Broadband Competition

Terms of Reference

a) the current and prospective levels of competition in broadband services, including interconnection and pricing in both the wholesale and retail markets;

b) any impediments to competition, and to the uptake of broadband technology;

c) the implications of communications technology convergence on competition and other emerging markets;

d) the impact and relationship between ownership of content and distribution of content on competition; and

e) any opportunities to maximise the capacity and use of the existing broadband structure.

Personal Background

My Business, Engineering and Technical experience in and beyond the Telecommunications industry spans more than 35 years in several roles including: Technician, Senior Technician, Technical Manger, Engineer, Manager, Project Manager, Bid Manager, Development Manager, Specialist IT Consultant, Investment Director and a Conceptual Analyst.

During this career I have worked on many aspects of the technical and engineering aspects of business including: Installation, Commissioning and Maintenance of: open wire, cable, optical fibre, coaxial cable, waveguides, telephones, PABXs, commander (key) systems, switchboards, crossbar, reed-relay and digital exchanges, digital cable multiplexers, data multiplexers, routers, and TCP/IP switches, voice and data communications standards, telephony network interfacing, VOIP, SHF radio, Baseband and carrier transmission systems, PCM and SDH/ATM digital transmission systems, associated channel signalling, common channel signalling (CCS7), line signalling, data transmission protocols and signalling, metering analysis, network signalling analysis, and voiceband monitoring and analysis, leading to quantifying operational service standards for customers.

I also have extensive electronic equipment design expertise covering valve, transistor, analogue, digital and hybrid ICs, ferrites, magnetics, printed boards, surface mount, stripline technologies, and in prototyping, engineering and manufacturing a very wide range of equipment including; audio, wideband and RF amplifiers, switched mode power supplies, digital computers, analogue and digital transmission measuring and monitoring equipment.

My Engineering and Business expertise includes and is not limited to: forward network planning, computer based emulation and modelling, computer programming, project planning, production management, production testing, Quality Management Systems, ISO 9001/2, business case development, project scoping, product development, tender management, bid management, supervision, management, team building and executive direction. I am very computer literate and have used computers in most business applications from 1972, including specific application development, PLCs, instrument control, word processing, number processing, and data processing, database development and management reporting, peer-to-peer and server applications, Internet Website development, email technologies and accounting systems development.

It is with this very extensive personal background that I am making this response to the Senate Hearing Committee on Broadband Competition, and my experience and expertise is here on behalf of the Australian public and on fairly competing telecommunication and/or broadcasting based businesses.

Response Introduction

This response is written without fear or favour, and it is aimed to give all Australians the best competitive communication network and services for the most economic outlay over the next 20 to 50 years, while providing telecommunications service businesses the chance to compete and have a healthy bottom line without resorting to unscrupulous business practices.

The terms of reference cover five statements that when briefly analysed show a set of common threads based on competition, convergence, broadband, and technology. As such I have briefly analysed the five terms and concluded that to minimise unnecessary repetition the responses shall be in the following order:

1 *(c.) the implications of communications technology convergence on competition and other emerging markets;*

2 *(e.) any opportunities to maximise the capacity and use of the existing broadband structure;*

3 *(b.) any impediments to competition, and to the uptake of broadband technology;*

4 *(a.) the current and prospective levels of competition in broadband services, including interconnection and pricing in both the wholesale and retail markets;*

5 *(d.) the impact and relationship between ownership of content and distribution of content on competition;*

This order was chosen because the convergence of technologies is of a critical importance and it has an overwhelming impact on all other terms. Once the critical importance of currently converging technologies is understood and managed, the opportunities to maximise the then available capacities become apparent, and the major competitive impediments now become obvious. This then sets the playing field markers for both wholesale and retail pricing, and this in turn will resolve the conflict of interest between content and distribution. With that resolved, the cash-flow problem caused by issues in the "Three C's" namely Cost, Content and Coverage are then addressed, resolving the telecommunication / business / broadcasting issues and this in turn will provide the best competitively priced retail arrangements for the wholesale telecommunications network for the Australian people Government and businesses.

Terminology

These terms mean the following in the text in this document:

Competition	a commercial situation where suppliers of similar commodities (eg equipment or service provider) are pitted against others, and/or the situation where price and service become the deciding factors above recognised minimum engineering standards and/or long term viability.
Baseband	a frequency range of interest with the low frequency reference below 4 kHz.
Broadband	any communication involving a data rate of higher than 250 kb/s, or having a Baseband bandwidth exceeding 250 kHz.
Bearer	a physical medium and/or system that can transport communications.
Payload	the program content or available carrying capacity of a bearer.
Convergence	the timing of various technologies to transport different payloads onto more common technologies.
Technology	the application of physical equipment to create and solve a particular requirement.

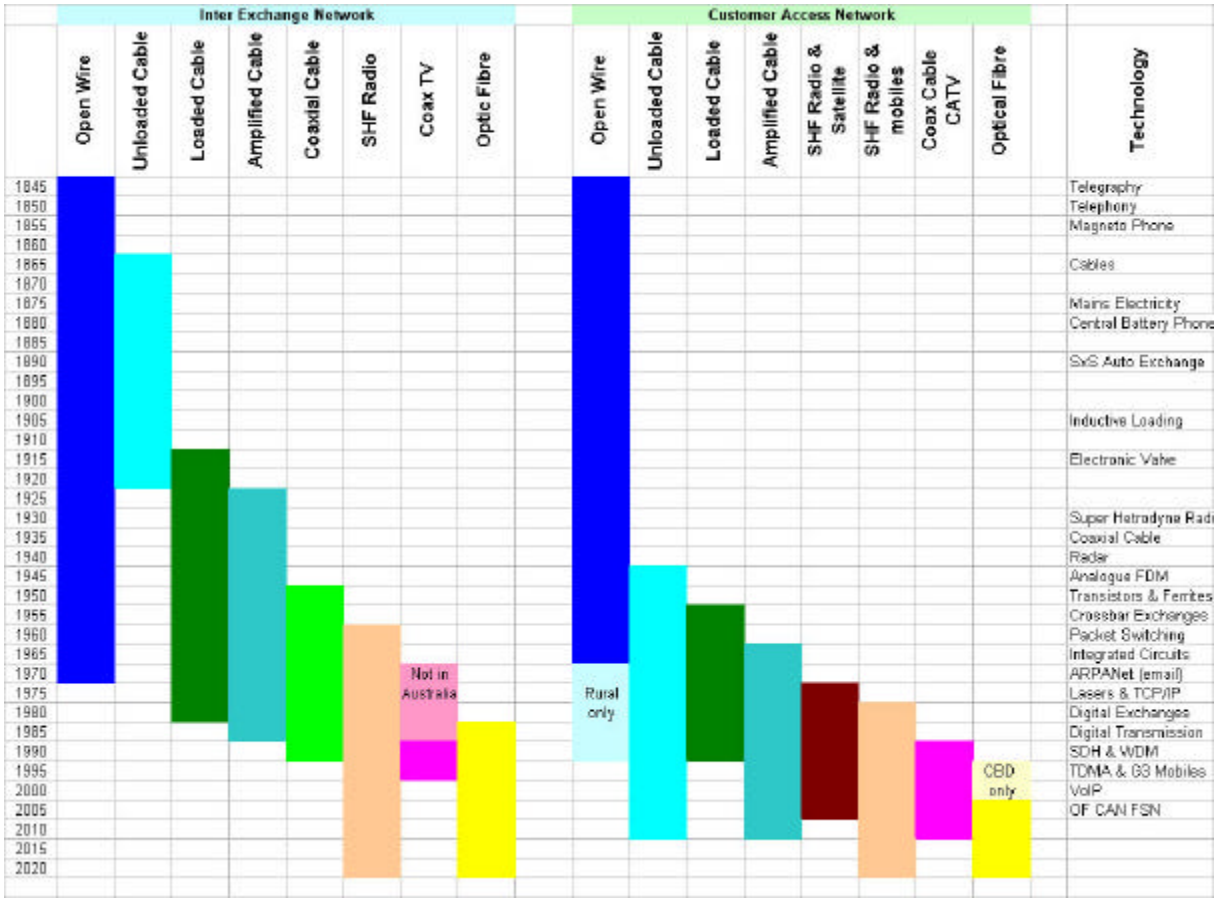
Reference Term 1

1 (c.) the implications of communications technology convergence on competition and other emerging markets;

The first converging technology to consider is at the physical level. This is essentially the wiring between exchanges, head ends, network IP switches and the customer access points in their various forms.

