Response to the

Regional Telecommunications Review

Discussion Paper

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1. Background

The Dot Points in paragraph 3 on Page 4 that describe the Government's multi-layered approach are of a major concern because they appear to be all about enforcing a competitive regime to squabble over which competitive business can provide the least service and claim Government funding, instead of utilising the inherent benefits of an infrastructure business to maximise the telecommunications services in synergy with the existing networks and available technologies.

Contrary to what is stated in paragraph 8, telecommunications technology is not 'fast pace' but currently (2007) industrial grade telecommunications equipment has a technology life of about 22.5 years, and is exponentially decreasing at about 0.9% in lifespan per year each year. (See Appendix B for the explanation.)

Paragraphs 9 and 10 - The Equitable Access statements in the Discussion Paper places the onus on people living long term in rural and remote areas to give their decisions on what telecommunication services they consider to be significant. This approach is deceptively striving for a minimum answer primarily because these people have a telecommunications service level that is based on much lower telecommunications service standards – because rural and remote areas do not have nearly the same level of telecommunications infrastructure as in urban situations.

The onus must be turned around to those in capital city urban areas to say what they consider to be significant, and this should be the standard of telecommunications for Equitable Access. With this frame of reference, it provides the opportunity for capital city businesses to move out of capital cities into regional and rural areas, and for urban people to follow by moving out of the capital cities and into regional, rural and remote premises.

It therefore follows that it is ***not a case of having telecommunications services that are significant to people living in non-capital cities in Australia***, but it is a case of having ***capital city equitable telecommunications infrastructure well beyond capital cities in Australia, so that equivalent business opportunities are available outside capital cities***; that is – in the bush!

From my decades of experience in telecommunications I know that the prime reason why equitable telecommunications services in non-capital cities is simply that the technology for wideband (for example 10 Gb/s) digital transmission over distances more than about 30 km using Optical Fibre is impractical without resorting to Synchronous Digital Hierarchy (SDH) based equipment – and this technology is coming mainstream on line in the next few years. It is not just a so-called a simplistic flicking of a switch to programme, purchase, install, commission and assimilating this equipment into the existing network infrastructures; as this process takes two to five years.

Paragraphs 11 and 12 contain a number of schemes, initiatives, obligations and programs that are all screaming out that the Competitive Regime is not and has not been working; because if it was – then there would be absolutely no need for any of these schemes, initiatives, obligations or programs. ***It therefore follows that the Government enforced Competitive Regime is totally the wrong framework for (regional) telecommunications policy – and it is hindering; not aiding the situation of putting equitable telecommunications beyond capital cities.***

Q 1.1 What telecommunications services do you consider most significant for regional, rural and remote areas?

The table below provides the telecommunication services that I consider most significant for Regional (non-capital cities and suburbs, towns, villages with premises located within a 3 km radius of the local telephone exchange), Rural (premises located radially beyond 3 km less than 7 km from local telephone exchanges), and Remote (premises located more than 7 km from local telephone exchanges) areas, in relation to Urban (capital city and suburbs) areas.

Service	Technology	Geography	Standard
Telephony	Fixed Wire CAN	Urban	Available at every household
		Regional	Available at every household
		Rural	Available where practical (1)
		Remote	Not practical
Telephony	Fixed Radio CAN	Urban	Not practical
		Regional	Not practical
		Rural	Available where practical (1)
		Remote	Available where practical (2)
Telephony	Mobile Radio CAN - CDMA	Urban	Available
		Regional	Available
		Rural	Available
		Remote	Available where practical (3)
Telephony	Mobile Radio CAN - WCDMA	Urban	Available
		Regional	Available
		Rural	Available
		Remote	Available where practical (3)
Internet	Fixed Access CAN ADSL 2+	Urban	Available
		Regional	Available
		Rural	Impractical
		Remote	Impractical
Internet	Fixed Radio CAN - WCDMA	Urban	Available
		Regional	Available
		Rural	Available
		Remote	Available where practical (2)
Internet	Fixed Radio CAN – point-to-point	Urban	Business only
		Regional	Business only
		Rural	Available where practical (2)
		Remote	Available where practical (2)
Internet	Mobile Radio CAN - WCDMA	Urban	Available
		Regional	Available
		Rural	Available
		Remote	Available where practical (3)
Internet	Hybrid Fibre Coax CAN	Urban	Available in Capital Cities
		Regional	Impractical
		Rural	Impractical
		Remote	Impractical
Internet	Fibre to the Home CAN	Urban	*Available everywhere*
		Regional	*Available everywhere*
		Rural	*Available everywhere*
		Remote	*Available everywhere*

Table 1a. Comparative Regional Services based on CAN Technologies

Pay TV	Hybrid Fibre Coax CAN	Urban	Available in Capital Cities
		Regional	Impractical
		Rural	Impractical
		Remote	Impractical
Pay TV	Satellite to the Home CAN	Urban	Available where practical
		Regional	Available where practical
		Rural	Available where practical
		Remote	Available where practical
Pay TV	Fibre to the Home CAN	Urban	*Available everywhere*
		Regional	*Available everywhere*
		Rural	*Available everywhere*
		Remote	*Available everywhere*

Table 1b. Comparative Regional Services based on CAN Technologies

Footnotes for Table 1

(1) Rural fixed wire access required cable being 0.64 mm diameter, not 0.40 mm diameter as used in urban situations. In some cases it is far more practical to provide a fixed radio (point-to-point) connection to the premises.

(2) Radio fixed access CAN is capable of covering up to about 30 km, and its usually limited by the earth's curvature or the terrain (hills / valleys).

(3) While mobile access in rural areas should cover all farms within a 7 km radius of the telephone exchange / mobile base station tower, beyond 7 km, the arterial roads should have mobile phone coverage.

Fibre to the Home (FTTH) has been shown in italics, as this is the emerging technology that has a range that I believe will be about 60 km from the local telephone exchange.

I do not believe that Internet on Power Lines has a use beyond LAN in a premises, or as an OOB network for meter management.

This table is based entirely on CAN technologies and their capabilities, and it closely reflects the CAN that is in place in Australia.
More details on CAN technologies and their capabilities is on my Website at:
http://www.moore.org.au/comms/04/04_comms.htm

Table 1 above provides much less than 50 % of the connectivity situation. It has to be realised that simply having the CAN infrastructure is not the panacea, and that there has to be a considerable Inter-Exchange Network (IEN) infrastructure that is imperative before these services can connect and carry traffic, and have any form of equity with that in capital city / metropolitan / urban situations. Some people use the USA-based term "Backhaul" and confuse this with both IEN and CAN structures.
More details on IEN technologies and their capabilities are on my Website at:
http://www.moore.org.au/comms/05/05_comms.htm

Unfortunately the ACCC works on reports that it has commissioned and over several years, these reports continually get the connectivity model totally wrong by not including the IEN infrastructure, and incorrectly assuming that some CAN

infrastructures (eg Mobiles) are total separate connectivity networks. Consequently the ACCC rulings are skewed, and these incorrect assumptions have been ineptly adopted by the DCITA, with disastrous consequences for Australian Rural and Remote communities. More details on the basics of the IEN connectivity model are on my Website at: http://www.moore.org.au/comms/01/01_comms.htm

Q 1.2 Do you consider that your current need for these telecommunications services is adequately met?

