers in metropolitan areas is relatively constant—although rural consumers have seen some decline since September 1996. Instead, it is the measured declines in service levels to residential consumers in metropolitan areas that have most sharply reduced the national average.

Figure 2.7: Percentage of faults cleared within two working days of notification, September 1991–March 1998

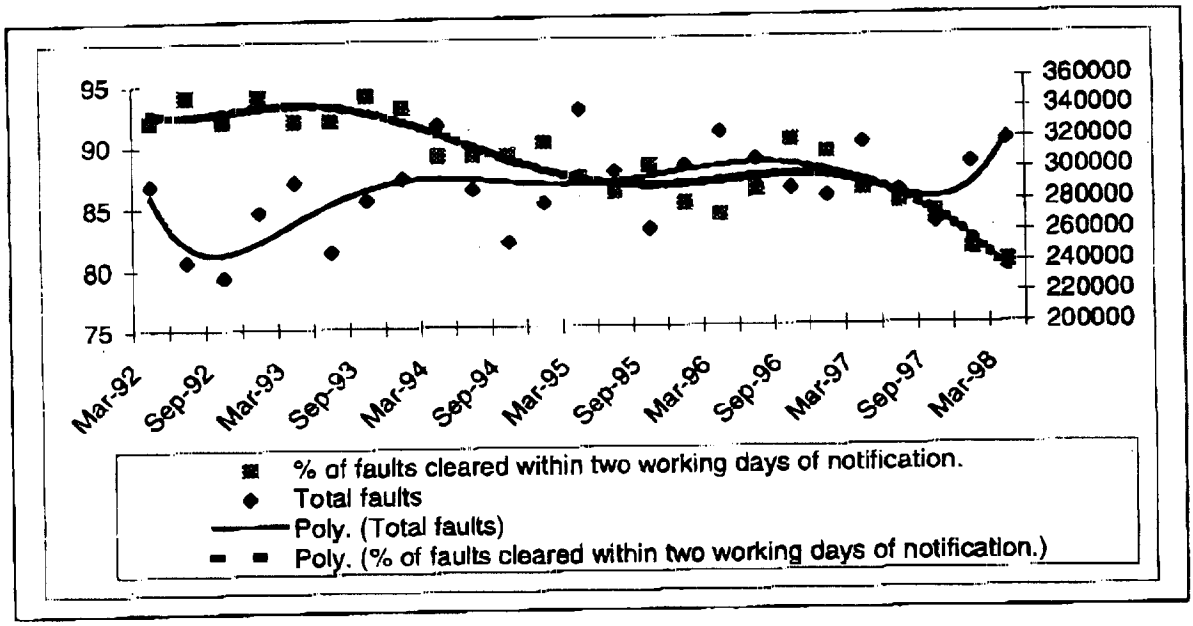


Source: Generated from ACA and Austel *Telecommunications Performance Monitoring Bulletin*, September 1991 to March 1998

2.37 It is important to remember that these performance measures are not adjusted for any unusual or unforeseen increase or decrease in the number of faults reported. The carriers are expected to maintain a standard level of service regardless of external factors altering the number of faults.

2.38 However, the available data reveal occasional irregular surges in the number of faults reported per period in the different regions of Australia. Figure 2.8 details the relationship between these surges in the number of faults and national fault clearance rates. The data are for each quarter from March 1992 to March 1998 and have been smoothed using sixth degree polynomials. The number of faults changes quite dramatically over the period and this can be seen to have significant effects on fault clearance rates. For example, the recent downturn in Telstra's fault clearance performance is closely associated with a dramatic increase in the number of reported faults.

Figure 2.8: The Relationship between Fault Clearance Rates and the Total Number of Faults Reported, March 1992–March 1998



2.39 In turn, much of this variation in the number of faults appears to be related to adverse weather conditions, such as significant flooding or particularly destructive storms. For example, in Far North Queensland, Telstra averages approximately 1,300 faults per month. In January 1998, this figure leapt to over 3,200 faults as a result of widespread flooding and cyclonic conditions. The January average for the preceding six years was approximately 1,500 faults per month. Drought is also an important, if less immediately apparent, determinant of fault levels. Prolonged periods of dry weather expose telecommunications cables to stress as the ground cracks and erodes, causing an increase in fault rates.

2.40 It is possible to show more rigorously the relationship between adverse weather conditions and network faults by comparing Telstra regional fault data with Bureau of Meteorology data on average rainfalls. A statistical analysis was undertaken whereby fault data from 34 regions over 78 months from January 1992 to June 1998 were matched with rainfall data from 107 meteorological areas (see Appendix E for a full description of the statistical tests). An extreme weather event was defined as rainfall which was less than the first decile or greater than the ninth decile for the month, where the deciles were obtained using 86 years of data for each month in each meteorological region. In essence, an index was created that identified periods of excessive rainfall or prolonged dryness considered outside the bounds of normal statistical experience in each region.

2.41 The findings indicate that in more than one third of the regions examined, extreme weather conditions were a statistically significant explanatory factor in the number of faults reported. In addition, extreme weather accounted for up to 35% of the total number of faults in some regions. Furthermore, the evidence indicates that these regions accounted for a large proportion of the total number of faults reported across Australia. Even in those regions where the results were not statistically

significant, the relationship between extreme weather conditions and faults was as predicted in the vast majority of regions.

2.42 In short, Telstra's fault clearance rates appear to be significantly affected by random surges in the number of faults reported. The question then is whether deterioration in service quality remains, once these surges are accounted for.

2.43 To examine this, a further test was undertaken on the data reported above. Extreme weather was found to account for much of the variation over time in fault rates. In most regions, no statistically significant trend remained once weather effects were taken into account. a A trend was evident in only five of the 34 regions analysed. This trend accounted for only 5 per cent of the total number of faults reported over the period.

2.44 It is possible, though it cannot be rigorously established, that this residual trend reflects network life cycle effects. It is known from telecommunications engineering studies that the incidence of faults throughout the various network elements follows essentially a U-shaped pattern, with a greater number of faults at both the start-up and shutdown phases of those elements' service lives. Reflecting this pattern, the fault rate on a copper pair network rises as the pair ages. While this rise can be offset through increased maintenance outlays, it would not be efficient to prevent it entirely.

2.45 The information that is available on Telstra's rural network indicates that life cycle effects can explain part of the trend set out above. Both the wireline and radio networks that presently service rural Australia were established or expanded in the decade from the late 1960s. As these network elements have now been in service for twenty or more years, some increase in fault rates is likely.

2.46 In summary:

- While there has been some reduction in the timeliness with which faults are cleared, this seems to mainly reflect an increase in the absolute number of faults.
- In turn, this increase is primarily due to adverse weather conditions.
- When weather conditions are controlled for, there does remain a slight but statistically significant trend increase in the fault rate. However, this trend accounts for only a very small part of the observed change in fault numbers over the period.
- It seems likely that the trend reflects normal "wear and tear" in a network that is now relatively mature.

2.47 It is unlikely that the various quality measures will or should record a significant improvement in the near future, even with the ongoing replacement by Telstra of its network and the development of new networks by entrants into the rural market. Instead, the higher fault levels associated with the start-phase of networks are likely to further affect the ACA quality measures. Such start-up effects are currently evidenced by the declining clearance standards for business consumers

(see Figure 2.4) that are accessing new network technology and most spectacularly, by the high fault levels apparent in the Optus network.[18]

2.48 These start-up-induced declines in network performance will occur regardless of the introduction by government of harsher penalties for quality failure. What the higher penalties are likely to do, however, is to seriously distort the network investment decisions of carriers in rural areas. Specifically:

- For an incumbent such as Telstra, the threat of such penalties will induce it to adopt a very conservative investment pattern. It will be forced to invest in the maintenance of the existing network infrastructure to a point where the costs far exceed the true benefits—a problem generally referred to as network gold plating. Furthermore, Telstra may have less incentive to completely upgrade the network in rural and remote areas for fear that any decline in quality associated with the start-up phase of an upgraded network will result in large fines.
- The threat of such penalties will also deter potential entrants into the Australian telecommunications industry. In effect, potential entrants will have to factor in the possibility of regulatory penalties when developing investment plans. This can only further reduce the incentives for competitive entry in rural and regional Australia.

B.4 Access to advanced services

2.49 Beyond the standard telephony service, rural consumers are increasingly concerned about access to newer services. The particular focus has been on the various services associated with the Internet, including electronic commerce and the development of intra- and extra-nets. Such services are widely seen as a means of reducing the costs that distance and remoteness impose on rural communities. It is hoped that with the development of the telecommunications network, rural communities will be able to access a greater array of services online, placing their access to information on a basis comparable to that of Australians in urban areas. Reflecting this, there is a great deal of concern in rural communities about whether the underlying infrastructure necessary to access the information economy is in place.

2.50 Comprehensive data comparing Internet access between urban and rural Australia has only recently become available. In June 1998, the ABS released the latest *Household Use of Information Technology* survey which found that rural Australia (defined broadly as non-capital cities) continues to lag metropolitan Australia in terms of Internet usage (see Table 2.3). Almost 16% of households in Australian capital cities access the Internet from home, as compared with only 7.2% in the rest of Australia.

[18] See ACA, *Telecommunications Performance Monitoring Bulletin: March 1998*, p. 10.

Table 2.3: Number of Australian Households Accessing the Internet from Home, 1998

Region	Number of Households	Percentage Accessing the Internet
Capital Cities	672,000	15.8%
Rest of Australia	182,000	7.2%
Total Australia	854,000	12.6%

Source: ABS, *Household Use of Information Technology*, 8128.0, February 1998, Table 12.

2.51 Research by www.consult indicates that this disparity in penetration rates between rural and urban Australia is slowly closing. In an analysis of its December 1997 online survey, www.consult found that 80% of Internet users were from metropolitan areas, with 20% from non-metropolitan areas.[19] This compares with a population split of 64% in metropolitan areas and 36% rural and regional.[20] However, when the data for new users are decomposed, it emerges that rural and regional users comprise 25% of the total of new users in the three months to December 1997, suggesting that their proportion of total Internet usage will increase above current levels. Nonetheless, that proportion would likely remain somewhat below the rural and regional share of the population overall.

2.52 The reasons for this disparity in Internet usage are seen by many to be the result of a failure on Telstra's part to roll out the necessary infrastructure for Internet services to rural communities. As the Kondinin Group recently concluded:

> The information super-highway is likely to remain a gravel road in the bush until access and service problems are rectified.[21]

2.53 In reality, the reasons for the disparity are more complex, with demand-side factors playing the primary role.

B.4.1 Demand-side factors

2.54 On the demand side, lower Internet penetration rates in rural Australia largely reflect the demographics of Internet demand. The available evidence indicates that Internet usage is highly correlated with higher income and education levels and is more common among younger people and those born overseas. These are demographic characteristics that are substantially more prevalent among capital city residents. Hence, it is hardly surprising that Internet penetration rates are greater in the urban parts of the country.

2.55 Table 2.4 highlights the strong relationship between household income and Internet usage, using ABS data. These data indicate that persons resident in the highest-income households are almost six times more likely to access the Internet than those resident in the lowest-income households. This is consistent with findings from the www.consult survey which found that the median annual household income for Internet users is $50,000–$60,000, almost twice the median income for the Australian population as a whole.

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[19] www.consult Pty Ltd, *Metro vs Non-Metro Internet User Analysis*, Draft, June 1998.

[20] ABS, 3101.1, June Quarter, 1997.

[21] Kondinin Group, *Press Release*, 3 June 1998, http://www.kondinin.com.au/Press_Release

Table 2.4: Relationship between household income and the proportion of households in regional and urban Australia accessing the Internet from home, 1998

Household income	Percentage of these households accessing the Internet	Number of such households in capital cities	Number of such households in the rest of Australia
$0–$14,000	4.6%	19%	25%
$14,001–$27,000	5.3%	16%	22%
$27,001–$44,000	8.8%	27%	27%
$44,001–$66,000	14.2%	15%	12%
$66,000 +	27.0%	22%	13%

Source: ABS. *Household Use of Information Technology*, 8128.0, February 1998. Table 12. Income data obtained by special request from the ABS

2.56 Importantly, Table 2.4 also details the proportion of both regional and urban consumers in each household income group. This clearly demonstrates that there are proportionately fewer high-income households outside the capital cities of Australia. It is therefore not surprising that Internet penetration rates are also lower in rural and regional Australia.

2.57 Similar conclusions can also be drawn when other important determinants of Internet demand are examined. Table 2.5 details the relationship between Internet usage and age, education and country of birth. It demonstrates that:

- 18–24 year olds are twice as likely as 40–54 year olds and fourteen times more likely than people aged over 55 to have accessed the Internet in the 12 months to February 1998;
- a person with a bachelor's degree is four times more likely to have accessed the Internet in the 12 months to February 1998 than a person whose highest formal educational attainment is a secondary school certificate; and
- Australians born overseas are somewhat more likely (25.7% versus 21.5%) than those born in Australia to have accessed the Internet in the 12 months to February 1998.