Converging CAN and IEN Technologies

The accompanying chart shows three areas of inter-related data, which when viewed in correlation with each other, shows that with time, newly introduced technologies have been pivotal in establishing and terminating various types of technologies both in the Inter-Exchange Network (IEN), Internet Protocol Network (IPN), Community Access Television Network (CATVN) and in the Customer Access Network (CAN). (For this exercise, the IEN encompasses the IPN and CATVN.)



Technology List

The technology list is basically telecommunications oriented, while the network charts are both bearer or 'transmission path' oriented. The time stamping is in nominal five-year blocks for simplicity and based more on the commercial reality than the engineering conception. Some technologies (for example optical fibre) took at least a decade to develop into commercial realities so most of these 'technology stampings' are really nominal – but related to the Australian environment.

It is also important to note that for some decades there has been a very strong international lobby working on mind-shifting the decision-makers (gate-keepers) away from advances in

physical technology developments to focus them on commercial developments in sales. This devious power-play needs to be recognised and now fully understood that commercial sales developments come after the reality of an earlier physical technology developments. An example of these forces that continually undermine ownership and efficiencies of public (Government) owned utilities/infrastructures is described very well in the reference "**Power Play: the fight for control of the worlds electricity**", written by Professor Sharon Beder, Scribe Publications – Melbourne 2003 ISBN 0 908011 97 0. The telecommunications industry smacks of the same undermining techniques by very powerful multinational businesses. It is well worth reading this book and through that be educated on just how far these companies will go to deliberately manipulate governments, oppositions and the masses.

Australia has been at the forefront of many of the opto-electronic and information based technology developments. Therefore Australia stands to lose an immense fortune if the intellectual property (IP) of these technology developments is again lost to international interests through company acquisitions, and/or the outsourcing of manufacturing rights without direct and ongoing Australian Government and Oppositions support.

Inter-Exchange Network

The chart relating to the Inter-Exchange Network is of particular interest, as it closely relates to known technology changes in Australia. There are a few major significant trend lines that can be visualised on this chart. These trend lines are associated with the beginning of various transmission mediums and the end of life of these mediums/bearers.

The first trend line is taken from running a line from the nominal start dates beginning with Loaded Cable, and including most up to and including Optic Fibre. It is interesting to note that from about 1915 there have been 'transmission technology hops' that have about a 15 year spacing, apart from the open wire technology (which is seen in virtually all old landscape paintings and photographs).

The second trend line is very interesting, as it relates to the death of the use of various transmission mediums. By linking the end of Open Wire as the base and include those through to Coax Cable, it shows that these technologies were curtailed in quick succession.

This rather quick curtailment of older transmission mediums is very significant and it showed that a major restructure of the Inter-Exchange Network removed all analogue transmission and replaced it with digital transmission. ***Not only was digital transmission introduced only less than a decade before, the cost savings through optical fibres and digital switching were so significant that the move to digital was the imperative.*** As a consequence, the only existing transmission methods in use now are optical fibre and digital radio but optical fibre carries the lions' share. Twisted pairs are commonly used in exchange buildings, but most major links are with optical fibre and most small links (to mobile base stations) are either optical fibre or short haul SHF radio.

In this first stage of network convergence, voice channels and their associated signalling shared the same digital streams under the ITU-T G series recommendations. Video (TV) was also sent on 'virtual containers' in digital streams utilising Plesiochronous Digital Hierarchy (PDH). Digital exchanges switched the digital streams at the 64 kbit/s speed, and maintenance soon became almost non-existent.

In the second stage of network convergence PDH was encapsulated into the Synchronous Digital Hierarchy (SDH) along with Network Management functions, and Asynchronous Transfer Mode (ATM) to encapsulate data streams, and soon network management became almost non-existent.

In the third stage of network convergence PDH and ATM were largely transferred to the Internet Protocol Suite (TCP/IP), IP switches replaced most of the previous telephony based digital switches. In this 'Data Mode' the network is largely self-repairing and telephony use is rivalled by Internet and other data forms usage.

Internet Protocol Network

The physical bearers for the IPN are identical to those used for the IEN, as they use the same technology for transmission between IP switches as the earlier IEN, but carry the information digitally in packets and not long held circuits. As far as the wholesale network is concerned, these packets are encapsulated (like envelopes for letters) and it looks like the bearer is occupied as for the IEN, but the network occupancy is much lower for the same voice and data flow because as people stop to listen and breath, these pauses do not occupying any bandwidth. This technology is called Voice on Internet Protocol (VoIP).

Super High Frequency (SHF) Radio

In locations where optical fibre does not connect, an option is to use SHF Radio. Many non-Telstra mobile base stations use this technology – and in most cases, the competitive carriers have multiple duplicated base station equipment at co-located sites – clearly this is ***very far from the most cost-effective solution*** for the general public.

A far cheaper industry solution for Australia would have been to have one comprehensive mobile base station network all parented onto one comprehensive existing (wholesale) switched network connected utilising optical fibre as the main mode of bearer medium. Each mobile could then be allocated to the service provider of their choice and the wholesale network could then easily manage the charging of all calls to a relatively small number of wholesale interfaced service providers, and these service providers could then relate their charges to their retail clients. But international de-regulation/ liberating/ trade organisations have forced the Australian public to pay out for the most expensive mobile network model – that of multiple minor base-station networks, and heavily expensive advertising campaigns to compete for a very limited public utility resource.

In instances where SHF Radio links are not financially viable – remote locations with a low payload – then the application of an SHF Radio via satellite is an option. Such applications are now very rare for anything other than mass transmission systems – like TV Network Broadcasting. (I believe the ABC was forced into using satellite as their preferred distribution network to make the sale of Aussat more palatable.) Bi-directional transmission satellite systems are very expensive as the uplink equipment is rare and requires expertise to install.

Community Access TV Network

CATV distribution is the odd one out in that it uses a comparatively very poor standard of technology, and consequently has a high maintenance overhead. This maintenance has been substantially reduced by introducing optical fibre from the head-end to the fan out points which can be taken as the interface between the IEN/IPN and CAN in this case.

Currently there are two major competitive CATV networks and the amount of direct duplication in these networks is not really obvious to most of the population. It is more painfully obvious in the coax distribution that accesses homes where competitive coax networks sit under one another on poles. What is not generally known is that Telstra has a large portion of their cables underground, and the strung up coax cables are in most cases a duplication of these. What a blatant waste of resources – and an eyesore!

Customer Access Network

Having grasped the Technology and IEN transmission charts the Customer Access Network (CAN) chart for transmission mediums is very telling. There are a few trend lines and a direct correlation with the IEN that need to be resolved.

The first trend line is taken by running a line through the rough initiation dates of the various technologies, starting with Unloaded Cable through to Optical Fibre. Although Optical Fibre is used in many CBD situations for most major businesses, it looks as though it is very late in being introduced into the home. The situation is even worse if the CBD only component is removed, and Optical fibre is clearly lagging technologically in being implemented.

The second trend line is taken from the end of non-rural Open Wire through CATV Coax, where I think CATV Coax life will end before 2010 and be replaced by Optical Fibre to the home.

The third line is a horizontal (support) line based on about 2010 (or before) where Unloaded copper Cable will stop and with it amplified copper Cable. These will both be replaced by Optical Fibre, which will coincidentally spell the end of CATV Coax.

ADSL is a late addition and I believe that it will be a stopgap until an Optical Fibre CAN is engineered for Broadband to the home, so its lifespan will die at about 2010 (if not before).