For Capital City-based people: If your business had to relocate to a regional or rural centre, what standards of telecommunications would you consider essential?

We have a critical situation in Australia where almost all the business is carried out utilising high capacity telecommunications infrastructure, and because this infrastructure is not equitable out of non-capital cities, businesses cannot decentralise from the major urban areas to regional cities, towns and more open working environments. This has impacted on housing costs making city housing far too expensive and country housing a poor economic choice.

Q 1.3 What telecommunications services do you consider will be needed to meet your needs in the future?

We have a serious need to populate the north-west of Australia but Telstra's communications infrastructure facilities are stretched. Todd's telegraph needs to be totally revamped with very high capacity (4 * 10Gb/s) Optical Fibre systems and the link past Guam needs to be considerably hardened if our desired Internet speeds are to be supported. This strategy could provide the necessary infrastructure to link Darwin to Port Headland – Geraldton – Perth.

In simple engineering terms:
It is imperative that all regional cities and towns have FTTH available for all businesses premises within 15 km from their local telephone exchanges, and that the IEN that connects with these local telephone exchanges has the reserve hardened capacity to and from the nearest two state capital cities, to carry sustained upload and download speeds in the FTTH CAN exceeding 100 Mb/s with an occupancy of not less than 0.35 E in these CANs.

It is imperative that all regional cities and towns have FTTH available for all non-business premises within 15 km from their local telephone exchanges, and that the IEN that connects with these local telephone exchanges has the reserve hardened capacity to and from the nearest two state capital cities, to carry sustained upload and download speeds in the FTTH CAN exceeding 100 Mb/s with an occupancy of not less than 0.20 E in these CANs.

Q 1.4 What would you consider to be 'equitable' access to telecommunications services for people in regional, rural and remote Australia?

Equitable access is the situation where any capital city based business could be relocated into a regional or rural centre and have the essential telecommunications infrastructure so that it functioned the same as before.

For fixed access services it will be FTTH as describes in the response for Q 1.3 above.

For mobile access services it will be WCDMA running G3 covering all regional and rural areas as defined in the footnotes to Table 1 above and for remote situations, all roads between regional / rural centres shall be capable of communicating with G3 mobile phones.

2. Competition

Q 2.1 Do you consider competition to be important for telecommunications infrastructure and/or services in regional, rural and remote areas?

The sweeping statements in paragraphs 1, 2 and 3 are full of praise for competition between businesses, and completely fail to mention that technology advances over the decades, which I believe have actually been the prime reason why end user prices have been falling.

Telecommunication equipment /infrastructure is expensive to purchase, so it is installed for the long term (20 to 50 years) and removed when the maintenance costs make it uneconomic to keep operating. Technology advances come from people 'building a better mousetrap' over several years if not decades, which is a far cry from competitive sales and marketing which usually has a three to nine-month lifetime. In this light, competition and technology are mutually exclusive, and process changes due to ageing technology replacements cannot be attributed to competition.

We currently have a regulatory framework that has yet to prove that the Competitive Regime is actually working. Recently, I believe the Minister for DCITA stated that the competitive regime has caused a drop in end user costs of about 26% since 1997, about 3% per year accumulative over the 10-year period. On a recent Saturday morning I did a quick calculation of some savings made through regular infrastructure technology advances over the same period and I was surprised to find that there was an apparent drop in end-user costs of about 73.5%, or about 14.2% per year accumulative. The substantiation of these figures is included in Appendix A.

For those that are sceptical when reading this; even if my in-exhaustive figures were discounted by an incredible 75%, then the drop in end-user costs would end up with about 26% over the same 10-year period – meaning that the unsubstantiated drop in end-user costs due to competition is at the best 0.0%. In other words, it appears that the Competitive Regime is actually pushing end-user prices up – not down!

Taking this to the next step – the inflationary pressure caused by the Competitive Regime is in the order of +265% over 10 years, or +10.8% per year accumulative, not –3% per year accumulative as stated from Government sources. This clearly shows to me that the Competitive Regime probably has never worked and the regulatory

framework that supports the Competitive Regime appears to be very misguided. If this is the case, then very big changes are urgently required to remove this competitive telecommunications infrastructure disaster – which I believe is the prime cause why regional, rural and remote end-users are never being properly addressed and also explains why the USO was introduced in 1982 to cover up the gross shortcomings of the then proposed Competitive Regime.

Q 2.2 How can competition be better encouraged in regional, rural and remote areas?

With the realisation that the Competitive Regime is a major failure – but nobody will stand up and say that because so many parts of the business economy are tied to it; the most prudent approach would be to encourage competition in the reselling of wholesale telecommunications services as retail packages, and discourage competitive infrastructures by encouraging Telstra to purchase all the competitive infrastructures – and manage the telecommunications infrastructure as an infrastructure business – not a competitive business.

This way the infrastructure revenue would be focussed on maximising the growth of the infrastructure and not on advertising, legals, sponsoring and dividends. The obvious answer is that there should be one Australian telecommunications infrastructure business to provide the infrastructure, and a number of competitive resellers to retail the bundled products. (Monopoly is a word that is inclusive with the competitive regime – and exclusively not any part of an infrastructure regime!)

Paragraphs 4 and 5 reflect the 'skew' that the ACCC have forced on Telstra in declaring parts of Telstra's infrastructure to be available to competing infrastructure providers to use at will. I believe that this act of stupidity is hard to rival as not only is Telstra's competitive position compromised, but unnecessary duplicate equipment is introduced into Telstra's exchange sites by the competitors, the wiring is unnecessarily made rather complex (read time consuming and prone to error), the purchasing power of both camps is diminished (economics: the law of diminishing returns) so the overall equipment is more expensive, now because dedicated IEN routes are required for a remote Points of Presence (PoP) valuable IEN route capacities are lost, there are now multiple billing sequences, and multiple expensive managements to be paid.

Add these up and the winners are the (USA / multinational) equipment suppliers – and I know that because I worked as a Bid Manager for Nortel Networks in their Alternate Carriers group and personally saw the waste caused by the competitive regime, and paid for by Australian end-users.

In my opinion the Australian Government needs to review and repeal the Competitive Regime as a matter of economic urgency, and 2009 is too far away.