Table 2.5: Relationship between selected demographic characteristics Internet in urban and regional Australia, 1998

Selected demographic characteristics	Use of Internet in 12 months to February 1998	Percent of pop'n per category cities	Percentage of pop'n per category towns	Percentage of pop'n per category rural areas
Age group (years):				
18–24	42.4%	15.4% (a)	13.6% (a)	12.2% (a)
25–39	31.2%	23.8% (b)	22.2% (b)	21.8% (b)
40–54	21.9%	20.8% (b)	19.0% (b)	22.5% (b)
55+	3.1%	20.3%	21.9%	18.8%
Highest qualification				
Secondary school	14.3%	49.1%	55.7%	56.9%
Trade certificate	17.2%	19.5%(c)	22.3%(c)	21.5%(c)
Other certificate	22.7%	19.5%(c)	22.3%(c)	21.5%(c)
Diploma	35.7%	7.4%	5.7%	6.0%
Bachelors degree	55.9%	15.3%	7.4%	7.7%
Place of birth		**Urban areas**	**Rural areas**	
Australia	21.5%	76.4%	88.3%	
Outside Australia	25.7%	23.6%	11.7%	

Notes: Definitions: (1) rural areas = people living on separate properties or in population clusters of less than 1,000 people; (2) towns = all urban centres with a population of 1,000 to 99,999; (3) cities = urban centres with a population of 100,000 and over.

(a) = Figures include 15–18 year olds

(b) = Figures calculated by apportioning the 35–44 category

(c) = Combines skilled vocational and basic vocational qualification

Sources: Internet data from ABS, Household Use of Information Technology., 8147.0, and Demographic data from ABS, Australian Social Trends, 4102.0.

2.58 Table 2.5 also details the proportion of both regional and urban consumers in each age, education and country of birth category. In general, people in rural and regional Australia are older, with significantly fewer 18–24 year olds compared with the cities. The majority of rural and regional Australians have a secondary school certificate as their highest level of formal educational attainment. Compared with their counterparts in urban areas, very few have bachelor's degrees and even fewer are foreign born.

B.4.2 Supply-side factors

2.59 Despite being the focus of much of the current debate on telecommunications infrastructure, there is very little evidence that supply-side factors have a major impact on the disparity between rural and urban Internet penetration rates.

2.60 To begin with, the almost ubiquitous rollout of the fixed telephony network means that virtually all consumers with the appropriate computing facilities can access the Internet. However, the key issues are not whether rural consumers can access the Internet, but whether they can access it at a price and at speeds that allow reasonable use.

2.61 At present, most Australians access the Internet by dialing their Internet Service Provider's (ISP) local point of presence (essentially a bank of modems). For this service they generally pay a fee to the ISP and 25 cents per call to the local call provider. Many rural and regional consumers have access to a local point of presence, as there are very few barriers to the establishment of such facilities. Evidence from the United States, for example, suggests a minimum of 200 subscribers is sufficient to meet efficient levels of scale for a point of presence.[22] While there were only 62 ISPs in Australia in 1995, there are now almost 600 with over 1000 points of presence in 270 towns around Australia.

2.62 For those rural consumers without access to a local point of presence, several major service providers offer a '13' or 019 number that incurs a local call charge. Access to this local call charge point of presence typically entails a fixed fee that is only marginally higher than that imposed on consumers in metropolitan areas.[23] It is unlikely, therefore, that the price of access to the Internet is a major determinant of the disparity between rural and urban consumers in terms of Internet usage.

2.63 Table 2.6 demonstrates the limited impact of price on Internet penetration differentials between rural and urban areas. It sets out ABS survey data on the main reasons why households with computers do not have access to the Internet. While the costs of Internet access are an important reason for non-connection, the differences between rural and urban consumers in the importance of this factor are negligible. Instead, it seems that the major difference between rural and urban consumers is that the former have poorer access to computing capacity than the latter.

Table 2.6: Main reasons why households with computers do not have access to the Internet

Reasons for not accessing the internet	Capital cities	Rest of Australia	Australia
Costs are too high	29.6%	30.4%	29.9%
Lack of interest in the internet	29.1%	28.3%	28.8%
Poor computing capacity	8.4%	12.0%	9.7%
Adequate access outside the home	7.9%	5.2%	6.9%
Other (a)	22.1%	23.3%	22.5%

Note: (a) Includes privacy concerns, lack of confidence/skill with computer, poor opinion of the Internet, lack of access to ISP and inadequate telecommunications infrastructure.

Source: ABS, *Household Use of Information Technology*, February 1998, 8128.0, Table 15.

2.64 Lack of access to an ISP and inadequate telecommunications infrastructure (both captured in the 'other' category in Table 2.6) also differs only marginally between rural and urban consumers.

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[22] S. Greenstein, 1998, 'Universal Service in the Digital Age: The Commercialization and Geography of US Internet Access', *NBER Working Paper*, No. 6453, March.

[23] Bigpond, for example, provides a local call charge (019) number for rural consumers and levies Internet access fees of $7.00 per hour. This compares with an entry rate for urban users of $4.00 to $4.50 per hour.

2.65 A recent survey of farm owners confirms that potential problems with the telecommunications infrastructure are not a major determinant of whether or not a rural household accesses the Internet.[24] Of those farms surveyed that had a computer, only 12% claimed that 'problems with the phone service' were a major reason for not having a modem (used as a proxy for Internet access). In comparison, 41% said a modem was 'not useful' and 22% said it was 'too costly'.

2.66 Presently, the vast majority of Australian consumers access the Internet using the PSTN. While the PSTN was designed to deliver an efficient voice grade telephony service, all telephone customers, with the exception of those on radio networks, can also use the PSTN to send and receive faxes and access the Internet. The current access speeds available over the PSTN vary greatly throughout Australia, depending upon a multitude of factors including the modem being used, the quality of the local loop and traffic congestion. Under the Australian Communications Authority's End-to-End Network Performance Standards, Telstra has guaranteed a minimum data speed of 2.4kbps for the carriage of voice band data.

2.67 For some metropolitan consumers, Internet access speeds of up to 56kbps are possible over the PSTN. However, Telstra estimates that approximately 50% of the Australian population have PSTN access that is capable of sustaining medium data speeds of 28.8kbps. For many consumers in both urban and regional Australia actual access speeds below 28.8kbps are more common when using the PSTN. The average speed of Internet access in cities is approximately 14.4kbps.

2.68 Much higher speeds of access to the Internet can be obtained through the installation of digital services such as ISDN or, more recently, through the installation of cable modems. However, such services are primarily used only by a select group of consumers, particularly business customers. Thus, Telstra currently provides around 500,000 ISDN access line equivalents (based on the international standard of 64kb access line equivalents), as compared with 10 million PSTN access lines. Large corporate businesses and governments account for 55% of current demand for Telstra's basic rate ISDN service. Medium to large businesses account for 15%, small businesses for 30%, and residential customers for less than 1%.

2.69 In short, most consumers have access to data transmission at reasonable speeds via the PSTN, or can obtain higher speed access through specialised networks such as the ISDN. The relatively low level of Internet use among these consumers confirms the primacy of demand factors in determining Internet penetration.

2.70 While most Australian households have access to data transmission at reasonable speeds, the available evidence indicates that for some rural and remote consumers, medium access speeds of 14.4kbps over the PSTN are comparatively rare. A December 1996 survey by the Farmwide Online Services Project found that two thirds of rural and remote consumers obtain average access speeds below what they consider to be the urban average of 28.8kbps (see Table 2.7). While, as noted above, many urban consumers do not achieve actual access speeds of 28.8kbps,

[24] J. Garnaut and C. Rasheed, 1998, 'Computers: Use in Management and Electronic Commerce in Australian Farming', *Australian Farm Surveys Report*, Canberra: Australian Bureau of Agricultural and Resource Economics.

particularly during peak load periods, the survey results do point to some disparity in access speeds.

Table 2.7: Average access speeds to the Internet in rural Australia survey, 1996

Average access speeds in rural areas	Percentage of survey participants
< 2.4kbps	< 1%
2.4kbps	3%
4.8kbps	3%
7.2kbps	6%
9.6kbps	14%
14.4kbps	14%
24.4kbps	23%
28.8kbps	35%
> 28.8kbps	2%

2.71 Lower transmission speeds in parts of rural Australia are primarily a function of the distance that some rural consumers are from the local exchange.[25] Variations in transmission quality, which are undetectable or readily acceptable for voice communication, are far less tolerable in data communications. The need to correct for the increased distortion that arises from transmission along the copper pair over greater distances significantly reduces the speeds at which Internet access can be obtained. Similar constraints apply to the current DRCS equipment used to provide consumers in remote areas with fixed radio access to the PSTN.

2.72 Distance from the exchange also limits the possibilities for rural access to ISDN, which is currently technically infeasible over distances in excess of five kilometres. Thus, Telstra's figures indicate that it is now able to supply ISDN to 93% of the Australian population, should they require such high-speed access. Telstra's carrier licence requires that it be in a position to make available, within 90 days of a request, a basic rate ISDN service to at least 96% of the Australian population by 31 December 1998. Most of the 370,000 subscribers without an ability to access an ISDN service live at distances greater than five kilometres from a local exchange.

2.73 While this suggests a pattern of rural disadvantage, there are three reasons why it is likely that access speeds will improve in rural areas over time:

- First, Telstra announced in June that it would spend $400 million over three years to upgrade the customer access network, commencing with expenditure of $120 million in the 1998–99 financial year. Some areas badly need a network upgrade, for example, the New England region in NSW where network facilities are at the end of their useful life. This upgrade will include the digitalisation of remaining analogue exchanges and improvements in the quality of the local loop, both of which will significantly increase Internet

[25] This assumes that other important factors, such as the modem technology and computer port speed are accounted for.

access speeds for regional consumers. Current DRCS links are also to be upgraded to new radio access systems capable of providing ISDN.

- Second, Optus, Telstra and AAPT each recently announced plans for digital satellite services. Iridium and Global Star also intend launching low earth orbit satellites services soon, providing 100% coverage of Australia for a range of services including Internet access. The Telstra service will allow a rural consumer to use landlines to dial a local Internet service provider and then use the satellite link to deliver data from the Internet to the user. Telstra believes the service will have similar throughput to the ISDN services provided to users in metropolitan areas.
- Third, improvements in modulation technologies will enhance the effective bandwidth that can be derived from even poor quality or very long local loop. While using these technologies will require more expensive equipment at the customer premises, it will avoid the need for costly replacement of existing copper pairs.

2.74 Despite these anticipated improvements in access speeds for rural and urban consumers alike, there is a strong push on the part of rural representatives to include high-speed access to digital data services in the definition of the standard telephone service.[26] While this might increase the penetration of Internet access in rural Australia, there are reasons to be cautious about such a policy, particularly if regulatory pricing distortions are introduced in tandem.

2.75 In particular, there is an issue about whether the benefits of such an extension would outweigh its costs. Estimates of costs and benefits are difficult to derive for projects involving services for which both demand and supply conditions are undergoing rapid change. Nonetheless, the fact remains that extending a high-speed access capability to all parts of the bush would, at least in the short term, entail substantial investment costs—probably in the region of $2 billion. However, the very limited use made of high-speed access in those parts of the country where it is available suggests that the consumer benefits it would provide will be slight. Benefits are likely to be even lower in country areas, where demographic conditions translate into relatively low levels of demand. As a result, the likelihood must be that any mandated extension of the availability of high-speed access would fail a conventional cost-benefit test.

2.76 This presumption is reinforced when the dynamic consequences of such an extension are considered.

2.77 By requiring rollout now of technologies that are still rapidly evolving, a mandated extension of high-speed access would create a substantial risk of stranded investment. There is, for example, considerable uncertainty about the merits of ISDN as compared to DSL as a means of providing high data speeds. To mandate extension today, which would likely entail the scaling-up of the ISDN, may leave Australia with a costly white elephant. Put in economic terms, the uncertainties about likely supply and demand conditions create a significant option value to the

[26] Standard Telephone Service Review Group, 1996, *Review of the Standard Telephone Service, Majority Report*, Canberra: AGPS.

deferral of investment decisions. A mandated requirement to supply would extinguish that option.

2.78 At the same time, mandating wider access may chill investments in commercially viable means of providing better service to people in the remoter country areas.

2.79 The Productivity Commission has noted that under the current regulatory regime, local calls by residential consumers, including those to an ISP, must be charged at a flat rate, with the rate itself subject to price-cap regulation. The inclusion of data calls within the scope of this requirement has already introduced significant distortions into the pricing regime. At approximately 30 minutes per call, the average local data call costs Telstra significantly more than the 25 cents it is currently allowed to charge, meaning that Internet users are cross-subsidised by users of voice telephony. While this subsidisation may artificially inflate Internet penetration figures, the losses made by carriers on local data calls may undermine the incentives to upgrade the PSTN to provide higher quality Internet access, particularly in rural areas.[27] If high-speed access to digital data services is included within the definition of the standard telephone service and Telstra is required to provide these services at below cost, the incentives bearing on network deployment will be further distorted.