Comparison: CAN – IEN/IPN

In comparing the technologies of both the IEN/IPN and the CAN it is very significant to note the relative introduction dates and their retirement dates of the same or very similar transmission technologies

	IEN in	CAN in	Years Delay
Open Wire	1845	1845	N/A
Unloaded Cable	1865	1925	60
Loaded Cable	1915	1955	40
Amplified Cable	1925	1965	40
Coaxial Cable	1950	1990	40
SHF Radio	1960	1985	25
Optical Fibre	1985	1990	5 / 25

This table shows that as more recent technologies have been introduced in the IEN, they have been followed some years (sometimes decades) with similar technologies in the CAN. It also shows that introductions are converging in time – in general.

	IEN out	CAN out	Years Delay
Unloaded Cable	1925	2005	80
Loaded Cable	1985	2010	25
Open Wire	1970	1990	20
Amplified Cable	1990	2010	20
Coaxial Cable	1995	2010	15
SHF	2005	2020 *	N/A
Optical Fibre	2020 *	2020 *	N/A

This table shows that as transmission technologies have been taken out of the IEN, they have been followed some years (sometimes decades) with similar technologies being removed from the CAN. It also shows the delays are converging with the two remaining technologies being SHF radio and Optical Fibre and both have very similar characteristics from a connection point of view!

Optical Fibre and Radio CANs have significant advantages compared to a Copper CAN:

	Copper Pair	Optical Fibre	SHF Radio
Bandwidth (Mb/s)	1	>50	>2
Distance (km)	~4	>60	>4
Lightning susceptance	High	Low	Low
Lifespan (years)	40	45	35
Voice	Yes	Yes	Yes
Video	No	Yes	Yes
Bi-directional	Yes	No (Yes – urban)	No (may be possible)
Central Battery	Yes	No	No

Conclusions – IEN/IPN

From about 1845 to about 1945 the entire IEN was entirely physical, and virtually based on Open Wire technology. From about 1955 till 1985, the entire IEN moved from an almost completely physical copper based entity to a radio and coax based entity. From 1980 to 1995 the IEN moved from a completely analogue entity to a completely digital entity. It is now largely converted to an IPN with ***virtually all transmission on optical fibre*** and providing considerable cost savings in network occupancy.

Conclusions – CAN

From about 1845 to about 1945 the entire CAN was entirely physical, and virtually based on Open Wire technology. From about 1940 every 10 years there has been a significant introduction of technology in the CAN transmission mediums. Although Optical Fibre is connected to major businesses in the CBDs, virtually no optical fibre connects from the local exchanges to the homes and this will be the next big move (irrespective).

Conclusion – The Future

There is a technology convergence between the CAN and the IEN/IPN for their respective transmission mediums, and they will converge onto Optical Fibre for the mainstream with a small portion on SHF radio. Mobiles will continue to use SHF radio as their medium.

Copper will no longer be the medium of telecommunications choice in either IEN/IPN or CAN areas and will need to be replaced because of age issues and bandwidth requirements by optical fibre in the very near future.

Optical Fibre has the capability of combining CATV, Broadband Internet, and multiple telephony circuits to every Australian residence within 70 km of a 'local' exchange / Central Office. For this to be effected the IPN/IEN/CATV/CAN/ISP needs to be pulled back from the highly integrated and seemingly competitive model that it is now to a simple, government managed, cost-effective, wholesale structured network, so that future duplication is avoided. Retail sales should be through both ASX based companies, and government business. For cost-effective running, the whole telecommunications network should be engineered and managed from a central government body and in this process all mobile radio base stations should be connected by optical fibre (where possible) and not radio links. This will be the future and it is due for completion by 2007 if not before.

Reference Term 2

2 (e.) any opportunities to maximise the capacity and use of the existing broadband structure;

While it might in the first instance seem sensible to maximise the capacity and use of the existing broadband structure, it must be realised that this is already the role of Communications Network Planning Engineers. This statement is self-damning of the so-called 'competitive' model that is currently in place in Australia if these Engineers have been dispensed with, outsourced to people/businesses outside Australia and/or not being utilised to do this role.

The telecommunications industry is one that can make considerable opportunities to minimise its overheads by near full network utilisation (without network or switch congestion), and that ***only comes about by effectively planning and long-term (>5 years) <u>managing the whole national network</u>. Not competitive parts of it, as is the case for now!***

Before any ***'opportunities to maximise the capacity'*** can be approached and realised, it is imperative that the whole telecommunications network needs to be managed/engineered by one Government-based body in a non-competitive environment so that the communications infrastructure can be fully utilised at will, and only through that will the economies of scale that are required be effective. This is, after-all, one of our main infrastructure assets that private and/or multinational businesses have proven they are incapable of maintaining for more than a few years, for the people, and for all business (with or without self regulation).

The problem is that private and/or multinational based business interests are continually undermining the long-term planning, installation, commissioning and maintenance processes through to take and redirect the earnings from well run government based businesses. Their common call is to introduce competition, and we already know that this theory is seriously flawed as it also introduces excessive advertising, excessive management teams, bribery, and political coercion for starters. There is a fundamental business conflict of interest here in that non-government businesses focus on marketing the target government business for investors to ***'steal by law' what is already paid for by the peoples' taxes***. When stolen, the long term planning and preventative maintenance programmes are minimised in favour of extensive advertising and the creation of 'shelved' or 'holding' companies are commonly structured to conceal cash flows away from the original core business to the new 'owners'.

The common result is generally poor network utilisation resulting in excessive network congestion, underutilised networks and soaring maintenance bills, the introduction of consultants to set a new business direction and the process repeats itself.

Further, these non-government businesses drive marketing sales packages that are implicitly confusing to their customers and considerably more expensive than a simple non-marketed product. It is this reasoning that makes non-government business the wrong management team for any national infrastructure and the Broadband access infrastructure in particular.

To compound the matter even further, having more than one competitive telecommunications carrier network in a place the size of Australia with its population is the prime reason why all the broadband networks will never be run at maximum capacity. It is difficult enough to plan for one major broadband network with a reasonably stable population, and have it running at near to capacity on a long-term basis; but to have more than one competing network and hope that they all are running at near to maximum capacity is a fools dream. Network churn will

see to that on a daily basis, so each network has to run with a considerable degree of non-occupancy to take on added customers at will.

If competition policies had not so acutely interfered with the national telecommunications network plan then the existing broadband structure would be working at, or near its maximum capacity. It therefore stands to reason that if you want the ***'opportunity to maximise the use of the existing broadband'***, then the governing competition policy has to be totally revised and structurally changed so that a national government body must manage the wholesale broadband network – it is that simple!

It is my understanding in here that the wholesale network is in effect the major broadband network, including the following:

- ***Telephony***: switches and multiplexers, high capacity optical fibre digital networks, terminal exchange equipment, and the current copper and radio customer access network, including all mobile base stations.
- ***Data/Internet***: IP data switches, routers, digital multiplex equipment, high capacity optical fibre digital networks, and customer data multiplex access networks.
- ***Broadband/Television***: transmission multiplexer and coding equipment, high capacity optical fibre digital networks, cable television distribution networks and terminating equipment.
- ***Network Management***: Metering, Supervision and Monitoring equipment, high capacity optical fibre digital networks, and management/system databases.

What customers are really requiring is minor broadband access to their homes and businesses that basically carries the full services delivered on a Broadband Customer Access Network (BCAN) that is: Telephony, Internet and CATV – all in broadband mode.

The extenuating problem is that the broadband customer access network is in crisis as the coax (CATV) is nearing the end of its low maintenance period and the copper CAN is also nearing the end of its low maintenance period, as maintenance I believe has been pulled back from preventative maintenance to reactionary maintenance.

It is my belief that the so-called ***'Networking the Nation'*** has resulted in an immense waste of otherwise useful resources that could have gone directly into building and maintaining the network. In all cases each interested group had to provide a bid submission (with their very limited knowledge) and in that, produce a business case to 'justify' their immediate service requirement. The reports have shown that a portion of successful bids have gone to social clubs and entities that included the almost key word 'communication' but omitted the actual key words 'network' linked with 'telecommunications' so I really doubt the credibility of the judging panel, and their expenses. Further the processes of advertising, lobbying, extensive meetings, document production and presentation, all combine to drain the resources from the essential core; that of providing a highly functional telecommunications network in Australia. This ***'Networking the Nation'*** was in my opinion a farcical waste of resources and manpower that was maybe well intentioned but ill directed and managed because there seemed to be no overall engineering plan to co-ordinate and standardise the overall program.