We have just witnessed what I believe is an almost unbelievable situation where the Minister for DCITA has just signed off on providing a huge amount of funds to further cripple Telstra – which – by the way is in the middle of providing the essential IEN infrastructure for the regional, rural and remote communities so that G3/WCDMA and Broadband Internet can be provided to these areas. Telstra's infrastructure will take about five years to complete and assimilate into the existing IEN and should be complete in 2009.

The funding that the Minister provided has gone to a competitive infrastructure provider (Optus/Elders) which will at the best somewhat duplicate what Telstra is already in the middle of providing! It is almost incomprehensive to me that Australia will now have a highly redundant rural and remote competitive (not synergetic) infrastructure that will have double maintenance and double management fees over its lifetime, costing more than twice than if one infrastructure was provided. Truly, I despair at the continual and unrelenting immense waste of our GDP in the name of competition – which – I repeat has yet to prove that it has any value for end-users.

3. Consumer Protection

Paragraphs 1 and 2 reflect the widely known assumption that the requirement for fixed line access phones is now falling and the void has been taken up by mobile phones. A sizable chunk of this 11 M lines is into PABX / Business.

From an Engineering aspect, what is not generally known is that VoIP requires high priority IP to work successfully, and this is in diametric contrast to the original needs of Internet for Data purposes, and VoIP is working because there is excess capacity, and the services are not yet running in network congestion mode. Further, much of Australia's IEN now utilises VoIP technology as it is easier and much cheaper to switch between Districts and Regions, and these particular voice routes over IP are priority set to handle voice – not data.

Paragraphs 3, 4, 8, 9, 10, 11 and 12 repeat what was said in paragraphs 11 and 12 in the Background. These nine paragraphs contain a number of schemes, initiatives, obligations and programs that are all screaming out that the Competitive Regime is not and has not been working for decades; because if it was – then there would be absolutely no need for any of these schemes, initiatives, obligations or programs, all of which are like expensive make-up over a weeping infestation – fixing the symptoms and not the causes.

Q 3.1 Do you consider access to a fixed telephone service to be important?

The imperative is that any person can call emergency services, or call somebody when in need or distress. As the coverage by mobile phones since 1985 has become almost universal, the need for public telephones has almost zeroed and it is becoming highly evident that public telephones have reached their use-by date.

The engineering problem is that mobile phones exhibit a far higher Quantisation Distortion Unit (QDU) value than that of a wire connected fixed line service. The source of the problem is the LCEP algorithm with the encoder/decoder in mobile phones, and the main problem is in GSM based phones where the QDU value is about 5.5, compared to a Digital IEN with wire CAN giving about 0.5 QDU. The working limit was 10 QDU so GSM to GSM mobiles failed the basic test.

With CDMA and WCDMA (G3) mobiles the QDU factors are much lower as the allowable bit rate is much faster – hence the imperative to move from GSM to WCDMA as soon as possible.

Fixed access phones would have been phased out much earlier as they have a far higher overhead than mobile phones (except that competitive infrastructure providers

have paid very dearly for Mobile Base Station locations, and the Spectrum Management Authority charged ridiculously high prices for spectrum allowance) negating the end-user value for customers. These two examples show very clearly how the competitive regime is a major blocker against providing telecommunications services and why the end user prices are artificially inflated to cover extortionate competitive costs.

If a G3 phone was packaged as a T200 phone then I would have no problem in moving over to the new technology – providing the call costs were not inflated.

Q 3.2 Have you experienced difficulties in obtaining adequate access to a fixed telephone service?

No – but I live in a well-established area within Sydney where genrefication has not taken its toll on available CAN infrastructure.

Q 3.3 Do you consider fixed telephone services in regional, rural and remote Australia to be reasonably available?

Based on the available technology of the times, the answer is 'yes', but this does not quantify that telecommunication services outside capital city areas are 'equitable' with telecommunications services in capital city areas.

Q 3.4 Have you recently experienced any serious or extended service faults or difficulties?

Based on the available technology of the times, the answer is 'no', but this does not quantify that telecommunication services outside capital city areas are 'equitable' with telecommunications services in capital city areas.

Q 3.5 Are the current priority service arrangements for people with a life-threatening illness adequate and accessible?

I am not in a position of knowledge in this area to answer this question

Q 3.6 Is access to a payphone important to you?

No, and access to a payphone has never been important to me since about 1967.

Q 3.7 Have you experienced difficulties in locating, accessing or using a payphone?

No.

Q 3.8 Do you currently make use of new technologies such as voice over Internet protocol (VOIP), such as Skype or Engin, for your voice calls?

Directly no, but indirectly I do, as much of the IEN infrastructure uses VoIP in its long distance transmission protocol to radically reduce bearer load, so we all use the technology in the right place. Currently Internet on the fixed CAN is not engineered for VoIP, and it should not be used in VoIP mode.

Q 3.9 Do you consider that the increasing availability of VOIP services is becoming an adequate substitute for your fixed service?

Please explain to me how VoIP is not a fixed access service – when the IP is connected through a fixed service CAN?

Q 3.10 Do you consider that the consumer protections in place allow for delivery of adequate fixed telephone services and payphones in regional, rural and remote areas?

No. The consumer protections are there to stop competitive businesses from neglecting non-commercial services. If regional rural and remote telecommunications was an infrastructure business then the services would be provided as a priority, and the notion of consumer protections would be totally unwarranted.

There are two prime reasons why some decades ago, services to non-commercial (rural and remote) areas were poorly serviced. The first reason was available technology and that impacted on the second; distance (low population density).

Until very recently, most telecommunications was engineered for generally highly populated areas and the need for long distance CAN communications was almost an 'Australia only' issue. Compared to Europe, the Australian population density is very low, and centred in the south east pocket of the continent. FTTH will change all that but Telstra has been hindered by the DCITA and the ACCC from rolling this out.

Q 3.11 Have you had a need to access the services offered by the Telecommunications Industry Ombudsman (TIO)?

No

4. Targeted Funding

The prime purpose for targeted funding is to purchase votes for an upcoming election to remain in power – nothing more – nothing less. The thinly veiled shroud of 'encouraging competition' (confusion) for improved services etc is, in my opinion, nothing short of corruption at a very high (Ministerial) level.

I have worked as a Forward Network Planning Engineer in Telstra, and I know the survey work that has to be done years in advance services are provided to an area. The haphazard spot funding to push through infrastructure that has been on the books without the necessary network synergy causes very expensive side issues that have far heavier negative impacts than if the politicians had never been involved.

One of the normal functions of a Forward Network Planning Engineer is to be involved with surveys to determine the public's telecommunications requirements some years before installation and commissioning of the CAN and its associated IEN. With privatisation, this work was shanghaied by marketing people with a very short-term focus, and then this work was neglected as the marketing people lacked the necessary professional telecommunications infrastructure expertise to translate these requirements in to IEN and CAN structures. Also

some equipment providers aimed at providing a turnkey solution that sold the equipment – but did not directly address the customer requirements.