2.80 It is likely that a mandated requirement to provide high-speed access would be accompanied by price regulation of that access. As with price regulation generally, this may well make the market unattractive to suppliers of new services, such as those provided over satellite. This is all the more likely as these suppliers would normally hope to defray entry costs by initially securing high prices from the consumers with the greatest willingness to pay. By providing these consumers with a price-capped alternative, regulation will undermine or even preclude the entry strategy that would otherwise have offered the greatest likelihood of success.

B.5 Conclusion

2.81 The widespread assumption that rural customers are particularly disadvantaged appears to be unsupported. Access to the PSTN is as ubiquitous in rural areas as in urban areas, particularly when factors such as relative incomes are taken into account. The price paid for these standard services is practically identical across Australia, although the smaller size of local calling zones in rural areas (in terms of population) does affect usage charges to country users. Those most adversely affected by local calling arrangements, namely the most remote 17,000 consumers, are compensated through a rebate on their overall telecommunications charges. While a great deal of concern has been expressed about rural charges, a major problem for rural consumers, but one that receives too little attention, is that the system of regulated pricing undermines the incentives for facilities-based competition.

2.82 The quality of rural service is difficult to judge from the available data. However, the measured reductions in quality are consistent with changing patterns of demand; network saturation; adverse weather conditions and the impact of the

[27] Industry Commission, 1997, *Submission to the Joint Committee of Public Accounts Inquiry into Internet Commerce*, Canberra: Industry Commission.

network life cycle. They do not necessarily suggest a withdrawal of service from the bush on the part of the carriers. Somewhat paradoxically, the recent tightening of quality controls may end up reducing the standard of service in rural areas. Potential entrants are less likely to risk entry into rural markets, with new and untested technologies, when the threat of multi-million dollar fines is ever present.

2.83 Finally, the available evidence on the penetration of advanced services in Australia indicates that rural consumers do lag behind their urban counterparts in Internet usage. While alleged infrastructure deficiencies are usually blamed for this disparity, the data suggest that lower levels of Internet penetration are primarily a function of the demographic characteristics of rural Australia. There is, however, some evidence to suggest that some consumers in rural areas are hampered in their ability to access the Internet by slow access speeds. There is good reason to believe that the entry of new market participants and the application of new technology, such as Internet access by satellite, will ameliorate these problems. However, if price regulation continues to hamper the ability of carriers to recoup their costs, the incentives for such market solutions are likely to be greatly undermined.

C. International comparisons of service levels

3.1 To better place the widespread concerns of rural disadvantage in telecommunications services in context, this section of the report contains a comparison of general service levels in Australia with those in Canada, New Zealand, the United Kingdom and the United States. These countries were chosen because of their socio-economic and regulatory similarity with Australia and the availability of appropriate data. Where possible, data comparing rural and urban service levels are reported.

C.1 Access to standard services on the PSTN

3.2 As noted above, access to the PSTN is the most fundamental element of the standard telecommunications service and hence provides a key indicator of cross-country differences. Table 3.1 presents the available national data on household telephone penetration rates. These data indicate that for each of the countries under review the vast majority of households have access to a telephone. Using the Morgan research data, Australia records the second highest penetration rate. It is worth noting that Canada, which records the highest penetration rates, excludes the remotest parts of the country from the relevant statistics.

Table 3.1: Household telephone penetration, 1997

	Australia	Canada	New Zealand	United Kingdom	United States
National Average	96.6%	98.7%[a]	96%	93%	93.8%
Rural Average	94.8%	n/a	n/a	n/a	94.3%

Notes: a This figure excludes the Yukon and Northwest Territories where a large proportion of customers fall into the "remote classification, not included in the Canadian penetration estimates

Sources: Industry Canada, 'Access: Cornerstone of the Information Society', September 1997; Telecom New Zealand Annual Report 1997; Oftel, Universal Telecommunication Services. Proposed Arrangements For Universal Service In The UK From 1997, February 1997; and FCC, Statistics of Communications Common Carriers, July 1997.

3.3 Unfortunately, international comparative data comparing rural and urban network penetration is not generally available. However, data from the United States indicates that telephone penetration in rural America at 94.3% averages slightly more than the national rate (93.8%).[28] This mirrors the Australian data that indicate penetration rates in rural Australia now exceed those in the capital cities. Interestingly, the American data indicate that the lowest penetration rates in the United States are in the inner cities, reflecting high rates of urban poverty. This is a trend not apparent in the Australian data.

3.4 A further indicator of the extent of access to the telecommunications network is the number of two-party and multi-party services. Such services were once the norm in rural areas of Australia. However, Telstra has now eliminated all its remaining party lines.

[28] This level of telephone penetration is not evenly distributed across the country. In many rural counties the telephone penetration rate is below 85 percent, see E. Parker, 1996, 'Telecommunications and Regional Development', http://www.rural.org/workshops/rural_telecom/parker/app.htm

Table 3.2: Multi-party lines

Australia	Canada	New Zealand	United Kingdom	United States
0	approx. 300,000	660	0	20,000

Source: Telstra sources plus Industry Canada, Connection, Community, Content: The Challenge Of The Information Highway, Final Report Of The Information Highway Advisory Council, September 1995; Telecom New Zealand, Annual Report, 1997.

3.5 Australia's record on eliminating multi-party lines compares favourably with the four other countries under review (see Table 3.2). Only the United Kingdom has also managed to install single party lines for all consumers. In mid-1997, the standard of service outside base rate areas, in at least one Canadian service area, was still a four-party line. Although the Stentor Alliance companies in Canada had committed to upgrading their multi-party services to a single line service by 2000, Bell Canada has now said that its upgrade will not be complete until 2002. Both the United States and New Zealand still have a small number of customers on multi-party line services, although Telecom New Zealand intends to eliminate all such services by the end of 1998.

C.2 Prices for standard telecommunications services

3.6 The vast majority of Australian consumers face identical prices for standard telecommunications services regardless of (a) where they live and (b) the costs incurred in providing them with those services. This is a function of the strict price regulation that is still a dominant feature of the Australian telecommunications policy regime. In contrast, many other developed countries have allowed prices to adjust to more accurately reflect the costs of service.

3.7 These countries are increasingly allowing prices to vary in accordance with costs because of the significant efficiency benefits that this allows. Under the current Australian regulatory regime, customers living in profitable areas pay a hidden levy (through higher prices) to subsidise the provision of services to consumers in unprofitable areas. An alternative mechanism would be to direct subsidies only to those consumers (both rural and urban) who cannot afford telecommunications at market prices.

3.8 The use of direct subsidies is generally preferable in an economic sense. A hidden levy stifles the demand of all consumers and will usually result in less usage of the service than would occur if prices were cost-based. This involves a welfare or efficiency loss, the extent of which depends upon the response of consumers to changes in price. On the other hand, direct transfers from consolidated revenue are likely to be less distorting as they avoid cross-subsidies between services and between customers.[29] No less importantly, direct subsidies also (a) increase transparency, (b) encourage more rigorous specification of the Government's 'universal service' commitment and (c) are less likely to distort the pattern of competition.

[29] Funding direct subsidies, however, may require an increase in general taxation which is itself distorting. Moreover, the costs of administering any scheme of direct subsidies need to be taken into account.

3.9 Despite these considerations, successive Australian governments have relied on cross-subsidies as a primary instrument of telecommunications policy. This has resulted in a pattern of prices which is increasingly at odds with that found overseas.

C.2.1 The price of access to the PSTN

3.10 The Industry Commission has recently identified the rental charges paid by Australian consumers for access to the PSTN to be the singularly most distorted price for telecommunications services in Australia.[30] As detailed in Section B, Australian regulation does not allow the full cost of access to the PSTN to be recouped via the rental charge. Instead, Telstra has to cover its costs in the provision of access by higher charges for other services, such as local, STD and IDD calls.

3.11 International comparisons highlight the extent to which Australia is increasingly alone in resisting upward movements in the price of access to the PSTN to more fully reflect the costs of provision. Table 3.3 compares Australian residential rentals with those of the four countries under review. At $11.65 per month, Australians have the lowest rental charges of the five countries, with the very low US rental figures associated with high and metered local call charges. Interestingly, Telecom New Zealand follows the US pattern of allowing consumers to choose from a menu of rental and call charge options. It levies a rate of $A 21 per month to those customers choosing to have timed local calls, as compared to the charge of $A 30 a month to those selecting the inclusion of local calls in their monthly rental.

Table 3.3: Residential rentals in Australian dollars per month

Australia	Canada	New Zealand	United Kingdom	United States
$11.65	$14.58-27.40	$21.11 or $30.41	$22.76	$3.93–55.21

Note: The exchange rates used in this comparison are from 3/5/1998. Specifically, Canada: 0.93, NZ: 1.17, UK: 0.389, US: 0.65.

Sources: Northwestel, 'Backgrounder: Rate Rebalancing, Preparing For A Competitive Marketplace', 1997; British Telecom, Annual Report, 1997; International Research Center, Universal Service Around The Nation, 1995; and Telecom New Zealand Annual Report 1997.

3.12 Importantly for the purposes of this report, Australian rural subscribers have access to the PSTN at the same price as their urban counterparts. Elsewhere, geographical de-averaging is becoming more prevalent. While incumbent carriers in New Zealand and the United Kingdom have so far resisted large-scale de-averaging, recent entrants in both these countries are beginning to offer lower access charges to residential consumers in major urban areas. Services to remote or high cost users in the United Kingdom have for a long time included additional charges for 'unusual constructions' and excessive time taken to install. This is also the case in New Zealand, where Telecom New Zealand has recently taken the first steps to geographically differentiate residential rentals in the face of emerging competition in local access.

[30] R. Albon, A. Hardin and P. Dee, 1997, *Telecommunications Economics and Policy Issues*, Industry Commission, Staff Information Paper, Canberra.

3.13 Rural customers in the United States routinely face higher prices than their urban counterparts. The data for the United Stated, reported in Table 3.3, are the most recent (1996) industry-wide figures available. The higher rates — up to $A 55 per month — are from Local Exchange Carriers in high cost rural areas or from local carriers that continue to be protected from competition by state regulators.

3.14 In Canada, rural customers have for many years paid lower base rental charges than their urban counterparts. However, this has been more than offset by an additional "exchange line mileage" charge that is levied if a consumer lives further than 5 km from a basic service area. The exchange line mileage is a monthly charge which varies from C$16 to C$30. Bell Canada, the largest Stentor member, had a line mileage charge of C$40 a month until late 1997.

3.15 Only with the recent introduction of competition in the local market and subsequent access rate rebalancing has the issue of charges to rural subscribers been addressed. The Canadian regulator has capped the exchange line mileage at C$15 a month and many Stentor Alliance companies have abolished the charge as part of a rate rebalancing process. In exchange, however, base rental charges for Canadian rural customers have been increased significantly, as part of an effort to more accurately reflect in rental charges the underlying costs of provision.

3.16 As detailed in Section B, a pattern of access pricing inefficiencies also permeates the Australian market for business rentals. Business consumers in Australia pay the lowest rental charges of each of the countries under review (see Table 3.4); significantly increasing the cross-subsidies required to offset the costs of access. Australia is also in a minority of the countries under review (the other being the United Kingdom) in charging a single price for access to the PSTN ($20 per month), regardless of where the business is located geographically.

Table 3.4: Business rentals in Australian dollars per month

Australia	Canada	New Zealand	United Kingdom	United States
$20.00	$29.00–$72.00	$43.80 or $51.50	$36.00	$64.35 (av.)