So I believe that we now have the situation where most 'competitive' carriers are probably not utilising their networks near full capacity, or well beyond full capacity. We also have five main forms broadband distribution to the customers via various customer access technologies. ***I believe the problem is: Other than Optical Fibre, not any of these current broadband technologies is suitable for the foreseeable future! How do we exit from them ASAP?***

Competitive Broadband Networks

1 Cable Television

This is in my terms a 'poor technology'. This technology has a characteristically high maintenance overhead and a comparatively low maintenance life. Community Access TeleVision (CATV) was developed in the late 1940s by North American amateur radio enthusiasts with minimum expense coax cable and connectors, and strung up on poles with amplifiers at regular and short intervals, because the cable attenuation was so great per unit length. The amplifiers have improved and are now solid state, and have a backwards channel, but the original technology of commercial quality coax cable and connectors is the unfortunate standard of construction that continues till today.

The problem is that the required infrastructure is really an industrial/military application and the existing major components (cable and connectors) have a very limited useful life, before heavy maintenance is required on a regular basis. My guestimation is that the initial installation will last about 8 to 10 years before the system will have to be completely replaced. This gives it a two to three year life span from 2003.

When CATV was first installed in Australia, it was done in a highly competitive environment. Consequently the battling businesses raced their installations to 'pass homes' as a mark of covering territory. (Much like dogs peeing on tree stumps – the environment has been marked.) To my knowledge, there was no such thing as a cost-effective business plan and as I understood it the imperative was to engineer a system that beat the opposition to cover streets and 'pass homes'. ***This must have been a financial windfall bonanza for the for the field installation staff, and technology companies exporting into Australia***, as time was the essence, and it was not uncommon to find a very high percentage of streets with dual cabling in most major cities.

There is virtually no CATV outside these capital/major centres. As I also understand it, the total bill for the initial rollout was well in excess of $4 Billion, that is $4,000,000,000. As said before, a high percentage would be on installation duplication, more on excessive overtime and shift work and multiple management forces. I have no doubt that this competitive farce has cost Australia dearly, in that most of the equipment would have been imported and adding a further $2 Billion to our then foreign debit in duplicated investment is nothing short of reprehensible, and in my opinion extremely irresponsible.

So much for the so-called 'competitive model'! This disaster clearly shows that the economic 'competitive model' is seriously flawed and I again refer you to my first reference "Power Play", as there is ample substantiation there to support these serious flaws.

Because of the relatively poor fabrication standards used in CATV that I have already outlined, and that I expect the maintenance life to not exceed 10 years before corrosion and metal fatigue become major issues, which will result in total system collapse on a regular basis unless regular replacement of cable/connector/repeaters is planned and implemented. In this case CATV should start to show considerable increase in maintenance and replacement by 2005 onwards.

Considering the possibly catastrophic situation that I believe is impending with CATV in Australia, I see that this system (CATV) access network needs to be replaced with an alternative transmission mode other than coax strung on poles, and/or underground in conduits. *(Optical Fibre To The Home (FTTH) is the obvious choice as the replacement.)*

CATV is not a future mode of Broadband to the home, and I am strongly suggesting that the total infrastructure be removed and be replaced by a much better technology (that is Optical Fibre To The Home - FTTH) as soon as financially and technically possible.

2 Satellite

The advantage of satellite is that it has a very large footprint and it can be made to cover almost all of Australia. On the reverse side, it is extremely expensive to maintain, (increased foreign debit) and because we are not on the equator, it has to be maintained (refuelled) far more regularly than those sitting geostationary on the equator – every three to four years. It will not work under less than ideal weather conditions, and that is when it is most wanted. It requires a large transmitting dish at the earth station to send a signal to, and that is very expensive, making it out of the reach of the normal customer. It has a limited bandwidth, or usage so that many users will effectively slow down the transmission rate. It is however good for TV distribution of a limited number of channels.

Most "Broadband" satellite comes with a landline for the upstream as the option to having a large and expensive satellite tracking dish and associated equipment. For an example refer to the equipment located at the satellite tracking station at Belrose/Terrey Hills in Sydney's northern suburbs. The upstream is limited by the physical CAN technology and if it is in a remote location then the data rate will be heavily restricted by Pair Gain System technology.

Considering the possibly that the associated copper based CAN is not properly maintenanced and/or uses PGS to get the distance in remote areas particularly, then the chances of this functioning effectively and on a continuous basis are very low.

Satellite is not a future mode of Broadband to the home, and I am strongly suggesting that the total infrastructure be removed and be replaced by a much better technology as soon as financially and technically possible. (Optical Fibre To The Home (FTTH) is the obvious choice as the replacement for satellite.)

3 SHF Radio (Mobiles)

Mobile phones have been in service for at least 10 years, and only in the last five years have they really hit their straps. The AMPS (Advanced Mobile Phone system) was developed by Bell Labs operating in the 800 MHz range and was the first really commercial mobile phones in Australia, and phased out in 2000. About 1995 GSM (Groupe Spéciale Mobile) was introduced and run on the 900 MHz range. These are analogue with digital decoding and carry seven voice channels per radio channel, have a Linear Exciting Predictive Encoder (LEPT) that works on a 13 kbit/s data rate – hence they cannot modem data and the sound is delayed and noticeably distorted. More recently Code Division Multiple Access (CDMA) has been introduced by employing a 'comb' of radio frequencies CDMA based mobiles occupy the 800 MHz and 1900 MHz ranges and utilise a spread spectrum to minimise field dropouts.

The third generation - 3G - systems are called UMTS: Universal Mobile Telephony System. UMTS provides better voice quality, and higher data transfer speeds. This enables 3G or UMTS to provide video and multimedia services to the users. The frequencies used by 3G / UMTS in uplink (from the mobile phone to the radio station) are in the range from 1900 MHz to 2000 MHz, and in the range from 2100 MHz to 2200 MHz in the downlink direction (from the radio station to the mobile phone). As I understand it the channels are 5 MHz wide, and there can be up to 12 channels per base station.

Considering that there is a multiplicity of mobile base stations in direct competition with one another, they cannot be operating efficiently (all nearly at full capacity), nor provide the

ground coverage that is required. Major changes to the competitive policy have to be made to correct this issue so that they can provide broadband coverage over the required areas.

SDH Radio is the current and future mode of access for mobile phones, but the Broadband conditions on bandwidth requirements for G3 and proposed G4 severely limit the available channels from any base station site. Even with this and the yet to be released "Adams Platform" protocol (refer to Media World Communications Ltd www.mediaworld.com.au) that potentially will dramatically minimise the necessary bandwidth for at Broadband in G3 and possibly G4 mobile phones.

SDH for Mobile phones is a future mode of access communications transport and it will continue to be dominant for the next 10 years. The problem will be multiplied running costs (caused by unnecessary competition of base stations), causing the available cells to be congested and simultaneously underutilised by competing carriers.

I am strongly suggesting that the governing competitive policy be radically changed so that these base stations will be able to work in cooperation with one another instead of against each other as a matter of extreme urgency. For this to happen all carriers would have to hand over their base station and network equipment to a centralised government commission that would eliminate competitive networks and maximise the coverage while minimising the network operating costs. The users will provide the content! ***These Mobile Service Providers would then become the retail outlets for the mobile wholesale product and truly be in competition of a common resource with minimum equipment and bandwidth wastage.***

4 Copper Twisted Pairs

Although twisted pair copper has been around since the earliest underwater (submarine) cables in the 1880s, it really did not get used domestically till the 1930s and 40s in the CAN. Insulated Twisted Copper pairs are the current standard access network technology and almost all residential homes connect with it. Even though the technology is well understood and very mature, it does have serious misgivings.

Because series resistance is predominant at voice frequencies (and below 150 kHz) the voiceband and above impedance is highly dependent on cable length, (and copper diameter) and this impedance is capacitive, not resistive. This issue causes impedance matching problems that usually manifest themselves as excessive echo problems and each connection has to be handled on a case-by-case basis. To compound matters further, the attenuation (loss of volume) for the vast majority of urban designed cables limit the useful length to typically less than 4 km for voice frequencies.