Mobile Phones

Paragraphs 2 and 3 clearly demonstrate the huge waste of resources caused by the competitive regime. Not only are their multiple mobile CAN structures that directly overlay each other (making all but the biggest mobile CAN almost totally redundant), but the associated IEN infrastructures are also highly redundant, and then there is Gateway interconnect, billing and multiple maintenance and very expensive multiple management fees. Add these up and we have a mainly metropolitan network that has a fair coverage, still with a large number of black areas, many base stations with far too many antennae and base station equipment for the areas, and a massive management costs along with immense advertising and marketing expenses – all of which impacts the end-user funds. This is economic madness!

Please explain to me how, after the Australian Government has just announced that they have a $15Bn budget excess, they can justify auction selling more Spectrum at extortionate costs to competitive infrastructure providers? This spectrum should be made available at zero cost (so as not to be inflationary) as a true incentive so that Telstra as the primary telecommunications infrastructure provider can provide low cost wholesale telecommunications services for competitive telecomms resellers to end-users in the areas allocated with the spectrum!

Paragraphs 7 and 8 further exemplify the proof that the competitive regime is totally dysfunctional and is costing far more than it is worth. I have yet to see any evidence to support that notion that these programs for competitive partial infrastructure are synergetic with ongoing mainstream network infrastructure initiatives.

I believe that paragraph 9 is totally incorrect, as a synergetic IEN infrastructure consisting of several large SDH-based transmission systems forming about 44 large intersecting Optical Fibre rings as suggested by me in a supplementary submission to the DCITA in 2005 http://www.moore.org.au/senh/06/06C_SynergeticApproach.pdf would have addressed this issue as a much cheaper engineering solution, and provided facilities for Broadband Internet and Pay TV for at least the next 20 years into all regional, rural and remote areas in Australia.

If this fundamental network planning initiative has been taken on board, it would take until about 2011 before this technology could become effective. Be aware that in 1998, 625 Mb/s SDH was becoming mainstream technology, and in 2008 10 Gb/s SDH will become mainstream technology. I know this through professional experience in working as a Project Engineer with Nortel Networks commissioning the New Zealand South Island main optical fibre ring for Clear Communications in 1997; and in 2007 working as a Project Engineer / Supervisor with Silcar Communications managing the installation and commissioning of several transmission and IP based IEN infrastructure projects in Telstra.

In the past two years, Telstra has already trenched in several thousands of km of optical fibre cable in rural and remote areas in preparation for installing a large number of intersecting SDH rings as the IEN foundation for committing to install a large number of 3G mobile base stations as CAN in rural and remote areas across Australia. To put it mildly, I was absolutely gobsmacked to hear that the Minister for DCITA had recently (September 2007) wasted about $2 Bn of Gross Domestic Product (GDP) in giving this funding to a competitive infrastructure business (Optus/Elders) to put in a non-synergetic network in a geographic area that

commercially will not be sustainable – where that Minister must have known that Telstra is well on the way to completing a comprehensive 3G CAN and thick IEN to do just this.

Having one infrastructure provider put in a high capacity IEN and CAN in a large geographic area that commercially is unsustainable without much of this IEN also used as a synergetic throughput and backup for mainstream inter-capital high capacity IEN infrastructure is bad enough; but actively funding a second infrastructure provider to put in a duplicated network will render both rural and remote networks to now run at a tremendous financial losses is national economic culpability. The Westminster System has a lot to answer for.

Q 4.1 Do you consider mobile phone coverage in regional, rural and remote Australia to be reasonably available?

With the massive hinderances imposed by the Federal Government's competitive regime and with available technologies, the answer is still 'no' – but there would have been a much larger and thicker geographic mobile coverage in Australia by now, if one telecommunications infrastructure business had been given the clear go-ahead without ministerial interference and undermining to install, commission and assimilate one comprehensive and synergetic IEN and mobile CAN.

If not, which areas do you consider need priority attention and why?

The prime economic area that needs priority attention is the immediate removal of the competitive regime as this idealistic economic farce is causing all Australians to pay out for at least two telecommunications network infrastructures, and for the advertising war between these infrastructure providers.

I have already mentioned about the farce of duplicate IENs and CANs in regional and rural remote areas that beggars economic rationality.

Q 4.2 Is adequate service being delivered through the combination of targeted funding for additional mobile phone coverage and satellite phone subsidies?

No. And targeted funding should be immediately stopped – as I believe that this act is nothing short of bribery and corruption at a Federal level.

Q 4.3 To what extent do you consider that the available range of mobile phone service and charging options meets the needs of people in regional, rural and remote areas?

The geographic coverage (range) of mobile phones is an Engineering issue relating to the operating frequencies, and the positioning of Mobile Base Stations – and this has been severely compromised by the Federal Government policy in continuing with the competitive regime – making infrastructure investment in all but urban areas rather unpalatable. The competitive regime needs to be immediately removed and replaced by an infrastructure regime with one telecommunications infrastructure provider.

To compound this situation the Federal Government's policy for the Spectrum Management Authority (ACMA) to auction off at the highest possible price, the mobile radio specific spectrum in geographic areas is one of the prime reasons why

mobile calls are charged so much. Considering that the Federal Government has apparently holding a budgetary surplus of about $15 Bn; this spectrum should be freely available to one national telecommunications infrastructure provider, and that provider should be making these wholesale services available to many competitive resellers to retail at comparable prices.

Q 4.4 In what sorts of circumstances would you consider that advanced mobile services may be able to provide an adequate substitute for fixed voice and/or broadband services?

Mobile phones have been marketed to the business and under 35's as the tiny, do everything personal communication interface, while the landline-based phone has been marketed as the table or wall phone. The prime technological difference in the CAN, and with very little lateral thinking it would be rather easy to engineer a table or wall based phone (like a T200) with a radio (wireless) CAN interface – without all the gadgets and fancy screens – but provide the facility for extended memory dialling.

This approach would immediately replace the necessity for copper wire CAN and provide the end users with phones that are normally stationary – but can be mobile, have large keypads, and a user-friendly handset. If this was made to work with WCDMA then it should have the capabilities of G3, and therefore have a 100BaseT LAN connection and/or USB connection on it providing the interface for local home computing / entertainment.

Who needs Sales and Marketing when we have Engineers?

Broadband and Internet

Information Communication Technology (ICT) is a transport infrastructure; like road infrastructure, rail infrastructure, shipping ports and airports, and these all work together to provide a total transport infrastructure. An earlier Government got it right with the Department of Transport and Communications. Education is a separate infrastructure portfolio that is associated with the Arts, and not remotely associated with Transport and Communications infrastructures! Somehow paragraph 1 ties these two diseparate entities!