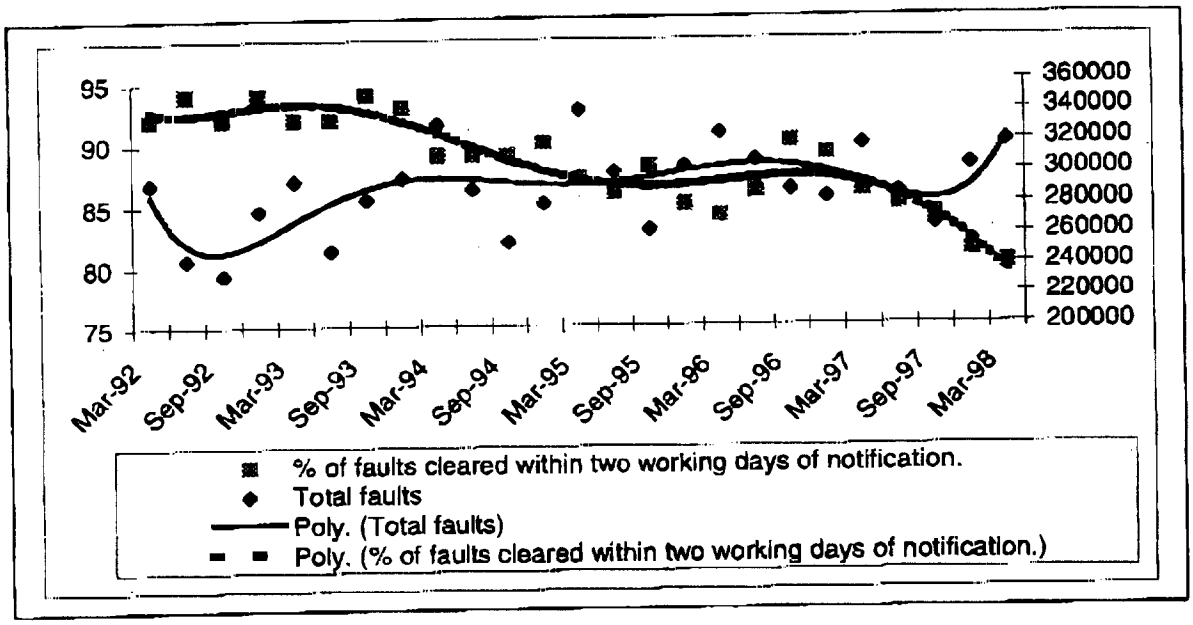
Note: The exchange rates used in this comparison are from 3/5/1998. Specifically, Canada: 0.93, NZ: 1.17, UK: 0.389, US: 0.65.

Sources: Sources: Northwestel, 'Backgrounder: Rate Rebalancing, Preparing For A Competitive Marketplace', 1997; British Telecom, Annual Report, 1997; International Research Center, Universal Service Around The Nation, 1995; Telecom New Zealand Annual Report 1997; and FCC, Statistics of Communications Common Carriers, 1997.

3.17 Geographical de-averaging is now commonplace for business rentals. In New Zealand, for example, the standard business access line rental is $A 51.50 per month. Yet for businesses located in major urban areas the rate is significantly lower at $A 43.80 per month.

3.18 Canadian and US rates also vary significantly between rural and urban areas. Generally, the higher rates reported in Table 3.4 for Canada (up to $A 72.00 per month) are for rural businesses. Prior to access rate rebalancing, Canadian rural customers were favoured by having lower monthly charges than those levied on urban customers. Now the Stentor companies, along with the abolition of the line mileage charges described above, have increased monthly per line charges to rural subscribers, especially for business customers. BC Tel, for example, asked the Canadian regulator in February 1998 for approval for significantly higher business rates in rural areas and lower rates in urban areas. The figure quoted for the United

Figure 2.8: The Relationship between Fault Clearance Rates and the Total Number of Faults Reported, March 1992–March 1998



2.39 In turn, much of this variation in the number of faults appears to be related to adverse weather conditions, such as significant flooding or particularly destructive storms. For example, in Far North Queensland, Telstra averages approximately 1,300 faults per month. In January 1998, this figure leapt to over 3,200 faults as a result of widespread flooding and cyclonic conditions. The January average for the preceding six years was approximately 1,500 faults per month. Drought is also an important, if less immediately apparent, determinant of fault levels. Prolonged periods of dry weather expose telecommunications cables to stress as the ground cracks and erodes, causing an increase in fault rates.

2.40 It is possible to show more rigorously the relationship between adverse weather conditions and network faults by comparing Telstra regional fault data with Bureau of Meteorology data on average rainfalls. A statistical analysis was undertaken whereby fault data from 34 regions over 78 months from January 1992 to June 1998 were matched with rainfall data from 107 meteorological areas (see Appendix E for a full description of the statistical tests). An extreme weather event was defined as rainfall which was less than the first decile or greater than the ninth decile for the month, where the deciles were obtained using 86 years of data for each month in each meteorological region. In essence, an index was created that identified periods of excessive rainfall or prolonged dryness considered outside the bounds of normal statistical experience in each region.

2.41 The findings indicate that in more than one third of the regions examined, extreme weather conditions were a statistically significant explanatory factor in the number of faults reported. In addition, extreme weather accounted for up to 35% of the total number of faults in some regions. Furthermore, the evidence indicates that these regions accounted for a large proportion of the total number of faults reported across Australia. Even in those regions where the results were not statistically

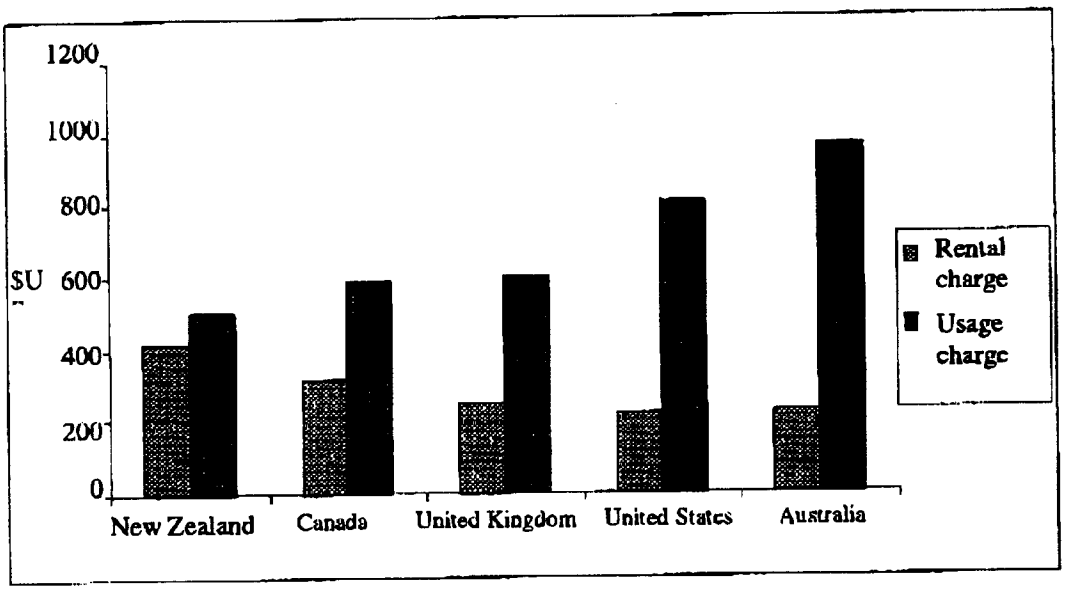
States in Table 3.4 is a 1996 industry average drawn from a recent Federal Communications Commission report, *Trends in Telephone Services*, and reflects both urban and rural charges, which differ significantly.

C.2.2 Standard service prices

3.19 International price comparisons of standard telecommunications services are generally difficult to interpret. List prices miss the many non-standard discounts that proliferate in telecommunications markets. "Average" or "unit" prices, calculated by dividing revenue by some measure of usage, are generally uninformative given the great variety in calling patterns across countries.

3.20 Bearing these problems in mind, the OECD routinely publishes a series of price comparisons. Figure 3.1 details 1996 OECD estimates of business telephone charges, including an annual rental charge and a basket of usage charges for local, STD and IDD calls. It is apparent that among the five countries under review, Australian business consumers pay the highest average usage charges, while paying the lowest rental charges. Such a situation is likely to continue for as long as Australian regulation maintains artificially low rental charges, requiring a large 'tax' on usage to fund the resulting losses.

Figure 3.1: OECD Basket of Business Telephone Charges, January 1996



Source: OECD, 1997, *Communications Outlook*, OECD, Paris, Table 6.1.

3.21 The issue for rural consumers, however, is the extent to which the usage charges they pay reflect standard prices. As detailed above, most consumers in Australia pay the same price for service regardless of where they are located. International comparative data on the extent of geographical de-averaging is not available. However, we do know that in Canada and the United States, the extensive geographical segmentation of the market is reflected in different prices. Consumers in New York City face a very different set of service suppliers than consumers in Wyoming and hence face different price sets. Similar outcomes are likely to occur in New Zealand and the United Kingdom with the proliferation of facilities-based entry.

3.22 One final indirect measure of the service customers obtain with their line rental is the average size of a local-call charging zone. The greater the average size of the zone, the greater the access provided to consumers at local call charges, which are generally substantially below those for calls between charging zones. Table 3.5 details the average local calling zone radius for an extended sample of countries. Local calling areas are large in Australia relative to those in other industrialised nations. A "local" call in rural Australia may actually travel many kilometres, yet is still only charged at a flat 25 cents per minute.

3.23 Many rural consumers in Australia are in local calling zones with relatively small numbers of customers. However, their situation appears to be no worse in this respect than that of their counterparts overseas. Rather, what distinguishes Australia is the widespread availability of discounted schemes aimed at offsetting the cost penalty incurred in rural calling areas. These schemes include Telstra's 'Pastoral' call rates, for calling within Extended Zones and between these and the relevant CSTs; and the 'Community Calling' rates in rural areas, applying between zones and their CST. Moreover, Australia is unique in ensuring that literally all customers either have access to an untimed local call or receive financial compensation for not having such access.

Table 3.5: Average radius of local call charging zones for selected industrial countries

Australia	France	Germany	New Zealand	Singapore	Sweden	United Kingdom	United States
32 km	19 km	20 km	29 km	21 km	25 km	26 km	19 km

Note: The data is for the following carriers: Telstra; France Telecom; Deutsche Telekom; TCNZ; Singapore Telecom; Telia; BT and Pacific Bell.

Source: Analysys

C.3 Quality of the network

3.24 Reliable comparative measures of the quality of the available infrastructure, particularly in rural areas, are unavailable. Furthermore, direct comparisons of quality levels between countries are impossible without information on environmental factors and life cycle effects. This section will simply detail the various quality of service regulations in each of the countries under review. The Australian regime, detailed in Section B, appears to be the most rigorous and objective of those examined and is unusual in differentiating between rural and urban service quality.

3.25 The Canadian regulator has only recently developed a set of objective quality of service indicators. Previously, the companies that were under the jurisdiction of the regulator reported customer satisfaction indicators using company specific standards. From the first quarter of 1998, the fourteen telephone companies using uniform national standards will be required to report using the new criteria. The regime will separate rural and urban reporting for provisioning and repair, but not for operator services and billing, as they are delivered on the same platform.[31] The

[31] CRTC, 'Quality Of Service Indicators For Use In Telephone Company Regulation', Telecom Decision 97-16, 24 July 1997. http://www.crtc.gc.ca/eng/telecom/decision/1997/d9716_0.txt

relative infancy of the Canadian system does not yet allow for comparison with Australian data, but should provide a useful reference point in the future.

3.26 In New Zealand, there was a concern prior to Telecom's privatisation that telecommunications service quality standards for residential telephone service might not be maintained. Ten telephone service indicators were initially agreed upon which included service connection times, fault incidence, operator response times, SPC exchange availability, payphone availability and billing disputes. In 1995 the Ministry of Consumer Affairs, in conjunction with Telecom, reviewed the adequacy of the quality of service indicators and agreed on a set of new indicators. These indicators did not include the separate identification of rural and urban subscribers.

3.27 The United Kingdom and New Zealand do not identify rural requirements separately in their quality of service reporting. The state public utility commissions are responsible for quality of telecommunications service in the United States, so reporting is highly variable. There is no national enforcement of service standards, although there is some national monitoring of customer complaints and service quality by the Federal Communications Commission.

C.4 Advanced services

3.28 Beyond the standard telephony service, rural consumers in Australia and around the world are increasingly concerned about access to newer telecommunications services, particularly access to the Internet. While the available evidence is far from comprehensive, it appears to indicate that rural consumers in Australia are relatively more likely to access the Internet than their counterparts overseas.

3.29 Table 3.7 details the total number of Internet connections in each of the countries under review and the number of Internet connections per 100 persons. In both absolute and relative terms, the number of Internet connections in Australia is comparatively large. In January 1997, Australia had 514,000 Internet connections (equivalent to 29 connections per thousand inhabitants), a twenty-four fold increase since 1991. Among the five countries under review, Australia has the second highest number of Internet connections per head of population. In fact, only five countries in the world have a higher number of Internet connections than Australia and only four have more Internet connections per head of population.

Table 3.7: Internet connections, January 1997

	Australia	Canada	New Zealand	United Kingdom	United States
No. of internet connections	514,800	603,300	84,500	591,600	10,112,900
Internet connections per 100 inhabitants	2.81	2.01	2.32	1	3.81

Source: ITU, Challenges to the network: Telecom and the Internet, 1997

3.30 Internet connections provide an indication of the dimensions of Internet access, but not of the extent of individual use. For example, one large business or university may have only one Internet connection, but numerous individual users. Table 3.8 provides the most recent data on individual access. By its nature this data is less accurate than that on Internet connections, but the pattern it points to confirms the

points made above. Again, the popularity of the Internet in Australia is amply demonstrated, with only United States having a greater number of Internet users per head.