As copper ages it becomes crystalline which makes it hard then brittle with any movement. Wind and/or vehicles on roads nearby assist in shortening the useful life to possibly less than 30 years before maintenance issues become major.

As it is many cables have been in the ground for upwards of than 40 years and experience has shown that most faults usually occur at the cable joints, the Main Distribution Frames (MDFs) or at customer premises plugs and rarely elsewhere. All these places are where the wires are bent, twisted or otherwise contorted – (more crystalline).

Because of extreme competitive pressures to advertise, sponsor, fund shareholders, and otherwise divert maintenance and network rebuilding funds, Telstra has (I believe) a copper based access network that is aged and in serious need of replacement in many (if not the majority of) areas and if funds are not seriously made available then I believe that this access

network in the very near future will be suffering major breakages that may require immense funding to replace and/or repair.

More recently a further burden has been placed on this ageing network to work in a frequency region that it was never designed for (that is – above voice frequencies). Asymmetrical Digital Subscribers Line (ADSL) technology has been introduced to try to provide broadband technology over this copper twisted network. This technology utilises a modem and uses the available bandwidth from about 30 kHz to about 1.2 MHz. Because of the very high attenuation in this frequency range, the modems transmit at high power levels, and without passive splitting filters to isolate these high power levels from telephony, intermodulation can result in excessive noise in telephony circuits. This is not an elegant technology but rather brutal and in any case because of the high insertion loss (attenuation) involved with ADSL, it cannot work beyond 3.5 km, so it is restricted to working in urban environments only.

Customer Access Cable is not engineered for working above voice frequencies and consequently it is not balanced nearly as well as carrier cable was – so using ADSL is literally asking for extremely difficult engineering problems to surface as the uptake of ADSL increases. High frequency crosstalk may be a very expensive issue, where situations like the Casualties Of Telstra (COT) cases may again resurface but this time in the Broadband Internet area. Considering the sensitivity of Telstra and their share price, that has never regained value from the $7.40 days, another round of Casualties Of Telstra (COT) cases involving Internet this time could be catastrophic for both Telstra and the prevailing Government (and the Opposition parties too).

A further issue under the construction banner is the existing Telstra based copper CAN and its connection to the IEN/IPN/SPN. As I understand, only 72% of the available CAN cabling can be connected to ADSL because in all the other cases, (18%) use some form of Pair Gain System (PGS) on them to provide the required voice grade circuits either by cable sharing/switching or through derived circuit creation – or both. Assuming that say 90% of all circuits are urban (that is less than 4 km in length) then the remainder 10% are non urban (that is: rural and remote) and must use PGS, and that means that of the 18% using PGS, the remaining 8% are less than 4 km long and are utilising PGS in urban situations, making about one in 12 unsuitable for ADSL.

In consideration that PGS are slightly cheaper than drawing copper cables underground, then it is a fair guess that the large majority of new housing estates and suburbs will be and are being wired with a majority of PGS, making a large proportion of these newer premises unsuitable for ADSL!

Copper twisted pair is an old technology that has demonstrated that it is unsuitable for the future carrying of Broadband. Further, the 'stick-on' technology of ADSL can only be seen as a stop-gap measure, until it is replaced by the far more elegant technology, that of Optical Fibre to the Home (FTTH).

I am therefore suggesting that the proliferation of the copper based CAN needs to be immediately restricted to a needs basis, and to be replaced by FTTH as a matter of financial and engineering urgency, as copper is now a wasted investment.

5 Optical Fibre

At this stage only some CBDs have optical fibre to them and in most cases that were primarily set up for telephony, not necessarily for Broadband Internet and virtually never for CATV via optical fibre. By now, all major CBD buildings should be set up to have full services network (FSN) facilities on optical fibre, and broadband to all hotel/home unit blocks

as a matter of urgency. By structuring the routers to see each room/home unit and nobody else, then all major CBDs could have the FSN as a matter of course, but the associated equipment needs to be installed and commissioned in front of the 'needs barriers'.

As Australia is tied to the ITU-T for industry based communication standards, and not the haphazard USA based company standards, it is essential that we in Australia continue to be actively involved in the initiation and development of these standards within the ITU-T framework, and actively negotiate standards to implement a Full Services Digital Customer Access Network (FSDCAN) based on Optical Fibre to the Home (FTTH).

5a - Exchange Based Interface

Local telephone exchanges as previously known may well be redundant in a very short time frame. The issue is that the local telephone exchanges are engineered to connect voice circuits with pair copper wire and nothing else. With Optical Fibre as the access medium, the interface cards need to include broadband Internet and CATV, as well as telephony – and I have yet to see any standards that pull all of these together.

The Main Distribution Frame (MDF) may well be another obsolete item as most cables could connect directly to the FSN exchange interface.

To further compound the problem, we already have an unhealthy situation where Telstra owned buildings have been compromised by laws allowing competing telecommunications businesses to install their equipment and competitive networks in those buildings. This practice cripples Telstra's network utilisation capacity and this Senate Hearing Committee needs to eliminate this seriously flawed "competitive arrangement".

5b - Optical Fibre Access Network

To date the copper based twisted pair network is nominally limited to about 4 km max length without the addition of any pair gain system equipment, but in the case of an Optical Fibre access network, the distance can extend to 70 km, so the ability of full services being provided to literally all households is now more real than ever. With this technology the local CAN may well extend to a nominal radius of 50 km via roads and 70 km if straight runs are permitted in outback situations.

With this access network structure, the advent of super-terminal/local exchanges may be the cheapest options with in the order of 100,000 lines per local exchange. This may well spell the end of highly distributed roadside cabinets in urban areas in favour of a passive optical fibre CAN structure.

5c - Customer Terminating Unit

From my experience in establishing the first working telephony on CATV in Australia (in Ballarat), each Home (Unit) will probably have a small mains powered and battery backed up box (about 200 mm x 120 mm x 50 mm) that will connect to an optical fibre and this will be the home interface, providing a full service interface of multiple phones – most likely ISDN or IP, a router linked LAN for the home office, and Video on Demand Cable TV services.

Small businesses will have a similar box that will have several phone lines and/or B-ISDN to connect directly to a PABX at the multiple 2 Mb/s or IP level, as well as Broadband Internet and CATV facilities on demand.

This Network Interface Unit (NIU) is the technology step that Australia can engineer and manufacture and in so doing, leads the world into this new technology.

Conclusion

It has been shown that a competitive network structure does not provide a maximised network usage, and the peripheral costs – advertising, multi-management, lawyers, outsourcing, differing engineering standards and differing technical practices, actually decrease the productivity and inherently limit the capacity. These practices may appear to increase the return on investment of the overall network but in fact they in reality deflect funds away from the core business – that of providing opportunities to maximise the capacity of any telecommunications structure, and minimise the overall operating costs.

We currently have multiple broadband structures that have been outlined here and it is clearly shown that with the exception of Optical Fibre - all other Broadband customer access network technologies should be either severely limited or stopped in the immediate future as these other technologies will not provide an ongoing low maintenance, interoperability and long life that Optical Fibre can provide. ***That is: any investment in the Customer Access Network that does not involve Optical Fibre in the future is a very poor investment.***

Cable Internet, Coax (CATV) has a short life till it moves into the high maintenance part of its life span and ADSL on copper twisted pairs must be viewed as a stop-gap measure only before Optical Fibre replaces all other CAN technologies en-masse as soon as financially possible.

G3 and G4 mobile radio has a wide band usage and to be effective, the mobile networks need to be aggregated and managed by a sub-government Commission to avoid multiple mobile networks congesting the very limited available bandwidths. In the case of Broadband Internet, all Broadband Internet networks and their interfaces need to be aggregated and managed by the same sub-government Commission to avoid multiple Internet networks and this opportunity will maximise the capacity and use of the existing Broadband structure.

In short the only opportunity to maximise the capacity and use of the existing broadband structure is to reposition the competitive businesses away from the various access networks and position these businesses and major Federal and State Government departments as wholesale to retail sales management agencies.

In turn the various access networks should be under the direct management of one non-competitive sub-Government Commission, and in that manner, the opportunities to maximise the capacity and use of the existing broadband structure would be optimised.