Paragraph 3 demonstrates that the Internet has an equal use requirements in capital city and regional, rural and remote areas – and that clearly identifies that 'equitable' means exactly that – irrespective of the geographic location, the expected Internet service speeds and connection is expected to match that in major capital cities. Paragraph 3 makes a mockery of PM Howard's push that the bush telecommunications are 'up to scratch' – and Telstra should be sold off.

I have already stated my position referred by paragraphs 4, 5, 6, 7 that a plethora of incentive schemes are a weak cover-up of the seriously failed competitive regime. If the infrastructure regime was in place then none of these so-called incentive schemes would be necessary, or the reports, or the need for "Australia Connected" – and why was it not before? Or the "Clever Networks" program – and is not this simply interfering with a national coordinated infrastructure programme – so there is absolutely nothing clever about that!

Paragraph 8 talks of a pornographic filter programme that is the end-users responsibility, when on an infrastructure basis a few well programmed routers at the gateway IEN levels as

described in http://www.moore.org.au/comms/06/06_comms.htm would provide clean Internet to those that are prepared to pay the little extra. This cost would be about $ 0.4 M, compared to the Government competitive regime outlay of about $87 M, which works out to be about 200 times cheaper than the Government initiative, provides a telecommunications infrastructure with a much lower usage (and therefore a much higher throughput).

If 10,000 customers took this up at a cost of my initiative for $2 per month, then it would pay for itself in 20 months, but the saving in network usage would pay for itself in a few days or less. With the $87 M Government initiative, with 10,000 customers paying $2 per month it will take about 4350 months (362 years) to break even – or about 4.5 human lives! I am not an accountant, but frankly the Government initiative on porn does not stand up.

Q 4.5 Do you consider access to, and the reliability and quality of, Internet and broadband services to be adequate in regional, rural and remote Australia?

No – if it was good enough then this review would never have been required.

If not, please outline the issues and locations you consider need priority attention and why?

The location of the problem is Federal Parliament / Government Departments and the issue is the Competitive Regime that needs immediate scrapping in favour of one Infrastructure Regime to manage all telecommunications infrastructure.

Q 4.6 Do you consider that the Australian Government programs provided to assist consumers and small businesses to make effective use of higher bandwidth services have been effective and appropriately targeted?

No – and this is not their field of expertise. I believe that most of the Government incentives and other hand-outs have the this process back-to-front and I believe that these programmes are demeaning to those people.

It should be the Governments priority to maximise funding directly to Telstra Infrastructure (without strings attached) so that they can get on with their business of providing a unified cost-effective and synergetic Inter-Exchange Network beyond major capital cities, and provide appropriate CAN infrastructure from all regional and rural centres to all premises, so that the wholesale services from this infrastructure can be onsold through retail resellers to the general public.

Networks are expensive and there is a high equipment entry fee, so economies of scale along with 24/7 high occupancy is a mandatory priority – and competitive infrastructures cannot come near matching a unified infrastructure approach. This is a prime reason why Governments have unwittingly wasted so much revenue on targeted programmes as these targeted programmes are the symptoms of the wrong reference model being utilised in the management framework.

Q 4.7 Is the availability of computers an issue in rural, regional and remote areas?

No – these are white goods, like cars, refrigerators, and farm implements.

When regional, rural, and remote areas begin to have equitable telecommunications and IT infrastructure to that in major capital cities, then those people can become more IT focussed, then competitive resellers will make (personal) computers more readily available.

Q 4.8 Do you consider that broadband is an important enabler for the delivery of better health, education, community, and emergency services in regional, rural and remote Australia?

Broadband Internet is one of the essential infrastructure components for electronic transport (communications). The applications for Internet based communications are limited by the Government's competitive regime in stifling Telstra from providing this essential infrastructure to regional rural and remote communities in Australia in a timely fashion as technology advances become available and cost-effective. Much of this topic has been covered at http://www.moore.org.au/comms/07/07_comms.htm and at http://www.moore.org.au/senh001.htm for earlier Senate hearings - that heard but did little to act as their hands were tied.

5 Targeted Responses for Particular Groups

Remote Indigenous Communities

The leading paragraphs in the discussion paper discuss a series of programs to address the symptoms – not the causes, and this simply perpetuates the problems – rather than resolving and terminating the problems for 'particular groups'. With this backward thinking it is also making perpetual work for the ministerial departments, and that is reprehensible. This situation is a failing of this infrastructure business (the Government ministerial department for DCITA), and competitive businesses thrive on this sad failing as they line up to suck money out for programs that are still born and on permanent life support.

Q 5.1 Do you consider access to fixed, pay and mobile phone services to be adequate in regional, rural and remote Indigenous communities?

If the needs for indigenous communities match those for the services provided, then the answer is 'yes'.

If not, which areas do you consider need priority attention and why?

Could you please provide the answers to the responses of the surveys done with indigenous communities over the last (say) 30 years in regards with their telecommunication needs, and this can then be matched against the available technologies of those times? Then we will have an informative answer that shows whether the needs are increasing or decreasing, where the changes are and how well the needs are being met with available technologies.

Q 5.2 Do you consider that Internet access is adequate for regional, rural and remote Indigenous communities?

Could you please provide the answers to the responses of the surveys done with indigenous communities over the last (say) 30 years in regards with their telecommunication needs, and this can then be matched against the available

technologies of those times? Then we will have an informative answer that shows whether the needs are increasing or decreasing, where the changes are and how well the needs are being met with available technologies.

If not, which areas need priority attention and how might access be reasonably provided?

See above for the answers.

Disability

Why am I not surprised that because this area is commercially low value – there is little push from the competitive regime to force Telstra to do more than it is already doing – and doing very well. It is a real pity that the competitive regime cannot see that telecommunications infrastructure per-se is commercially a low value product, and that the big money (profits) is in retail reselling - and that is where the competitive regime should have its focus.

It makes common sense to me that all those on disability pensions should have their Internet 100% subsidised and that they be logged via a 'clean' IEN-based router as this would remove access to all known porno sites. "CleanPool" has a nice marketing name, doesn't it! This way the traffic would be quite low and the overheads quite low too making it commercially very viable – and community conscious. This takes the connection cost away from those that can least afford it and provides a highly affordable level-user playing field.

Affordability really comes down to opportunity cost, and I would be rather surprised to see most disadvantaged people with the fastest computers, and be working these computers and Internet hard. From my experience in the Australian Seniors Computer Clubs Association around 2002-3, most seniors had hand-me-down computers and it was a major struggle to move them from dial-up onto Broadband. As it was then British Telecom came up with a nominal $30 per month marketing figure to get people to move over – and the world followed suit (so they could free-up the telephone IEN and move customers onto the much cheaper IP network).

Q 5.3 Are telecommunications and Internet services adequately available and accessible for people with disabilities living in regional, rural and remote Australia?