Table 3.8: Net users per thousand people, end-1997

Australia	Canada	New Zealand	United Kingdom	United States
178	149	156	99	203

Source: Computer Industry Almanac, 1998

3.31 Comparative data on rural Internet access is generally unavailable. However, a recent study in the United States indicates that American rural users are more likely to access the Internet than their Australian counterparts.[32] Approximately 14% of rural Americans are on-line, compared with 7.2% of rural Australians. However, this difference is due to the fact that Americans *overall* are more likely to access the Internet than are their Australian counterparts. As in Australia, Americans in rural areas are far less likely to use the Internet than their urban counterparts.

3.32 The factors underpinning this disparity seem to lie on the demand side—again, mirroring the Australian pattern. Thus, a recent American survey on household access to online services[33] indicates that online access amongst the poorest households in both rural (2.3%) and urban (4.4%) America is significantly below that of the richest rural (44.4%) and urban (50.3%) households. Similarly, households with the lowest levels of formal educational attainment in both rural (1.2%) and urban (2.1%) areas are much less likely to access the Internet than those rural (35.6%) and urban (39.0%) households with higher educational levels.

C.4.1 Internet pricing

3.33 Australia's embrace of the Internet is not surprising given the relative price of Internet access in this country. Table 3.9 details 1996 OECD estimates of the average charge for 20 hours of Internet access per month. Bearing in mind the many problems with international comparisons, it is apparent that Australian consumers pay relatively little for their Internet access, especially compared with their counterparts in New Zealand and the United Kingdom. The OECD survey rates Australia second behind Canada as the country with the cheapest Internet access.

Table 3.9: OECD peak rate Internet access basket, August 1996 ($US)

	Australia	Canada	New Zealand	United Kingdom	United States
Peak PSTN charge	13.71	11.99	21.00	53.42	13.93
ISP charge	10.42	8.60	39.73	11.82	14.95
Total charge	24.13	20.59	60.73	65.24	28.88

Source: OECD, 1997, *Communications Outlook*, OECD, Paris, Table 6.6.

[32] See B. Meeks, 'Web Demographics Changing', *ZDNN*, April 20 1998, http://www.zdnet.com/zdnn/content/msnb/0430/311653.html

[33] The National Telecommunications and Information Administration, 1998, 'Falling Through the Net II: New Data on the Digital Divide', http://www.ntia.doc.gov

3.34 As detailed in Section B, the vast majority of rural consumers in Australia can access the Internet at these low rates. In the other countries under comparison, services for rural subscribers seeking access to the Internet are highly variable.

3.35 In Canada, the Stentor companies are improving infrastructure and restructuring calling areas in order to improve access for rural customers, but coverage remains patchy. For example, Bell Canada, the Stentor alliance member with the largest number of subscribers, aims to have 90% local call access to the Internet by 2000. Canadians have the advantage of widespread satellite coverage, which gives subscribers access to the Internet using services such as DirectPC. However, as the return path is by terrestrial line, users of this service are still likely to incur long distance charges. Moreover, the effective speed on these services remains affected by the data transmission rate that can be achieved on the return path. This means that customers located at a considerable distance from a local exchange may achieve effective speeds that are well below the maximum rates satellite transmission can offer.

3.36 In the US, recent studies claim that 13% of the population still does not have ready access to the Internet. It is not uncommon for residential users and small businesses in rural areas to lack local call access to an ISP. Business users travelling in remote areas are sometimes provided with 1-800 access to the Internet from national providers. In principle, larger businesses in remote areas have the option of using direct connections for high-volume use. However, an informal study of pricing found that while a leased circuit cost US$237 per month in Portland, Oregon, the equivalent service cost US$2,080 in rural Lakeview.

3.37 The various national Internet service providers in New Zealand offer customers outside urban areas with access through 0800 numbers. Usage is charged at approximately twice the price of city access for the same service. For example, the business dial-up fee to the Xtra network is NZ$2.23/hour in urban areas, but almost twice that amount (NZ$4.40/hour) for consumers using 0800 numbers.

3.38 A barrier to use of the Internet by rural subscribers in Canada and to a lesser extent in the United State and New Zealand is the number of multi-party lines still deployed in rural areas. As noted above, Australia and the United Kingdom have eliminated all remaining party lines.

C.4.2 High speed access to the Internet

3.39 Australian consumers, including rural consumers, also have greater opportunity than their counterparts overseas to access the Internet using high-speed services. For example, ISDN links are significantly more widely available in Australia than in at least two other countries for which data are available (see Table 3.10). Data from Telstra indicate that it is able to supply ISDN to 93% of the Australian population. The Canadian and US carriers, on the other hand, can only supply ISDN to respectively 70% and 80% of subscribers. In the US, only 27% of the customers served by the NECA local exchange carriers, which typically serve those areas with 20 or fewer customers per square mile, have access to ISDN.

Table 3.10: ISDN access by population coverage

Australia	Canada	United States
93%	70%	80%

Sources: The USO after 1997—meeting user needs in an open market, Michael Rocke, Telstra. Forum, November 1996; BT. *How can I get ISDN?*, 1998, http://www.isdn.bt.com/whatis/getmain.htm

3.40 Furthermore, as detailed in Section B, Australian rural ISDN users do not get charged more than their urban counterparts. In contrast, US charges for ISDN and T1 lines are significantly higher in rural areas, with one study noting a difference of approximately US$1,800 a month for the same service. In New Zealand users in country areas are charged NZ$360 per year more than urban users for ISDN line rental.

3.41 The ACA has recently been asked to consider extending the definition of the standard telecommunications service to include access to an ISDN-equivalent digital data service. Similar proposals have recently been considered in the United States and the United Kingdom. In both cases, the regulators did not consider high bandwidth data services suitable for cross-subsidised provision.

3.42 In May 1997, the US Federal Communications Commission (FCC) issued an Order that defined the core services that would receive universal funding support.[34] The FCC found that higher bandwidth services were not eligible for funding, as there was no indication that a substantial majority of residential consumers used these services. In making its decision, the FCC explicitly canvassed the price increases that consumers of standard voice telecommunications services would incur as a result of an overly expansive definition of core services.

3.43 In July 1997, The UK Office of Telecommunications (OFTEL) set out its final decision on services eligible for universal funding support in the United Kingdom.[35] It also found that the universal service requirement should not be extended to include higher bandwidth data services. The existing requirement of 2.4kbps for voice band data transmission via a modem was considered sufficient. In taking this view, OFTEL stated that it did not see universal service as a means of rolling out new technology. Rather, its purpose was to ensure that those services provided by the market and that had become essential to most people, were made generally available.

C.5 Conclusion

3.44 The comparative data further undermines the widespread assumption that Australians in rural areas are disadvantaged in their access to telecommunications. In reality, Australian rural consumers tend to be substantially better served than their counterparts in the four countries Australians most often use as points of comparison. These four countries represent the leading edge in telecommunications, and hence set a high standard for the comparison.

[34] Federal Communications Commission, 97-157, *Report and Order on the Matter of Federal-State Joint Board on Universal Service*, May 1997.

[35] OFTEL, *Statement on Universal Telecommunications Services*, July 1997.

3.45 To begin with, Australia has among the highest penetration levels in terms of the standard telecommunications network. Importantly, penetration rates in Australia do not differ significantly between rural and urban areas. This compares favourably with countries such as the United States where telephone penetration in rural areas averages 85% in comparison with the national average of 93.9%. Australia also leads the group in having replaced all multi-party services with single lines.

3.46 In comparison with the four other countries examined, Australia has among the lowest prices for rural access to the standard telecommunications network and is unusual in terms of not charging rural consumers significantly more than their urban counterparts for most telecommunications services. The subsidy to rural consumers inherent in these access prices shows up in the higher charges that all Australians pay for STD and IDD calls.

3.47 Australia is also one of the few countries that maintains objective national quality of service measures, disaggregated between metropolitan and non-metropolitan areas. It is difficult, therefore, to assess exactly how Telstra's grade of service compares with that of carriers overseas. However, the fact remains that in Australia, rural consumers and the regulatory authorities have access to more comprehensive and systematic information on service standards than do their counterparts in other countries.

3.48 In both absolute and relative terms, Australians have been at the forefront in embracing the Internet. In part, this reflects the very low relative prices paid for Internet access in this country. These low prices are available to the vast majority of Australian consumers regardless of where they live. In comparison, rural consumers overseas, and particularly those in countries with substantial areas of sparse population settlement, generally pay a premium for network access. Rural consumers in Australia also have far greater access to high-speed Internet connections. For example, the vast majority of Australian consumers (93%) are able to access ISDN lines, compared with 70%-80% of the population in Canada and the United States. Finally, rural consumers in Australia, unlike their counterparts elsewhere, can access ISDN service at rates no higher than those charged in city areas.

3.49 The comparative data is summarised in the followed table. Detailed country reports are annexed.

Summary Table: Rural services comparison

	Australia	Canada	N.Z.	U.K.	U.S.
Tariff structure	Uniform rates Local call charge	Monthly subscriber charge (varies) Free local calls	Uniform rates	Uniform rates	Choice of fixed rate charges or metered rate plans
Additional charges for rural users		Exchange line mileage (eliminated by a number of Stentor companies in 1997)[36]	Regional rate ISDN (NZ$360 extra)[37]	Time-related for line installations[38]	Higher charges for ISDN / T1 lines LECs require deposits before connecting subscribers[39]
Isolated user concessions	Countrywide Calling Scheme Community Calls to Community Service Towns		18% discount—calls between Provincial Centres. 15% discount-calls between Regional Centres[40]		

[36] Stentor alliance web sites; CRTC web site

[37] TCNZ web site

[38] Oftel web site

[39] Rural Utilities Service, 12 April 1996

[40] Ministry of Commerce, Communications Division. New Zealand Telecommunications Information Publication No. 5, August 1997, p. 24.

	Australia	Canada	N.Z.	U.K.	U.S.
Maximum guaranteed data speed in rural areas	2400bps[41]			2400bps (note: policy)[42]	
Availability of ISDN	93% of pop[43]	70%		96% of UK businesses[44]	"Spotty"[45] Pacific Bell—97% (BRI) Bell Atlantic—99% Ameritech—82% (of lines, 1996) Rural—27% (NECA, 1997)[46]
Local call access to the Internet in rural areas?	Telstra's rural charge?	Not always. eg. NewTel (Newfoundland) has 90% local call coverage; Ontario &	Toll free access to internet anywhere in NZ. 0800 numbers for non-urban	Yes.	13% of the population does not have easy access to the Internet (1997)[49] The Univ Service Joint Board found that local

[41] The USO after 1997—meeting user needs in an open market, Michael Rocke, Telstra. ?? Forum, November 1996. http://www.dot.gov.au/programs/btce/forum/papers/usoaf97.htm

[42] Oftel. Universal telecommunications services. July 1997. http://www.oftel.gov.uk/consumer/univ_2.htm

[43] The USO after 1997—meeting user needs in an open market, Michael Rocke, Telstra. BTCE Forum, November 1996. http://www.dot.gov.au/programs/btce/forum/papers/usoaf97.htm

[44] BT. How can I get ISDN? BT web site, 1998. http://www.isdn.bt.com/whatis/getmain.htm

[45] Paul Budde. International Telecommunications and Superhighways Markets—1996/1997, p. 135

[46] Telecommunications operators' web sites; NECA. 1997 Access market survey of NECA's traffic sensitive pool members: keeping America connected.

[47] Stentor alliance web sites

	Australia	Canada	N.Z.	U.K.	U.S.
		Quebec will have 90% by 2000[47]	access.[48]		call access need not be provided.[50] 31% of the pop have access to the Internet in rural areas.[51]
Exchange/network digitalisation	85%, Dec 1997 100%, 1998	BCTel—99%, end-1997 Island Tel—100%, end-1997 MT&T—96% MTS—100% SaskTel—100% Telus—100% (switches)[52]	100%, 1998[53]	Scottish Highlands & Islands—80%, mid-1997[54] Digitisation of mainlines 92.6% (1997)[55]	Digitisation of mainlines 65% (1994) Rural—96% of COs, represents 98% of access lines, 1997 (for each state see main doc, Source: NECA)[56]

[48] TCNZ web site

[49] Greenstein, S. Universal service in the digital age: the commercialization and geography of US Internet access. Draft, 24 November 1997. http://ksgwww.harvard.edu/iip/iicompol/Papers/Greenstein.html

[50] Rural Policy Research Institute. Critical rural considerations regarding Joint Board recommendations to the FCC concerning Section 254 of the Telecommunications Act of 1996. P97-4, 8 April 1997. http://www.rupri.org/telecomm/P97-4.html

[51] National Rural Development Council. Telecommunications meeting, 29 Sept 1997. Notes from comments of James McConnaughey, NTIA, US Dept of Commerce.

[52] Stentor alliance web sites

[53] Communications Division, Ministry of Commerce. New Zealand Telecommunications Information Publication No. 5, August 1997, p.10

[54] £6M phones revolution set for the highlands. Aberdeen Press And Journal, 22 May 1997

[55] BT. Annual report for year ended 31 March 1997.http://www.bt.com/Report/fin/op-stats.htm

[56] NECA. 1997 Access market survey of NECA's traffic sensitive pool members: keeping America connected.