Further, as most of these access networks are rapidly reaching the end of their use-by dates, this sub-government Commission would be ideally placed to Tender for the introduction of the most cost effective optical fibre access network solution for the future.

Reference Term 3

3 (b.) any impediments to competition, and to the uptake of broadband technology;

We now live in a world of oversupply where we now expect all services to be provided without delay or disruption. In metropolitan areas, our water is usually always available – not due to competition, but because there is usually an ample supply and a very well engineered reticulation solution. Our phones are usually always available, again not because of competition, but because of a very well engineered network solution. Broadband is available in many urban areas of Australia, and in differing service standards – again not because of competition, but Broadband is a young technology in Australia, and the existing telephony (Narrowband) network access structure is inappropriate for cost effective full services (Broadband) network provisioning.

It should be profoundly obvious to all but the most inept, that the common technologies used for providing access for telephony are not suitable for Broadband distribution. This is spelt out in Reference Terms 1 and 2. An entirely different customer access network infrastructure is an imperative that must be implemented as a priority, and this is the first and biggest impediment to be overcome: with or without competition.

The response as per "Reference Term 1" has already discussed the process where the inter-exchange bearer / transmission network technologies lead the customer access bearer / transmission technologies by several years, but this time gap is decreasing and the two networks are becoming convergent in bearer / transmission technologies. As shown there, copper twisted pair technology is not suitable for Broadband transmission in the customer access network, just like it became impracticable in the mid 1980s for the inter-exchange networks, and that transmission technology was then replaced en-masse by optical fibres, (and some radio point-to-point systems). It therefore stands to reason that the Broadband customer access network must also be replaced by Optical Fibre technology as an immediate imperative, if Australia is ever to become and remain 'clever'.

The fact that we do not have a suitable universal broadband access network structure is the sticking point (impediment) to the uptake of Broadband technology – and competitive forces have invested in vane attempts to get market share in a group of technologies that are not suitable for long distance broadband access. Competitive proof of concept trial and other pilots have been going on for some years. The time for full-scale optical fibre customer access network implementation is already overdue, and our telecommunications industry needs a 'shot in the arm' (or elsewhere) to get it out of its competitive malaise, and back into engineering excellence.

In light of the immense costs for installing a new infrastructure in Australia, we have to avoid the serious failures of the simplistic competitive models used in the past and negotiate an economic model that provides the services to everyone that needs them at a very low cost, includes competition for service packages, and eliminates the unnecessary multiple duplication of services that happened with our telephony, CATV, ISPs and mobile networks.

This implies that currently for the overall telecommunications industry in Australia, there is already a high degree of duplication in both equipment and management, and this cannot be considered to be anywhere nearly as efficient as a sub-Government based Commission managing a non-competitive access network monopoly could be if run on efficient business lines, and consequently, the Australian public are paying a premium to have this competitive modem thrust on them. Multinationals are in effect monopolies by the coercive actions that they persistently take, so there is a blatant dishonesty within monopolies calling for

competition to improve the business standards. Can you imagine the situation of multinationals preaching to have themselves removed from business? I don't think so!

Competitive models are easy pickings for multinationals to plunder, and history has shown that for more than 100 years, though the writings are scarce. The scarcity of these writings is no real surprise as multinationals have actively lobbied, sponsored and supported many areas to make sure that their 'spin' on history is always favourable – so that makes the 'facts' much harder to find. Professor Beder's book "Power Play" on the Electricity Industry in the USA and now the globe, is a testament to the impediments and artificially raised retail prices that competition itself causes.

It has now been proven through the last 20 or so years of experience, that a direct competitive model is ***only good for those businesses selling the manufactured equipment*** and not those using and paying for the telecommunication services. (Considering that we in Australia effectively do not manufacture any equipment in major volume – so we import technology – not a 'clever' country.) Thanks to 'competition' we now also have heavily duplicated broadband networks carrying bulk telephony, bulk data (including Internet) and bulk Television. In Australia we do not have enough overall high-density population to make a competitive network effective in simple economic terms. (Neither do I believe that the USA or Europe have enough population to make simple competition an economic best practice!)

This competitive case is a very simple application of the law of diminishing returns in that, by maintaining more than one telecommunications network in a common geographic area as a competitive model is self defeating, as each competitive network beyond one (1) is in effect a redundant network (and each competitive network costs are roughly equivalent to the existing network before competition). To further compound the issue, each competitive network business will have their own management overheads that artificially raise the operational costs (read user costs) and there is the very real cost of competitive advertising, management, shareholders and sponsorship that further voids the competition argument, as these have to be paid by the end user. An efficient sub-Government business does not have any of these 'overhead expenses' to minimise their development and reinvestment capital.

Conclusion – Part 1

The impediments to the uptake of Broadband come from three main sources:

Competition: In a competitive environment the Broadband access networks will be multi-duplicated (as it has happened many times before both in Australia and elsewhere in the world). *To please both the multinationals pushing to take more of Australia's infrastructure, and to provide a path to provide Broadband access to all households, the competition has to be removed from the physical infrastructure and positioned only between the wholesale and retail parts of the supply chain – as sales marketing teams.*

Technology 1: It has been shown in Reference Term 1 that the converging transmission network components are merging to Optical Fibre. *This means that (other than SHF Radio for mobiles) all other access network transmission technologies need to be curtailed and exited from, as soon as technically and financially possible.*

Government: The Australian Government (and all Opposition parties) need to realise that Optical Fibre is the only suitable transmission medium for the future Broadband Access Network. *This means that the Government needs to make some hard decisions and actually take ownership of the Access Network through a set Government Commission, and through that manage the implementation of the Optical Fibre Broadband Access Network as a high priority.*

Technology 2: For several years many of our Universities have excelled in Optical Fibre technologies, but few have been able to transfer this research into business development. *This means that the Federal Government has to move on local manufacturing Optical Fibre technologies and have the research developed and implemented into this new Broadband Access Network, again as a high priority.*

Vertically Stepped Integrated Competition

An alternative to the current totally competitive model is to make the dominant carrier (say Telstra) the only wholesale (Government/people owned) carrier and let all the retail service and sales be managed by separate companies that can be (and have been) floated on the Australian Stock Exchange.

Another alternative is to create a sub-Government Commission and give it the total authority of the Access Network – in that all existing carriers will have to work through this Authority to connect with their customers. This Commission would provide and manage the access infrastructure and would not be in a competitive marketing model. That way it would do what it does best – without the pressures of advertising, marketing and news abuse. Again, the existing carriers could move into being sales and marketing at a retail level to the Australian public – and these businesses could be floated on the ASX

Big Australian businesses could have their own wholesale interfacing Retail servicing bodies. State and Federal Government Departments already exist and they could be treated as Retail bodies - except that they would not be on the Australian Stock Exchange.

This way the Government manages the security of the essential telecommunication services for defence and other national emergencies, and the general public have services provided to them at very low competitive rates in products and packages that retail bodies are now expert in producing. Big Australian businesses would have a unit of their organisation that provides retail services to their own divisions, and interfaces directly with the wholesale supplier – at wholesale rates.

State Government based corridors could be utilised for major communications bearer systems, and the cross subsidy from this would be a handy windfall for all State Governments. So major communications bearers could follow rail and power easements and the country rural and remote areas would then have a telecommunications infrastructure that would equal that in major cities. This would be the necessary catalyst to decentralise people from the major cities, back to rural environments, as then Broadband communications would not be the major issue that it is now.

The telecommunication retail businesses would move from a broad mix of staff to basically a sales and marketing business with a legal/engineering wholesale interface to Telstra or a sub-Government based Commission, and sales marketing people at the sales end to the real people.

With this model, the Retail bodies would place their bulk order network requirements with the Wholesale body and that would give our country a chance stop continually blowing out the Balance of Payments, by much better management of our existing and required plans for our telecommunications resources.

Non-Competitive Savings

As an example, in the mid 1990s a particularly elegant Australian developed relational (associational) computer program (Netmap) was utilised to ‘groom’ the Telstra network and

better utilise existing network structures. I believe that about **$1 Bn was saved in a year** through this effort, and considering the hefty multiple duplications that exist in our so-called competitive networks today, savings should be in the order of more than **$5 Bn per year** through minimising unnecessary link / path duplication and utilising links / paths far more effectively.