Could you please provide the answers to the responses of the surveys done with people with disabilities living in non-urban areas over the last (say) 30 years in regards with their telecommunication needs, and this can then be matched against the available technologies of those times? Then we will have an informative answer that shows whether the needs are increasing or decreasing, where the changes are and how well the needs are being met with available technologies.

6. Consumer Education and Awareness

Training

Australia has a national Technical And Further Education (TAFE) infrastructure, which the current Federal government has been doing everything in its subversive power to derail and replace with a privatised system of education called Australian Technical Colleges. Instead of getting on board with the TAFE and fostering it to be truly national with nationally coordinated courses from central sources, the Federal Government has let TAFEs remain

basically regional with very little coordination and support. I have tutored in TAFE and seen this first hand.

TAFEs have the essential infrastructure for the mainstream people that have not picked up on Internet and electronic commerce, and computer based work practices – and this is where the funding for Internet education and training should be focussed.

The other alternative is Seniors, and most regional and remote areas have an ageing population – so this is highly relevant. Seniors – like indigenous communities have special needs in training and these people cannot learn in the TAFE / School environment. I know this as I have taught hundreds of Seniors to use computers for about two years and I was the National Development Manager for the Australian Seniors Computer Clubs Association for about 18 months – developing the right environments for seniors to learn computing and Internet applications.

Telecommunications Consumer Information

This is an interesting war: It is in the primary interests of competitive businesses to confuse their clientele – just like lions on the prey before they go in for the kill. And it is in the interests of infrastructure businesses to provide customer awareness – just like parents caring for toddlers to prevent them being killed.

Q 6.1 Is access to IT training and technical and customer support adequate in regional, rural and remote areas?

This is not my area of expertise

If not, how can it be improved?

Utilise TAFE, ASCCA, public schools and universities as appropriate as this is why they are there in the first case.

Q 6.2 Is adequate information available for telecommunications consumers?

Yes – but not in a form that is simple

If not, how can it be improved?

Utilise the services of the Consumer Telecomms Network (CTN) and other similar information bodies.

7. Other Issues

Q 7.1 Bearing in mind the issues raised in this discussion paper, do you consider that people in regional, rural and remote parts of Australia currently have equitable access to telecommunications services?

No – and the competitive regime is hindering the equitable situation

Q 7.2 Is there any other matter that you would like to raise and which you feel has not been covered by this Discussion Paper?

Yes – the urgent need to remove the Competitive Regime from telecommunications infrastructure in Australia and replace it with an Infrastructure Regime.

If so, please outline the issue.

The Failed Competitive Regime

While I agree with the sentiment of a telecommunications Internet infrastructure being "Universally Available", there are obvious competitive business constraints that will do everything in their power to prevent this – and it comes under the guise of "managing the interests of our shareholders" – which basically means minimising the investment expense to provide a service and charge as much as possible to maximise the profit – for the profit of the shareholders. This is exactly what competitive business is all about – it is not about nationally managing long-term infrastructure with minimised profits; as that is what Infrastructure Business is all about (but you will have to look very hard to find this topic in Business / Economics courses).

So the answer here is patently clear: If you want Broadband Internet to be Universally Available, then the infrastructure provisioning ***must not*** be operated under a competitive regime, because with competitive businesses; this is the least cost-effective method and extremely inefficient as it gives the least possible 'bang for the bucks' (service delivery to the end users).

The combination of suitable technologies to manage both distance and terrain have become both available and affordable in the last 20 years, and these technologies are well known to Professional Engineers. For cost-effective telecommunications infrastructure solutions, it is imperative that both the Inter-Exchange Network (IEN), and the customer Access Network (CAN) networks are not geographically duplicated as this more than halves their cost-effectiveness while more than doubling their overhead costs.

Maximum Internet download speed limitations are determined by relatively simple engineering mathematics relating to the IEN and CAN capabilities and it is these relationships that determine the overall minimum expected download speeds for customers. The maximum download speed is determined by the smallest bottleneck between the sending device and the receiving device; and in most cases for Australia, this is in the international network. The other two major bottlenecks are the rural and remote IEN throughput capabilities, and the Customer Access Network CAN capabilities.

One of the prime roles of Professional Telecommunications Network Engineers is to manage the forward network planning process in consultation with the public so that customers' needs are both anticipated and accounted for some years before the current network is expanded/augmented or re-engineered. This was done through a series of inputs including customer impact surveys and the Engineers turned the requests into reality in a timely manner with available technology.

Since about 1982, this Engineering role has been largely hijacked by the competitive regimes' political interests pushing for short-term, un-coordinated quick-fixes that inevitably are far more cost-expensive than a national coordinated approach. The privatisation of Telstra caused most of these Engineering positions to be replaced with advertising and marketing

people who did not have the necessary expertise, background and long-term experience and that is why there is a management disconnect with customers.

The Best Practices Farce: It is the ethic nature of Competitive Businesses to cheat, lie, steal, rape and plunder – without fear or favour, and without morals. This is why we have restrictive laws and Police to enforce what is not allowed by law. Self-regulation in this environment has a very short half-life, and anybody that thinks that self-regulation works in a competitive environment is extremely naive!

Self-regulation does work very well in an infrastructure business environment – but it appears that the Australian Federal Government is totally against having its infrastructure managed by infrastructure businesses. It is my understanding that the push for the competitive regime comes very heavily from the World Trade Organisation / World Bank, and if that is the case then I very much query their motives as I cannot see any advantages for Australia.

Best Practices is a flow-on from Total Quality Management (TQM) where comparative processes were analysed to narrow the variation in every product, which in turn provided the highest Quality products with the least defects. Simply by mapping out a process onto a flow chart it becomes obvious that there are Quality steps that can be taken to dramatically improve cost-effectiveness and this process works extremely well in infrastructure businesses. Unfortunately in competitive businesses, the goals are much shorter term (often as short as a year), and it usually takes in the order of 18 months for the first round of TQM to show benefits – hence the push for competitive businesses to call in consultants to rush introduce Best Practices from another situation – and inevitably the real gains are rarely harvested!

Where To From Here

The Federal Government of the day has to realise that the Competitive Regime has had its use-by date and it has proven to be a rather foul 'White Elephant' that we can all do well without – particularly in the telecommunications infrastructure business.

The Competitive Regime has negatively impacted on the advancement of Australian telecommunications infrastructure since about 1982 and there has been a large number of enquiries, reports and surveys that have all 'pussy-footed' about the situation but have never asked the direct question of what direct benefit has the Competitive Regime actually produced, and if so then give the figures, and directly compare these to that obtainable by the Infrastructure Regime. So I have resorted to making my own figures and these are given in Appendix A, and the results are outlined here:

To date the lame cry has come from the Minister of DCITA to say that the Competitive Regime has to be complimented for dropping end user call costs by an amazing 26% over the last 10 years (or in normalised terms about 3% per year accumulative).