	Australia	Canada	N.Z.	U.K.	U.S.
Network upgrade	On demand (?)		Same as urban consumers[57]		On demand
Access to SS7/IN features					Rural—57% of COs, represents 68% of access lines, 1997[58]
Mobile network coverage	Telstra digital—94% Optus digital—91%[59]	Island Tel— 14 cell sites MT&T—95% of the pop of NS MTS—95% of Manitoba[60]	Telecom NZ D-AMPS 96% BellSouth NZ Digital GSM 91%[61]	Orange & One 2 One—95% of pop[62]	
Access to a phone / payphone			97.9% payphone availability[63]	93% of customers are within half a mile of a payphone[64] 9% of parishes don't have a payphone[65] BT provides one payphone for every 475 people	In Massachusetts there are some 25,000 Nynex public payphones for a population of 6 million. Nynex provides one public payphone for every 240 people.[66]

[57] Communications Division, Ministry of Commerce. New Zealand Telecommunications Information Publication No. 5, August 1997, p.10

[58] NECA. 1997 Access market survey of NECA's traffic sensitive pool members: keeping America connected.

[59] Telstra/Optus mobile press releases and coverage maps

[60] Stentor alliance mobile subsidiaries' web sites

[61] Communications Division, Ministry of Commerce. New Zealand Telecommunications Information Publication No. 5, August 1997, p.15

[62] Remote chance to get mobile. Scotsman, 4 March 1998.

[63] Communications Division, Ministry of Commerce. New Zealand Telecommunications Information Publication No. 5, August 1997, p.36

	Australia	Canada	N.Z.	U.K.	U.S.
Households connected to the network	96.4% (1996)	98.7% (1997)[67]	96%[68]	93% (1995)[69] North of England: 82%[70]	93.9% (July 1997)[71] In rural areas—85% (1996)[72]
# of people without phones	17,000 without untimed local calls in isolated areas[73] 238,000 households (1996)			1.6 million without a fixed phone[74]	6.2 million households, 900,000 of these are rural [75][76]

[64] Oftel. Universal telecommunication services. Proposed arrangements for Universal Service in the UK from 1997. Chapter 5: Public call box provision, Feb 1997.

[65] Rural Development Commission. 1997 Survey of rural services.

[66] Benton Foundation, 1996.

[67] Industry Canada. Access: cornerstone of the information society, Chapter 4. 9 Sept 1997.

[68] Telecom NZ Annual Report 1997, p.3

[69] Oftel. Universal telecommunication services. Proposed arrangements for Universal Service in the UK from 1997. Chapter 3: Provision for all, Feb 1997.

[70] NIAA. Avoiding Exclusion: The challenge of shaping the Information Society in the Rural North, December 1996. Part 6: Tele-communications and networks. http://www.niaa.org.uk/rural/rindex.htm

[71] FCC, Statistics of Communications Common Carriers, July 1997.

[72] Parker, Edwin B. TVA rural studies. Telecommunications and rural development: threats and opportunities. May 1996. http://www.rural.org/workshops/rural_telecom/parker/app.htm

[73] Department of Communications and the Arts. Comparable untimed local call benefits for telecommunications customers in isolated areas outside standard zones. Discussion paper and request for submissions, Sept 1997. http://www.dca.gov.au/policy/untimed.html

[74] Oftel. Universal telecommunication services. Proposed arrangements for Universal Service in the UK from 1997. Summary, Feb 1997. http://www.oftel.gov.uk/consumer/uniserv2/summary.htm

[75] FCC. Statistics of Communications Common Carriers, July 1997.

[76] Rural Utilities Service, 12 April 1996

	Australia	Canada	N.Z.	U.K.	U.S.
Other factors—eg. multi-party lines		300,000 multi-party lines in 1995. Varies by region.[77]	660 customers are on party lines. All will have individual service by end 1998.[78]		20,000 customers (served by 126 companies)
Quality of service reporting	Yes. Objective & subjective. Includes rural.	Yes. Subjective. Objective as of 1998. Includes rural	Yes. TCNZ's Residential Telephone Service Quality. Doesn't include rural[79]	Yes. Objective	Yes. Under state utility commissions so indicators vary.
Competition in rural areas	Optus—99% coverage for long distance[80]	Island Tel—no NBTel—yes[81]	Clear—13.6% coverage (1997)[82] Several competitors for national and international toll calls but not for local calls and access.[83]	Licence conditions include target coverage of 80-90% of pop. but hasn't happened[84]	5% (40 companies) of NECA's rural pooling operators say they have competition[85]. However, virtually all customers have access to competing long distance service.

[77] Industry Canada. Connection, community, content: the challenge of the information highway. Final report of the Information Highway Advisory Council, Sept 1995. Available from http://strategis.ic.gc.ca. and Stentor alliance web sites

[78] Telecom NZ Annual Report 1997, p.3

[79] Communications Division, Ministry of Commerce. New Zealand Telecommunications Information Publication No. 5, August 1997, p.35

[80] Australian Communications Authority. Telecommunications performance monitoring bulletin. Issue 3, December 1997, p.5.

[81] Stentor alliance web sites

[82] Statistics New Zealand

[83] APT Yearbook 1997

	Australia	Canada	N.Z.	U.K.	U.S.
Concessional / funding schemes	Yes	Yes		Largely market driven	Yes. Link Up; Lifeline

[84] Rural Development Commission. Telecommunications development in rural England. Summary of research findings, 1996. http://www.argonet.co.uk/rdc/summtco.html

[85] NECA. 1997 Access market survey of NECA's traffic sensitive pool members: keeping America connected.

Appendix A: Canada

A.1 Rural and urban service levels

In many respects, Canada is in a similar situation to Australia in that it is large, sparsely populated, and has recently introduced greater competition into its telecommunications markets. However, each province in Canada has an incumbent telephone company, which together make up the Stentor Alliance. This industry structure produces basic differences in the regulatory environment between Canada and Australia.

The issue of rural services has been addressed recently by the regulatory body, the Canadian Radio and Telecommunications Commission (CRTC), in response to regulatory changes instituted as part of broader industry deregulation.

Universal service in Canada is managed through a subsidy scheme, which has recently been extended to competitive carriers in an effort to encourage service to high cost areas. The Canadian Telecommunications Act, in subsection 7(b), sets down the following policy objective:

> to render reliable and affordable telecommunications services of high quality accessible to Canadians in both urban and rural areas in all regions of Canada.

Currently this objective is achieved by imposing an "obligation to serve" on the incumbent local exchange carriers. This obligation permits a carrier to charge for any unusual construction that must be undertaken in order for it to be able to provide the service. The extent of these obligations is detailed in the Terms of Service of the Bell Canada Act.[86]

The CRTC has said that these obligations will remain, pending an investigation into the most appropriate way to carry out the provisions of the Act now that the local market is open to competition. Any implementation of changes to the system in order to address the issue of service to high-cost areas is scheduled to be in place by January 2000.[87] The CRTC is currently (June 1998) undertaking regional consultations on the best way to achieve service to these areas.

A.2 Access to standard services on the PSTN

Canada's household telephone penetration rate is approximately 98.5%.[88] However, this figure excludes the Yukon and Northwest Territories where a large proportion of customers fall into the "remote" classification, not included in the Canadian penetration estimates. Separate penetration rates for rural and urban areas have not been identified, although significant variation across provinces is likely given the diversity apparent in the share of population that resides in rural locations (see Table A.1). Table A.2, provides an indication of the impact of this variability on the Stentor Alliance company's customer and network characteristics.

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[86] See, '*Local Network Connection And Network Component Unbundling: Final Argument By Stentor Resource Center Inc*', October 1996,.

[87] Canadian Radio and Telecommunications Commission, Service to high-cost serving areas. Telecom Public Notice 97-42, 18 December 1997.

[88] *Industry Canada*. Access: cornerstone of the information society, Chapter 4. 9 Sept 1997

Table A.1: Urban and rural population figures, for Canadian provinces and territories, 1996 Census

	Urban		Rural		Total Populatio
	Population	%	Population	%	
Canada	22,461,210	77.9	6,385,551	22.1	28,846,761
Newfoundland	313,819	56.9	237,973	43.1	551,792
Prince Edward Is	59,460	44.2	75,097	55.8	134,557
Nova Scotia	497,858	54.8	411,424	45.2	909,282
New Brunswick	360,421	48.8	377,712	51.2	738,133
Quebec	5,597,625	78.4	1,541,170	21.6	7,138,795
Ontario	8,958,741	83.3	1,794,832	16.7	10,753,573
Manitoba	800,063	71.8	313,835	28.2	1,113,898
Saskatchewan	627,178	63.3	363,059	36.7	990,237
Alberta	2,142,815	79.5	554,011	20.5	2,696,826
British Columbia	3,057,388	82.1	667,112	17.9	3,724,500
Yukon Territory	18,447	60	12,319	40	30,766
Northwest Territories	27,395	42.5	37,007	57.5	64,402

Source: Statistics Canada, Urban and rural population counts, for provinces and territories, 1996 Census http://www.statcan.ca/english/census96/table15.htm

Table A2: Stentor Alliance demographics

Company	Exchanges	Lines in service	Customers served	Communities	Area covered
BCTel					
Bell	642		7,000,000		
IslandTel					
MT&T	175	721,707			
MTS		660,000			
NBTel					
NewTel	26	89,756		>463	
Northwestel	4	80,842	110,000	137*	3,900,000km²
QubecTel	135		550,000	304	272,000km²
SaskTel	342				
Telus		1,823,000	2,800,000		

Note: * Northwestel: 92 communities served by exchanges, 45 by satellite

Source: Island Tel Annual Report 1996 http://www.islandtel.pe.ca/annual_report/years.html

Canada still has a relatively large number of two-party and multi-party lines, with most of these lines located in rural and remote areas. In 1995 there were 300,000

multi-party lines out of a total of 12.4 million residential telephone lines.[89] The Stentor Alliance companies have committed to upgrading most residential and business customers to digital, single line phone services by 2000.[90] BCTel, for example, in its 1997 capital investment plan, was aiming to upgrade 43 communities from party line services to single line services. Island Tel (Prince Edward Island) completed its 10-year program to convert all party line services to single line in February 1998.

Table A.3 provides an overview of the available information on rural service levels for selected members of the Stentor Alliance and the various plans these companies have for improving rural access to the PSTN.

[89] *Industry Canada*. Connection, community, content: the challenge of the information highway. Final report of the Information Highway Advisory Council, Sept 1995. Available from http://strategis.ic.gc.ca

[90] *Industry Canada*. Canadian content: creating an information highway for Canadians. Chapter 4 Access: cornerstone of the information society. 9 Sept 1997.

Table A.3: Rural Access Developments in the Stentor Alliance

BCTel	• The service standard for customers outside a base rate area in mid-1997 was a 4-party line service. • Under the Rural Upgrade Program, such exchanges are being replaced to digital individual line standard.[91]
Bell Canada	• Bell's current requirement is to provide services to customers who are within 62 metres of their existing plant. Approximately, 30% to 40% of Bell's service area is not covered by plant. Meaning that roughly 8,000 to 9,000 households are without services with around 2,500 of these households having outstanding requests for services. Approximately 60,000 services are supplied via 4 party line service. • Bell, under their Rural Bell plans to replace these 4-party line with single line services over the next 4 years..[92] Bell's Rural Upgrade program includes the digitisation of network.
NewTel	• In the face of potential competition, NewTel has allocated C$60 million for improvement to services in rural areas of Newfoundland, to be completed by 2000.
Northwestel	• A three-year program to upgrade the last seven under-serviced communities in the Northwest Territories was completed in December 1997 at a total cost of $3 million. The upgrade gives these communities access to local and long distance services and features including call waiting, call display, three-way calling and call forwarding. • The one remaining under-serviced community has yet to get commercial power.[93]
SaskTel	• SaskTel has said that it will improve local calling options in rural areas under its Exchange Area Program. Phase One, which will improve local-calling options for 50,000 rural customers on 82 exchanges, commenced in February 1998 and was completed in mid-March. • SaskTel has identified disadvantaged exchanges by high short-haul long distance usage and charges, the small number of customers in an exchange and a low level of local calling. The company's exchange restructuring plans include the expansion of 30 and elimination of 52 exchanges in return for the removal of Extended Area Service charges whereby customers in one exchange could ring customers in an adjoining exchange without incurring long distance charges.[94]

A.3 Prices for standard telecommunications services

The regulated Canadian carriers are currently undergoing a process of rate rebalancing in order to bring prices closer to the costs incurred in providing the service. Consequently, local rates are increasing and long distance rates are decreasing around the country.

Prior to competition, local rates were set according to the number of lines accessible by local calling, resulting in a pattern whereby the lowest rates were applied in the

[91] CRTC. Telecom Order 97-513. 15 April 1997. Available from http://www.crtc.gc.ca/

[92] E-mail from Wayne Ferguson, Telstra.