This wholesale/retail model would let the various parts of each organisation to do what they do best, that is the retail companies would service the customers needs and produce competitive packages that would meet the requirement of their customers. In the case of Government bodies, their client interface would directly manage the client issues and the wholesale interface would manage their medium term planning (a few years).

The economies of scale that would be applicable will virtually stop ongoing purchases of overseas purchased telecommunications equipment for at least a year, and **this could save Australia about $7 Bn.** The heavily duplicated mobile networks that exist could be much better repositioned to properly cover the major city and suburban geographies. Already economies of scale have meant structural changes to Community Access Television (CATV) holdings such that the content is effectively single sourced, and it should follow that the engineering management of this network be brought under one management to minimise overheads, reduce and eventually eliminate duplicated routes, and minimise the overall operating costs.

Australia's Economic Balance

The article "***Electronics as an Economic Catalyst***" by Professor Trevor Cole, in Electronics News August 2003, is clearly embarrassing to the Australian economic forecast in that this article does not focus on the age old "mining industry and primary produce" as the future backbone for the ongoing strength in Australia – but points out that the Balance of Payments is now worse than it has ever been - primarily because of our immense imports of technology (even though we are nationally flush with IT expertise – but don't use it to our advantage, and we have no manufacturing and software development to speak of to export)!

When it comes to Information Communications and Technology (ICT), according to Professor Cole, we are not even on the map with an almost invisible 0.5% of our Gross Domestic Product (GDP), where the better (developing) countries have in the order of 8.0% as their GDP. In other words we have to increase our ICT by a factor of at least 16 times (or in percentage terms, by 1600%) to normalise our GDP. Only a radical change can assist here!

We have the answer shouting at us and it will solve both the Balance of Payments (BOP) problem, and our Gross Domestic Product (GDP) problem and it staring us in the face, and when (and if) the Government / Opposition parties wake up to it then it will also solve our lacklustre business in the Information Communications and Technology (ICT) sector, and provide us with a world class telecommunications infrastructure again.

The answer is to engineer and manufacture all our Optical Fibre requirements for the National Broadband Customers Access Network (NBCAN) in Australia – with Australian based companies. The second part is to engineer and manufacture the Exchange Interface Termination and Customer Premises Terminal Ends (Network Interface Unit – NIU) in Australia – again with Australian based manufacturing companies.

This is NOT a tall order - just a change in mindshift from looking for the cheapest worldwide manufacturer (which cannot provide equitable incomes for their workers wherever they are). ***The simple fact is if we have this (or any) equipment manufactured offshore, then we effectively un-employ people in Australia and that is a bad/dumb national business policy.***

This means that we would manufacture the optoelectronic interface chips in Australia, and not import them – even if they cost more to manufacture here. These chips will have a global customer base and they should be required worldwide – not just Australia. Compare that as a commercial possibility to the farcical episode of an Australian company that manufactured a short run of special Fast Fourier Transform (FFT) chips for one radio telescope in Australia.

Professor Cole shows us in his article that our ratio of ICT exports to imports is about 31%, when it should be greater than 100%, and this is a golden opportunity. This situation exemplifies the fact that Australian ICT business needs to manufacture and export more than 300% of what it does now, and to do that we need a radical change in the Tendering and Manufacturing policies to remove this impediment.

When it comes to Optical Fibre for the Broadband CAN, this ***MUST*** be engineered and manufactured inside Australia and we ***MUST*** export this technology to stabilise our BOP for ongoing ICT imports.

My guestimation is that for urban conditions a single fibre use in full duplex will work well, and for distances nominally greater than 10 km, two fibres working in directional mode. With this in mind then the nominal cables would be 1 fibre for urban drops, 2 fibres for non-urban drops, 10, 20 and 100 fibres for distribution from heads to cabinets / pits. As the loss in single mode cables is in the order of 0.25 dB/km or less then the entire CAN could be passive and extend upwards of 70 km from an Exchange / Head to a customer premises (Network Interface Unit – NIU).

As I see it, the technology problem will be the time taken to perform optical splicing. This is an immediate issue, and like always, if the problem is actively tackled then a suitable solution is usually forthcoming in good time, making this program a reality. We already have a large amount of optical expertise in our Universities so we have the advantages at our doorsteps.

The ITU-T is actively involved in discussions and proposed recommendations for optical fibre based access networks, and Australia should be heavily involved here.

The underlying impediment is that longer term planning has been placed at a low priority, and that customer service has been given a very high priority, and it is the effective longer term planning that ultimately makes a telecommunication infrastructure efficient – not the immediate service resolution. To avoid repeating this pitfall it is imperative that an Australian based engineering team specify and manage to programme of projects to create a nationally structured Optical Fibre Customer Access Network for transporting Broadband to all Australian households. With this in place the uptake of Broadband will be assured.

Conclusion Part 2

The impediments to competition is the current multi-duplicated provision of current mobile (GSM, G3 and soon G4), ADSL arrangements and CATV access networks. In other words the impediment is itself – caused by a competitive economic model! So we will have to have a solution that is outside the models used to date and it has been proven that the simple tabled ‘competitive’ model is not nearly as efficient as a Government based monopoly.

As this may be too difficult to digest, then a compromise has to be sought. The competitive forces need to be in business, but they don’t need to have equipment, and they have all proven that when in competition the maintenance of equipment falls down the priority list, well below sales advertising and extensive political lobbying. – (One Tel was a prize example of a company without equipment – but in the wrong ‘competitive’ structure!)

The compromise proposed is that:

- All existing and new customers access network becomes the property of a sub-Government Australian Commission. With this managed by one non-competitive body, the business efficiencies will be much higher than for a competitive situation.
- This Commission would manage the network's growth, development, maintenance and structure, and provide these services to all retail Sales Service Providers at a wholesale level.
- The Retail Sales Service Providers would package the wholesale services as retail services to their customers, and as such, they would be on a level footing with each other – depending on the contracts they negotiated at the wholesale level.
- Major Federal and State Governments would form their own wholesale – retail service supply arrangements. Their IT departments would manage their communications at the wholesale level, and have full security of their networks.
- Major businesses would form their own wholesale – retail service supply arrangements. This way they would not have to go through a third party to have their services provided at a wholesale level.

Further Impediments to the Broadband Uptake

Beyond our immediate major urban cities, the transmission infrastructure is essentially 'flat rings' and spurs designed primarily for telephony and not for Internet and/or CATV, so even if there was a large uptake in Broadband Internet, the only areas that would immediately benefit would be the greater urban cities.

Open interconnected rings of very large bandwidth eg 10 Gbit/s Dense Wavelength Division Multiplexing (DWDM) for most inter-nodal networks will have to be the order of the day and these will have to extend out and through to virtually every country town with populations exceeding 10,000 people.

Further, to provide minimum delay and speed downloading, a network of mirrored web caches may be required to hold the most recent web information and minimise the long traffic paths that would otherwise drag down the overall networks response times. This facility is near a reality as computers with massive Hard Disk Drives are relatively cheap these days.

Conclusion Part 3

These further impediments drive home the need for one governing non-competitive body / Commission to totally manage the national telecommunications wholesale network. It also points out that the current telecommunications network arrangement although designed primarily for the major urban areas only does not have a substantial network outside there.

Considering that an optical Fibre Customers Access Network will provide the infrastructure for virtually any house in the Australian mainland (and Tasmania) to have and use Broadband facilities including Internet, CATV and telephony, the possibilities of a vastly different network structure may be required and with it, facilities to make the response times much faster than they would be if the uptake was virtually 100%.

Considering that many people in country towns still use video-cassettes as their main source of evening entertainment, the social structure may change and they may move to a mix of CATV and Internet as happens in most major urban areas with current CATV and Broadband facilities readily on hand.