Appendix A shows unequivocally that telecommunications equipment replacement at the end of its useful life (typically about 20 to 30 years) by newer technology equipment has had a far greater effect on dropping end-user costs than so-called competition and that technology advances have exclusively caused at least a 73.5% drop in end user costs over the same period, compared to 26% as claimed by 'competition'.

This startling fact with supporting documentation makes a laughable mockery about competition having any negative effect on end-user prices, and it demonstrates further that the

competitive regime is responsible for at least a 10.8% per year increase in end-user costs - not a 3% decrease, and this is a immense 13.8% per annum accumulative differential!

With these facts now facing the Government of the day,

- **it is high time that the telecommunications competitive regime is immediately scrapped, and**
- **be replaced by a infrastructure regime to synergetically coordinate the maximum use of telecomms infrastructure in Australia, and**
- **provide this wholesale to competitive telecomms resellers that can onsell the services to the public at comparable retail prices.**

The competitive regime would then have its rightful place out of infrastructure, and only in competitive reselling.

Since 1982 when the Davidson Report was commissioned as the vehicle to introduce the competitive regime into Australian telecommunications there has been massive advances with telecommunications and IT technologies that have more than addressed the apparent need for competition to raise service standards.

The Davidson Report has been reviewed but not in the light that the competitive regime is dysfunctional and is actually causing massive unnecessary infrastructure expenditures, and delaying a synergetic / coordinated telecommunications infrastructure in Australia – and this shows by the continuing reviews, and a plethora of ad-hoc 'fix-its' from the Government with a prime purpose of funding to buy votes.

If you look a little closer you will find that the introduction of digital exchanges into Australia in 1980 did not produce huge improvements in service standards until optical fibre was installed in the Melbourne-Sydney route in 1987. I know this because I engineered the structure of that OF cable between Sydney and Seymour (Victoria), and I worked as an Engineer in Long Line maintenance. The reduction of overhead maintenance callouts and costs together with the massive improvements in service standards was nothing short of stunning – and this had absolutely nothing to do with competition, and everything to do with replacement of end of life obsolete technology.

With technology advances in the mid-late 1980s, it became possible to remotely interrogate and reconfigure digital switch's translation tables and this technology advance opened the way for far cheaper centralised switch maintenance practices along with greatly improved service standards associated with network switching, and as a Senior Engineer in Network Investigation I know that much of this pioneering technology work was done by the specialist Engineers and Technicians in this area.

The nationally coordinated drive by Telstra HQ to standardise a wide range of State-based CAN specifications and repair practices in the early 1990s normalised and narrowed the wide range of CAN technologies into a mainstream that had resounding financial and engineering/overhead savings. Old technologies were nationally phased out because their maintenance costs were too expensive, and I was on many of the Working Groups – all of which were technology focussed – not competitive focussed!

Appendix A – Savings due to Technology Life Cycle Replacement

Timeframe	Base Year	From Technology	To Technology	Service / Bandwidth Improvement Ratio	Technology Area	% Tech. Area Affected	Technology Cost Savings / Bandwidth Improvement (%)	Technology Accumulative Improvement Figure %
1995-1995	1995			1	All	100		120.12
1995-2000	1996	PDH	SDH	2	IEN	20	10.00	108.11
1995-2000	1997	Dial IP on Cu pair	ADSL IP on Cu	2	CAN	15	7.50	**100.00**
1995-2000	1998	HFC (Pay TV only)	HFC with Internet	1.8	CAN	20	8.89	91.11
1997-2002	1999	SDH STM-1	SDH STM-4	4	IEN	20	15.00	77.44
1999-2004	2000	SDH isolated	SDH with SCN	1.5	IEN	40	13.33	67.12
2000-2005	2001	ADSL iosolated	ADSL with OOB	1.3	CAN	30	6.92	62.47
1998-2003	2002	ISDN (2 Mb/s)	VCTS (155 Mb/s)	50	CAN	5	4.90	59.41
2000-2005	2003	CCS7	CCS7 on IP	4	IEN	35	26.25	43.82
2000-2005	2004	Digital Switching	IP Routing/Switching	3	IEN	40	26.67	32.13
2002-2007	2005	GSM	CDMA	1.5	CAN	30	10.00	28.92
2003-2008	2006	ADSL	ADSL 2+	1.5	CAN	8	2.67	28.15
2005-2010	2007	HFC with Internet	HFC dig TV	1.4	CAN	20	5.71	**26.54**
2005-2010	2008	HFC with Internet	HFC with Broadband	4	CAN	20	15.00	22.56
2005-2010	2008	1 Gb/s OF	10 Gb/s OF	10	IEN	10	9.00	20.53
2005-2010	2009	STM-4	STM-64	16	IEN	10	9.38	18.60
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The excerpt of the associated Excel Spreadsheet shows that over several years, replacement technologies have caused massive bandwidth improvements, and/or greatly reduced maintenance overheads in specific technology areas (simplified into Customer Access Network – (CAN) and Inter-Exchange Network (IEN)), together with a minimal extra purchase costs – and in some cases much cheaper. These savings / benefits have been calculated to give a percentage savings / bandwidth figure totally based on changed technologies and excluding competition.

With 1997 as the base date these savings have then been multiplied on each other to give an accumulative improvement figure like a golf score but starting at 100.

By 2007, the normalised technology accumulative improvement figure is 26.54. The means that due to replacing end of life cycle technology with new technology, the network utilisation gains and overhead cost reductions had reduced the end-user / overhead costs by 73.46%.

Hard-line economists who have been brainwashed into thinking that competition is the prime reason for improved business performance will remain highly sceptical of these figures as this philosophy does not sit comfortably with what they had been taught. The painful problem for these brainwashed economists is that these figures are reasonably traceable and these figures do therefore do have a solid basis to stand by themselves. That then brings into very serious question the validity of figures bandied about to praise competition.

The natural approach is to disbelieve the savings due to replacing end of life technologies with new technologies, and an easy way to do this is to 'discount' the technology figures so that they become far less significant. This is radical – but we are trying to save the faces of thousands of so-called eminent economists that have made their living through praising the unquestionable virtues of the Competitive Regime!