[93] Full telephone service arrives in Jean Marie River. Northwestel News Release, 9 Dec 1997.

[94] SaskTel. SaskTel announces changes to top local and long distance services. Press Release, 7 Nov 1997.

smallest, rural communities, notwithstanding that the cost of service delivery was highest in these areas.[95] Currently, Canadian local call rates are based on a monthly flat rate for unlimited local calls.

The CRTC has approved local rate increases for January 1, 1996, 1997 and 1998. A number of the incumbent carriers, facing increased competition, declined to apply the 1 January 1998 rate rise. The CRTC has also put a price cap of C$15 a month on the exchange line mileage paid by customers located more than five miles from a basic service area. Previously these customers paid between C$16.70 and C$40 a month exchange line mileage.[96]

As rate rebalancing has only just commenced, it is difficult to ascertain how rural customers will be affected. The elimination of exchange line mileage charges will obviously be beneficial but it is uncertain as to whether this will be offset by increased local call rates for rural customers.

For business consumers, rate rebalancing amongst the Stentor companies has seen some business rates increase in rural areas and decrease in urban areas in order to bring prices more in line with costs. At the same time it seems that the incumbents are improving local calling options for their rural residential customers. It appears that in the larger provinces there is some ongoing cross-subsidisation of rural residential customers by rural business customers. The incumbents in the smaller provinces (e.g. NBTel and IslandTel) have established territory-wide uniform pricing and created one calling zone so urban and rural users are subject to the same prices.

[95] NewTel. Impact of CRTC Decisions on NewTel and its customers. Press Release, 18 Dec 97

[96] Northwestel prepares to implement CRTC rate rebalancing decision

Table A.4 evidences these pricing trends by detailing the pricing practices of Stentor Alliance members. Table A.5 summarises the local service rates currently levied across Canada.

Table A.4: Stentor Alliance Pricing Trends

BCTel	• Reduced the number of rate groups in British Columbia from 11 to 7. Business rates increased by up to C$4.25/line/month in small towns and rural areas, and decreased by up to C$9.90/line/month in urban areas. Residential rates increased by an average of 70 cents/line, and mileage charges were eliminated.[97] • BC Tel asked the CRTC in February 1998 to approve lower business local rates in urban areas and higher rates elsewhere. Proposed changes to multi-line business rates range from a C$16.85 decrease to a C$8.25 increase.[98]
Bell Canada	• Proposed to extend free local calling areas for rural customers to at least one town or city and the area in between.[99] • Eliminated local rate differences and established a fixed monthly rate for business subscribers in July 1997. The single line business telephone rate became C$45.45 and in the far north it became C$40. This meant an increase for rural business customers from C$29.80 to C$45.45 a month. [100]
IslandTel	• Eliminated its exchange line mileage charges in 1997, obtained approval for a province-wide fixed price for residential services and expanded free calling areas to include all neighbouring exchanges in the province. [101]
MT&T	• Established a single Nova Scotia-wide residential rate and two business rates for local telephone service in January 1998. Mileage charges were abolished, and customers served by analog switches have been given a discount. [102]
MTS	• The CRTC granted MTS price rises for residential lines of 35c per month in December 1997, and 49c per month in January 1998. The company is also allowed a price rise in May 1998 of 11c per month for urban residential lines and 26c for rural residential lines.
NBTel	• The CRTC approved a restructuring proposal, which included making the whole province a single rate group with rates at C$20.00/month (residential) and C$34.70/month (business).[103] NBTel also undertook residential programs, including expanding local calling areas and eliminating mileage charges for about 70,000 customers.

[97] Telecom Update, 21 April 1997

[98] Telecom Update, 16 Feb 1998

[99] Bell Canada wants rate increase to upgrade rural services. Newsbytes News Network, 30 June 1997.

[100] Government upholds Telecom Order CRTC 97-803. Minister of Industry Press Release, 20 March 1998.

[101] Island Tel reports continued growth in 1997. Canada Newswire, 2 Feb 1998.

[102] Telecom Update, 1 April 1997

[103] Telecom Update, 1 April 1997

NewTel	• According to NewTel, in Newfoundland and Labrador it costs about C$38 per month, on average, to provide basic local telephone service. • NewTel increased its local rate by C$2.50 in January 1998 to C$19.95 per line per month. NewTel also has programs, which allow customers to expand their local calling areas, thus eliminating long distance charges to nearby communities.[104] As of January 1 1998, all residential customers in Newfoundland began paying the same rental rate: C$15.45/month for single line, or C$12.90 for two-party service.
Northwestel	• Has mileage charges limited to C$15/month by a CRTC ruling. It has rebalanced its rates, increasing local rates and reducing long distance rates • Local rates will rise by C$4/month this year, and by C$6 in 1999.[105]
SaskTel	• Increased its local phone rates commencing 1 February 1998. Rural rates increased from C$12.65/month to C$18.65, rates for outer metro customers increased from C$14.10 a month to C$19.10, and rates for metro customers increased from C$15.35 a month to C$19.35. These rates do not include mileage charges, which vary according to distance from the exchange. [106]
Telus	• Restructured its business rates in 1997, such that in cities the monthly rate is C$45, in towns it's C$50 and in rural areas C$55, for any number of lines. • Telus proposed its third local rates increase in June 1997. Its proposal was to increase the rates for customers outside the city of Edmonton by C$3 per month per line on 1 January 1998. The rate would then be C$23.90. It also proposed to increase the rate for Edmonton customers by C$2 per month per line on 1 August 1997. The rate would then be C$18.25.

Table A.5 Local service rates across Canada, Stentor alliance, January 1997

Telecommunications Operator	Rate range (per month) Single line business	Rate range (per month) Single line residential
BCTel	$27.00–$67.15	$13.85–$25.95
Bell	$27.80–$51.80	$14.75–$25.55
IslandTel	$32.10–$49.10	$17.85–$20.20
MT&T	$34.25–$59.40	$18.95–$21.00
MTS	$28.15–$33.85	$12.75–$14.40
NBTel	$25.80–$34.70	$15.45–$17.25
NewTel	$33.40–$48.00	$14.55–$17.45
Northwestel		$13.70–$16.33
SaskTel (not regulated)	$27.70–$34.70	$12.65–$14.10
Telus	$37.88	$20.90

Note: Rate rebalancing has occurred since then, so some rates have changed

Source: Northwestel. Backgrounder: rate rebalancing, preparing for a competitive marketplace January 27, 1997. An industry perspective.

[104] NewTel. Impact of CRTC Decisions on NewTel and its customers. Press Release, 18 Dec 97

[105] Telecom Update, 16 Feb 1998. CRTC: http://www.crtc.gc.ca/eng/telecom/decision/1998/d981_0.txt

[106] SaskTel. SaskTel announces changes to local rates and improvements to long distance savings plans. Press Release, 7 Nov 1997 & 19 Jan 1998.

A.4 Quality of telecommunications services

Canada's recent introduction of price cap regulation led the CRTC to initiate a change in the model for reporting quality of service indicators. Commencing in the first quarter of 1998, the Stentor Alliance companies will report quality of service data using interim national standards. The CRTC will not finalise the quality of service standards until 1 January 1999.

Previously, only three companies reported customer satisfaction indicators using company specific standards. These companies will provide reports under both old and new regimes until the new standards are complete. The new regime will separate rural and urban reporting for provisioning and repair, but not for operator services and billing, as they are delivered on the same platform.[107] As part of the need to establish an appropriate delineation between urban and rural areas in order to be able to report on them separately, the CRTC approved,[108] on an interim basis, Stentor's proposed distinction based upon local loop length and density.

The interim Canadian quality of service data should be available for comparative purposes by the end of 1998.

A.5 Access to advanced services

A 1996 survey of North American farmers by the Department of Rural Extension Studies, University of Guelph, found that two of the main obstacles to rural residents getting on the Internet were a lack of service providers in rural areas (61%) and long distance charges (52.2%). The main obstacle, however, was lack of knowledge and training (64.2%). The survey also asked if party lines were an obstacle: 10.4% of respondents in Canada and 3.4% of respondents in the US said they were. Respondents to the survey came from Canada (21.9%), the United States (66.9%) and elsewhere (11.2%).

Table A.6 indicates that subscribers in the smaller provinces are better off in that their phone companies (e.g. NBTel and IslandTel) claim to provide 100% local call access to the Internet. The incumbents in the other provinces have plans to upgrade in order to provide 100% local call access, as there is strong demand for this service. However, in many cases this will not be achieved until early in the next century.

Access speeds also appear to vary greatly between rural and urban areas and across provinces, reflecting the diversity in network structures detailed above. Telesat offers its satellite-based DirectPC service to rural Canada, giving high-speed Internet access at the same price as it offers in urban centres. However, the return path for DirectPC is over the terrestrial network so rural users are still likely to incur long distance charges.[109]

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[107] CRTC. Quality of service indicators for use in telephone company regulation. Telecom Decision 97-16, 24 July 1997. http://www.crtc.gc.ca/eng/telecom/decision/1997/d9716_0.txt

[108] In Local Competition, Telecom Decision CRTC 97-8, 1 May 1997.

[109] Satellite Internet access will have rural users beaming. *Financial Post*, 12 Feb 1998.

Table A.6: Internet Access in Canada

BCTel	• Provides local call Internet access to only 16 communities in British Columbia
Bell Canada	• Ninety percent of telephone lines will have local call Internet access in Ontario and Quebec by the end of 2000. Bell's residential ISDN service costs between C$51 and C$57/month depending on where the customer lives.
IslandTel	• All subscribers on Prince Edward Island have local call access to the Internet.
MTS	• Provides local call Internet access to 26 communities in Manitoba. It introduced an ADSL service in March 1998, currently available to 70% of Winnipeg customers only, and due to be available to 90% of Winnipeg customers by early 1999.
NBTel	• Spent the past four years making sure almost all of its rural customers have dial-up access to the Internet through affordable touch-tone lines. It is also engaging in intense competition with Fundy Cable, as both companies compete to install fibre optic networks throughout their territory.[110]
NewTel	• By the end of 1997, NewTel had provided local call Internet access to 463 communities throughout Newfoundland and Labrador, comprising 90% of telephone lines.[111]
Northwestel	• Provides local call Internet access to 2 communities in the Northwest Territories and the Yukon.
SaskTel	• All subscribers in Saskatchewan have local call access to the Internet
Telus	• Offers local call Internet access throughout Alberta

As in Australia, there are a number of government funding initiatives and programs in Canada designed to provide better access to data services for people in rural and remote areas. These are detailed in Table A.7.

[110] New Brunswick's rural residents get plugged in. *Globe and Mail*, 2 Sept 1997.

[111] NewTel. NewTel launches Phase One of $60 million Rural Services Program. Press Release, 22 Dec 97

Table A.7: Concessional and funding schemes for Internet access in Canada

Scheme	Description
Community Access Program	• Sponsored by the Federal and Provincial Governments with private support. • Aims to provide rural community public access points for Internet access. Aim is 5,000 communities with access by 2001. • The February 1997 budget extended the program to the 5,000 rural and remote communities with populations between 400 and 50,000, and added $30 million to the program. • In January 1998 the Government announced 1,000 more sites in about 830 rural and remote communities with funding of $15 million.
Federal Regional Initiative for Northern Ontario	• Established in 1987, • 1996 budgetary allocation was $60 m. • One of the program's projects is to supply an accessible telecommunications infrastructure for the region.
CANARIE	• Non-profit corporation industry-led and managed. • Industry Canada has allocated $104.5 million from 1993-99 for CANARIE's programs. • Established to encourage information highway related development. • E.g. Pilot Project for Aboriginal Networking: awarded $1.25 million in Oct 1997 for 7 projects.
Northern Ontario Heritage Fund Corporation programs	• The NOHFC identified telecommunications as a priority in its 1996 guidelines. • The fund has so far provided C$1.2 million to improve access to telecommunications in Northern Ontario, including community fibre optic network projects, videoconferencing, distance education and telemedicine. • The fund launched a new telecommunications project in March 1998.

Appendix B: New Zealand

B.1 Rural and urban service levels

Deregulation and the threat of competition has resulted in significant improvements in Telecom New Zealand's (TCNZ) operating efficiency, service availability and delivery, to the benefit of both urban and rural customers. Prices of domestic toll services, cellular services, leased circuits and data services have fallen following competition. Most rural consumers now enjoy the same standard of service as urban users, and new network investment has enabled the introduction of services such as EFTPOS in many rural communities.

After deregulation and the privatisation of TCNZ, trade practices legislation (the Commerce Act) became the primary instrument of regulatory control of the New Zealand telecommunications industry. However, during the privatisation process, the New Zealand government used the articles of associations provisions of the Companies Act 1995 to enshrine pricing commitments previously made by the publicly owned Telecom. Consequently, TCNZ's articles preclude it from:

- Charging for the usage portion of local residential calls;
- Raising the price of standard residential line rentals above the rate of increase in the cost of living (CPI); and
- Charging different line rentals to rural and urban subscribers.