Reference Term 4

4 (a.) the current and prospective levels of competition in broadband services, including interconnection and pricing in both the wholesale and retail markets;

We already now know that competition and terrorism are equitably evil and the real reason for introducing competition is to set up business structures that will divert return funds from reinvestment in the core product and place these funds in shareholders and foreign owned multinationals. If you still doubt this then read again the stated reference "Power Play" by Professor Sharon Beder. The speed that Chiere Blair (a Barrister in her own right and the British Prime Ministers wife) had her comments on the causes of terrorism hushed up by several political forces speaks for itself on the accuracy of her statements and the power of multinationals to control the media.

The economic competitive model is seriously flawed for all but equally sized micro economic situations – like a house auction. Even in these cases the model is flawed by floor bidding from agents intending to destabilise the level playing field. When it comes to megalithic electrical, pharmaceutical and telecommunications companies for starters, working under the same interpretation of the same laws, with the same legacy equipment, this economic competitive model has never been a reality.

The current telecommunication competitive model in Australia provides a very wide range of services at both the wholesale and retail market arrangements, but because the current Access Network for Broadband does not exist outside some major urban areas where CATV, ADSL and telephone services are simultaneously available, this exposes further flaws in the actual existence of a current and prospective Broadband access network, and therefore a service. (This is covered in Reference Terms 1 and 2.)

With this severe limitation in the equation, and given the expected blowout in costs to continue maintaining the current access technology (as outlined in my response to Reference Term 3), then the argument of this Reference Term (4) is superficial.

Reflecting back on Reference Term 3, it should now be obvious that behind the front of 'competition' is the tactical separating of once powerful and well structured Government managed service organisations into much smaller sales focussed businesses lacking engineering processes and spending heavily on advertising become easy prey for internationally based corporations to plunder at the Australian public's expense.

To circumvent this issue, the national telecommunications infrastructure needs to be placed back into Government hands under the control of a Commission and this Commission must manage the engineering of the product up to and including the wholesale level. The competition players and other Federal and State based government based services would then be the wholesale to retail merchants and through that, the prices of the telecommunications commodities would be 'self regulated' as the pricings of the government retail levels would be public knowledge and the competitive players would be free to compete. – That is a level playing field, and anyone or business that complains about this structure is not seeking to play competition fairly!

While ever there is a competition for customers where each competing retail company has to provide substantial network services (ISP facilities, network interconnect and/or network infrastructure etc.) then this is never going to be satisfactory.

Conclusion

Under the current (seriously flawed) competitive model, Broadband services (possibly ADSL) are provided on a profit model where the only way that cheaper comparative services are provided is by the deliberate restriction of Internet based services, (through deliberately structuring in network and switch congestion, and other activities pushed through from marketing forces to limit, delay and/or restrict the level of actual services available to the customers.

In other words the 'more competitive' Internet Service Providers must be running in a state of heavy congestion and have an absolute minimum of face to face (telephone call centre) customer response service, and/or else also be providing pop-up advertising so that they can run a profitable trading/business model.

In Professor Beder's book "Power Play" there is a comparative reference to the cost of lighting a half a bridge from two electrical power companies – each providing equal power to half the bridge. These comparative rates show that the Canadian Government monopoly electricity pricing is about 23% that of the USA Company electricity. As the analogy between the USA based electricity power companies' business models and the now Australian telecommunications companies business models is far too close to ignore, then it stands to reason that with a well run Government enterprise – free from the politically meddling hands of multinationals, Australia's telecommunications service costs would be less than 50% of what they are now. This is mainly due to the comparative inefficiencies of the 'competitive' model that bleed the core industry of its funding.

Under my proposed 'Vertically Stepped Integrated Service' model, each Sales Service Provider (SSP) would be providing the same service standards for network and switch congestion. The customer face-to-face service would be the difference. Depending on the negotiated costs for wholesale provision, each SSP would have a differing baseline for their profit margin.

The only way to secure a well engineered Broadband Customer Access Network that uses consistent and low maintenance infrastructure for all Australia, is to create this infrastructure through a Federally funded Commission, and engineer, manage and maintain this infrastructure as that, and not as a commercial entity. This body would NOT be involved in the retail level, but would secure the contracts at the wholesale level and as such they would not be under pressure from the undermining efforts by multi-nationally based forces to liberate / free-up / and/or open the market to competitive forces.

With this Commission in place, it would then be in the right place to selectively purchase existing telecommunications network infrastructures and through that the cost-effective approach of managing and developing the whole Australian telecommunications network in a non-competitive environment can then again be realised, with very significant savings to our currently out of control Balance of Payments debits.

Reference Term 5

5 (d.) the impact and relationship between ownership of content and distribution of content on competition;

The current CATV competitive model is in a phase of 'self healing' by Optus handing over the soon to be high maintenance CATV network to Foxtel/Telstra, and the content of these two are now closely aligned. This is a step closer to one largely non-retail body managing the physical network (coverage) and the other largely retail body managing the content, and through that the cost is minimised – for a time.

The three C's of telecommunications are mentioned here (Cost, Coverage and Content), although the cost is about to escalate as the Coax goes into its end of life high maintenance phase, the coverage is strictly only main capital cities, and the content is heavily USA biased.

I have absolutely no doubt that every news item is carefully scrutinised before airing to make sure that the underlying agenda is aligned with a paid business proposal, and this agenda is monitored to see how much sway it has with the majority of the more fickle masses. Most news items (or 'stories') have a spin on them to support a business and/or political theme (or more likely, both). Inevitably what is the acceptable 'norm' is gradually shifted over a number of years to an extreme situation and this creates dangerous political situations.

Professor Sharon Beder in the book "Power Play" shows how the "think tanks" of the electrical power generation industry in the USA (often named as a *something* Institute) introduced several devious strategies to change the governing Laws to help themselves to the people's infrastructure. When I did Economics, there was a lot of discussion about "COMPETITION", but very little about "EFFICIENT GOVERNMENT BUSINESSES" mainly because (according to Professor Beder) these think tanks have, over several decades, systematically removed references about efficiency of Government businesses, and also removed references of the downsides of competition, raised the fear of a socialist state, and obviously adjusted University courses through selective funding and other 'assistance'.

So with that background in place and in the knowledge that these same think tanks have developed strong political and business ties, and created "Industry Associations" to honour the work that they have done, it must be fair to say that I now am at the very least extremely sceptical of glowing environmental awards to businesses, people touting competition as good business practices and any news item, Editorial or 'feature story' in any form of media.

Unfortunately for Australia, the greed of the predominantly USA based multinationals has infected our politicians to the point that over the last three decades our politicians have been systematically bought out and through that, they have passed Laws in Australia to greet liberalisation / competition and trade organisations. As we have now seen the consequences, our infrastructure that was owned by the people through the paying of their taxes and managed by our Governments has been and is being systematically opened to 'competition', crippled and made not-dominant and then sold off to major multinational companies that are predominantly USA based.

The content of Foxtel is very heavily weighted with USA material and themes. This is clearly out of alignment with our population, which is predominantly Anglo European and Mediterranean based – but the Laws have been systematically changed over decades to reduce Australian content!

Conclusion

Those business that own a large amount of media content will do whatever they can to maximise their return on investment, by distributing this content by whatever means become necessary, and screening the content.

Competition and media content are a couple of the business based tools that predominantly USA based multinational companies use as their leverage to force their entry into efficiently run foreign government businesses, bring these businesses to their knees, then they systematically steal what is rightfully that foreign countries infrastructure assets.

The Australian people have already paid their taxes to provide all major infrastructure and now have had their telecommunications and power infrastructures stolen by foreign (usually USA based) multinationals, and we are about to lose our roads, railways and airport infrastructures, unless the Government and Opposition parties wake up from their petty party rivalry malaise and act for the Australians who voted for them, and not for the multinational businesses that have compromised them.

The Australian Federal Government and its Oppositions must continually legislate to increase the amount of Australian based content in all media distribution outlets. The spin-off for this sensible legislation is increased Australian employment, an improvement in our international Balance of Payments, and a more stable GDP. And that makes Australians healthier!

Final Remarks

For this technical advancement in our country it will be necessary to pull together a team of experienced people and through that, lead and direct the activities necessary to make this advancement happen. I am willing to be on that team, and/or work with that team in any capacity to reach many of the goals sought from this Terms of Reference.

Malcolm Moore
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