A one-share ownership held by the government and known as the 'Kiwi Share' enforces these articles. TCNZ can break these commitments only if its profits are 'unduly affected' or if there is mutual agreement between all shareholders. After deregulation, the Ministry of Commerce also decreed that the residential service will remain as widely available as it is at present.

B.2: Access to the PSTN

New Zealand has close to ubiquitous access to the PSTN, with some 96% of households connected to the network. Separate figures for rural and urban penetration are no longer available. However, it appears that TCNZ has maintained residential telephone service access in line with the Ministry of Commerce directive on service availability.

Furthermore, while TCNZ still has customers in remote rural areas with party line services, it announced in 1994 a commitment to replacing all of these services with dedicated lines by 1998. As at March 1997 there were only 661 party-line customers remaining in New Zealand.

Currently more than 99 percent of Telecom's 1,762,000 access lines are connected to digital switches. TCNZ has also made a commitment to upgrade the remaining rural and remote lines served by electromechanical technology based switches to digital by the end of 1998.

B.3 Prices for standard telecommunications services

In 1988, anticipating competition, Telecom re-balanced the price of long distance calls and the residential telephone service rental. This was done by reducing the price of long distance calls and increasing the price of the residential telephone service. Since the adoption of the Kiwi Share Obligations in September 1990, TCNZ has met

the requirement that the line rental for residential users in rural areas be no higher than the standard residential (telephone) rental. In real terms, residential rental charges for all New Zealanders have remained relatively constant since 1989 (see Table B.1).

Table B.1: Residential telephone (standard) service price increases

Date of Change	Current $NZ	Constant $NZ (1989)
1 November 1989	$27.80	$27.80
1 January 1991	$29.19	$27.61
1 January 1992	$29.62	$27.75
1 January 1993	$29.91	$27.66
1 January 1994	$30.25	$27.59
1 January 1995	$30.79	$27.31
1 February 1996	$31.88	$27.48
1 August 1997	$32.81	$27.65

TCNZ business rentals, on the other hand, indicate an increasing disparity in the price levied rural and urban businesses. The standard business access line rental (analogue line) is NZ$725.04 per annum while the rate in the city is NZ$616.32. Very large telecommunications services users can also typically qualify for up to a 10% discount on business telephone line rentals and call usage charges under TCNZ's 'Premier Plan". Discounts of 10% or over must be disclosed under New Zealand's telecommunications information disclosure regulations.

The long-distance calls market in New Zealand has proven to be highly competitive since the 1990 reforms. Rural consumers appear to have shared in the resulting price reductions. For instance, TCNZ's non city-to-city national call base tariff rates reduced in real terms by 14.5% over the period September 1990 to March 1997 (11.5% from inflation and 3% nominal reduction in tariffs).[112] On 1 February 1998, TCNZ made a significant step towards the introduction of a single long-distance pricing structure by reducing its 15 distance charging bands to just four.

New entrants into the New Zealand market are also providing discounts to rural consumers. Telstra New Zealand, for example, offers an 18% discount off TCNZ's standard rate for calls between provincial centres and 15% for calls between regional centres.

B.4 Quality of telecommunications services

There was a concern prior to TCNZ's privatisation that telecommunications service quality standards for residential telephone service might not be maintained. Ten telephone service indicators were initially agreed upon that included service connection times, fault incidence, operator response times, SPC exchange availability, payphone availability and billing disputes. In 1995 the Ministry of

[112] New Zealand Telecommunications, Information Publication No. 5, Communications Division, Ministry of Commerce, August 1997; Statistics New Zealand; Telecom New Zealand Annual Report, March 1997

Consumer Affairs, in conjunction with TCNZ, reviewed the adequacy of the quality of service indicators and a set of new indicators was agreed. These indicators did not include the separate identification of rural and urban subscribers. Table B.2 details TCNZ's recent performance on the most significant of the new indicators. In line with the Australian data, performance standards for service requests for in-place facilities have remained relatively constant, while standards for new services have declined.

Table B.2: Selected quality of service data for TCNZ

Indicator	Oct 95–Mar 96	Apr 96–Sept 96	Oct 96–Mar 97	Oct 97–Mar 98
percentage of residential telephone service requests that meet the customer's requested installation time	94	93.3	90.8	87.7
percentage of 'intact' residential telephone service requests completed within 24 hours of customer's request;	96	95.8	95.5	96.9
percentage of 'intact' residential telephone service requests not completed within 48 hours where the customer completed within 24 hours of customer's request	0.7	0.7	0.8	0.8
percentage of residential telephone service requests outstanding 96 hours after the installation date requested by the customer	0.7	1.0	1.5	1.5

Source: New Zealand Telecommunications Information Publication No. 5, Communications Division, Ministry of Commerce August 1997

B.5: Access to advanced services

The larger Internet access providers in New Zealand give 0800 dial-up access to subscribers who are at a distance from the provider's POPs. This is more expensive for the customer than using a local ISP.

Pricing for ISDN services from Telecom New Zealand vary between urban and rural areas as city subscribers are given a preferential rate. The city rate ISDN basic rate access (2x64k) costs NZ$1,440 per annum while the regional rate is NZ$1,800.

Appendix C: The United Kingdom

C.1 Rural and urban service levels

The British telecommunications regulator (OFTEL) outlined its universal service plans in July 1997, the first time such obligations have become explicit as part of UK licence agreements.[113] Specifically, Oftel's noted its intention "that everyone should have access to a basic, affordable telephone service". This basic telephone service was deemed to include:

- a connection to the fixed network able to support voice telephony and low speed (minimum of 2400bps) data and fax (group 3) transmission;
- the option of a more restricted service package at low cost;
- reasonable geographic access to public call boxes across the UK at affordable prices;
- free access to 999/112 services, itemised bills, the choice of selective call barring, and access to operator assistance and directory information;
- the option of an outgoing calls barred (OCB) service, together with a repayment plan, as an alternative to disconnection for non-payment; and
- the provision of universal services at geographically averaged prices.

The United Kingdom is part of the European Union's liberalisation program, which includes an open network provision (ONP) covering the requirement that funds be made available in each country to ensure everyone has access to basic voice services.[114]

Reflecting the high population density of the United Kingdom, OFTEL concluded that there was no need for a universal funding mechanism, as there was no undue burden on BT. [115] In the costing exercise for Oftel's universal service study, BT ascertained that less than 5% of its lines were in areas deemed uneconomic, although this represented 20% of the UK land area.[116]

C.2 Access to standard services on the PSTN

The United Kingdom recorded a telephone penetration rate of 93 percent in 1995, according to recent OFTEL universal service papers, but this rate varies considerably on a geographic basis. For instance, the penetration rate in the north of England is 82 percent. In mid-1997, it was found that approximately 900,000 of the 1.6 million households without a telephone would like to have access to the fixed telephone network, but that the majority of these could not afford access.[117] Services to

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[113] Oftel sets UK's first universal service commitments. Total Telecom, 30 July 1997.

[114] New entrants count the costs of ONP. Total Telecom, 11 Aug 1997.

[115] Oftel. Universal telecommunications services. July 1997. http://www.oftel.gov.uk/consumer/univ_2.htm

[116] Oftel. Universal telecommunication services. Proposed arrangements for Universal Service in the UK from 1997. Ch.6 What does universal service cost?, Feb 1997. http://www.oftel.gov.uk/consumer/uniserv2/chap6.htm

[117] Oftel. Universal telecommunications services. July 1997. http://www.oftel.gov.uk/consumer/univ_2.htm

uneconomic areas are currently provided by fixed line, although BT's licence allows for the use of fixed radio networks.

Among the 700,000 households that did not want access to the fixed network, some 250,000 have access to a mobile telephone.[118] Mobile networks are increasingly a viable alternative to the fixed network in the United Kingdom, even for rural consumers. One-2-One and Orange claim to cover 95% of the UK population. Network upgrades from Cellnet and Vodafone are expected to provide digital coverage to 90% of A and B roads in the Scottish Highlands and Islands by the year 2000. Currently about 40% of these roads have reliable mobile coverage. This is expected to reach 70% by end-1998.[119]

There are now 136,000 BT public call boxes throughout the United Kingdom. Eighty three percent of UK customers have a public call box within half a mile of their home. Over 95% are in good working order at any one time. There are also over 500,000 private payphones throughout the UK.

All of BT's customers can obtain free itemised billing, outgoing calls barred service and premium rate service barring. The vast majority of BT's customers can also access additional services such as charge advice, selective call barring, call waiting, call diversion, three-way calling, calling line identification, call return and reminder call.[120]

C.3: Prices for standard telecommunications services

Under its licence, BT is required to charge services at geographically averaged prices irrespective of the costs of provision, hence services are available to all UK customers at the same price, regardless of location. An exception to this allows BT to levy an additional time-related connection charge where more than 100 person hours of labour are required to carry out a line installation.[121] BT is also required to charge the same call box tariffs regardless of location.

OFTEL, in its policy position on the provision of basic services at "affordable prices", was expected to address the issue of low penetration rates in the rural north of the United Kingdom. However there was some disappointment amongst interested organisations that this did not include abolishing extra charges for connection based on distance.[122] BT has in place some standard concessional funding schemes for light users of the service and for incoming and emergency outgoing use only customers.

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[118] Oftel. Universal telecommunication services. Proposed arrangements for Universal Service in the UK from 1997. Summary, Feb 1997. http://www.oftel.gov.uk/consumer/uniserv2/summary.htm

[119] Remote chance to get mobile. *Scotsman*, 4 March 1998.

[120] Oftel. Universal telecommunication services. Proposed arrangements for Universal Service in the UK from 1997. Ch.2 What level of service?, Feb 1997. http://www.oftel.gov.uk/consumer/uniserv2/chap2.htm

[121] Oftel. Universal telecommunication services. Proposed arrangements for Universal Service in the UK from 1997. Ch.2 What level of service?, Feb 1997. http://www.oftel.gov.uk/consumer/uniserv2/chap2.htm

[122] NIAA. Avoiding exclusion: the challenge of shaping the information society in the rural north. Dec 1996. http://www.niaa.org.uk/rural/rindex.html

C.4 Quality of telecommunications services

BT reports on quality of service to Oftel in the Comparative Performance Indicator Report, but this does not include separate reporting for urban and rural services. BT surveys 43,000 customers each month to ascertain satisfaction levels and is able to report on indicators such as time to repair a fault. For example, at the end of 1997, BT was able to clear 90 percent of business customer faults within five hours and 99 percent by the end of the next working day. The company also reported that in 1996, 99 percent of orders for new connections were completed within the agreed time, whilst in 1984 this figure was 84 percent.[123]

BT also introduced a Customer Service Guarantee Scheme in 1991 under which it has agreed to supply the service on the date agreed with the customer, to repair services promptly, to keep appointments and to not disconnect services by mistake. The customer is entitled to financial compensation if this guarantee is not met.[124] For residential customers, this compensation is one month's line rental charge for each day BT fails to meet its guarantee and, for business customers, £25 for each day.

C.5 Access to advanced services

BT claims that 96 percent of UK businesses have access to its ISDN service and that it is "working to make ISDN available to all customers within the UK". It announced in August 1997 that it would no longer be offering ISDN2, replacing it with ISDN2e, an ETSI standard service that supports advanced features such as voice and data forwarding. BT says it will charge users £80 for upgrading to this new service.

Initially, BT noted that some exchanges in rural Wales and Scotland were unable to support ISDN2e and that they are unable to afford to upgrade these exchanges.[125] More recently, however, BT has announced it will be installing ISDN at small, rural exchanges at a cost of £2 million. It also announced a £6 million upgrade of 200 small exchanges throughout the North commencing in June 1998.. Some of the exchanges are being upgraded from analogue to digital, some others are getting a

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[123] BT. BT liberalisation case study. October 1997. http://www.bt.com/World/corpfin/regulatory/liberalisation/report/casestud.htm

[124] Oftel. Universal telecommunication services. Proposed arrangements for Universal Service in the UK from 1997. Ch.2 What level of service?, Feb 1997. http://www.oftel.gov.uk/consumer/uniserv2/chap2.htm

[125] Users protest at axing of ISDN2. *Network Week*, 3 Sept 1997.

digital upgrade. BT is spending £5 million on optical fibre and microwave radio links to its remaining 43 analogue exchanges.[126]

In a move aimed at reducing development costs in rural areas, BT is trialing a radio telephone system in 60 homes in rural Scotland. The technology will allow these homes to have access to any services, including ISDN, which are supported by the local exchange. If the trial is successful BT will use the technology more extensively in rural areas.

There is some evidence that BT's existing rural services are not sufficient for business users. Some of these users are seeking funding from local councils and the EU in order to create their own alternatives to the lack of infrastructure suitable for data. Communications managers in rural areas have supported the Oftel move to allow carriers to share facilities.[127]

[126] £2m phone upgrade will have us talking. *Aberdeen Press and Journal*, 9 March 1998.

[127] Rural regions are left behind. *Computing*, 13 Nov 1997.