Let us assume that the gains through technology advances are double overstated and therefore the technology-based figures should be reduced by 50%. This would give the eminent economists some face:

Base Year	From Technology	To Technology	Technology Cost Savings / Bandwidth Improvement (%)	50% Discounted Savings	Technology Accumulative Saving
1995	0	0	0.00	0.00	109.36
1996	PDH	SDH	10.00	5.00	103.89
1997	Dial IP on Cu pair	ADSL IP on Cu	7.50	3.75	**100.00**
1998	HFC (Pay TV only)	HFC with Internet	8.89	4.44	95.55
1999	SDH STM-1	SDH STM-4	15.00	7.50	88.39
2000	SDH isolated	SDH with SCN	13.33	6.67	82.49
2001	ADSL iosolated	ADSL with OOB	6.92	3.46	79.64
2002	ISDN (2 Mb/s)	VCTS (155 Mb/s)	4.90	2.45	77.69
2003	CCS7	CCS7 on IP	26.25	13.13	67.49
2004	Digital Switching	IP Routing/Switching	26.67	13.33	58.49
2005	GSM	CDMA	10.00	5.00	55.57
2006	ADSL	ADSL 2+	2.67	1.33	54.83
2007	HFC with Internet	HFC dig TV	5.71	2.86	**53.26**
2008	HFC with Internet	HFC with Broadband	15.00	7.50	49.27
2008	1 Gb/s OF	10 Gb/s OF	9.00	4.50	47.05
2009	STM-4	STM-64	9.38	4.69	44.84

But again the 50% technology discounted figures speak for themselves and they show that technology replacements still far exceed the gains made by competition and now this is getting embarrassing! *Can the truth come out?* So lets cut the 50% discounted figures by another 50% - to make the technology based cost reductions appear miniscule!

Base Year	From Technology	To Technology	Technology Cost Savings / Bandwidth Improvement (%)	75% Discounted Savings	Technology Accumulative Saving	Technology Accumulative Saving %	Claimed Competitive Saving %
1995	0	0	0.00	0.00	104.52	-4.52	
1996	PDH	SDH	10.00	2.50	101.91	-1.91	
1997	Dial IP on Cu pair	ADSL IP on Cu	7.50	1.88	**100.00**	**0.00**	**0.00**
1998	HFC (Pay TV only)	HFC with Internet	8.89	2.22	97.77	2.23	3.00
1999	SDH STM-1	SDH STM-4	15.00	3.75	94.11	5.89	5.91
2000	SDH isolated	SDH with SCN	13.33	3.33	90.97	9.03	8.73
2001	ADSL iosolated	ADSL with OOB	6.92	1.73	89.40	10.60	11.47
2002	ISDN (2 Mb/s)	VCTS (155 Mb/s)	4.90	1.23	88.30	11.70	14.13
2003	CCS7	CCS7 on IP	26.25	6.56	82.51	17.49	16.70
2004	Digital Switching	IP Routing/Switching	26.67	6.67	77.01	22.99	19.20
2005	GSM	CDMA	10.00	2.50	75.08	24.92	21.63
2006	ADSL	ADSL 2+	2.67	0.67	74.58	25.42	23.98
2007	HFC with Internet	HFC dig TV	5.71	1.43	**73.51**	**26.49**	**26.26**
2008	HFC with Internet	HFC with Broadband	15.00	3.75	70.76	29.24	28.47
2008	1 Gb/s OF	10 Gb/s OF	9.00	2.25	69.17	30.83	30.62
2009	STM-4	STM-64	9.38	2.34	67.54	32.46	32.70

The bold numbers in the above table appear to tell the story that internationally a massive lie in economics has been promulgated for some decades. Even with discounting the technology based gains by an enormous 75% the result still comes in at about equal to that claimed by the competitive regime. In this bad-case scenario, the technology-based gains easily account for the apparent gains claimed by eminent economists who have praised the competitive regime.

With the situation now clearly showing that technology-based service gains are real and very substantial, and are reasonably accountable (and this is a short list), then the Technology Accumulative Improvement Figure of 100:26.54 as given in the first table is highly realistic.

In direct contrast, the Competitive Accumulative Improvement Figure is (100 – 26) or 100:74. In other words, the Competitive Regime can claim a mere 26% while the Technology / Infrastructure Regime can claim 73.46% reduction in end-user costs and/or improved network capability over the same timeframe.

It is now very clear that through using the Infrastructure Regime, the overhead costs would have dropped by 73.46%, but the Competitive Regime have let the overhead costs drop by only 26%, and we know that all of this and more is entirely due to technology replacement. So in other words there is direct inflationary pressure caused by the Competitive Regime in the order of 185% over the 10-year period, or at least 10.8 % per year/ per year inflation – not negative 3% per year / per year inflation as claimed. The difference is almost 14% per year/per year and this is huge, and cannot be ignored – no matter how embarrassing it is.

It is now very clear to me that the Productivity Commission may need to completely revise its philosophy to factor in technology changes as the major reason for telecommunications productivity and not competition. The Productivity Commission will have to comprehend that telecommunications infrastructure operating in a Competitive Regime is extremely inefficient and not highly efficient as taught in schools and universities.

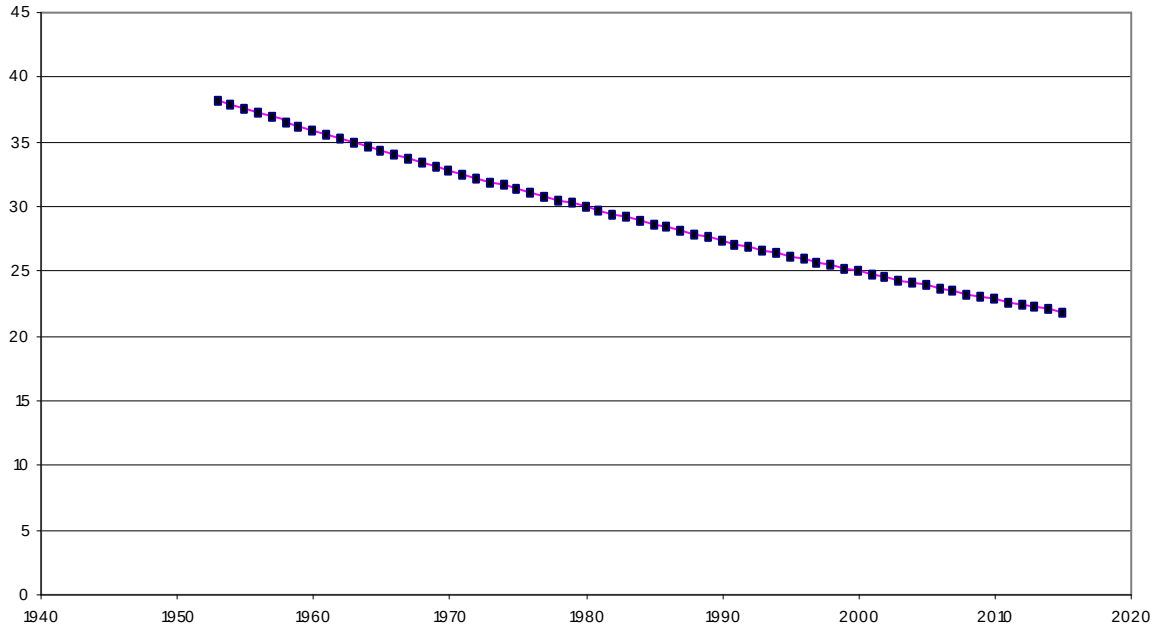
This revision in philosophy could radically change the direction of the Productivity Commission to drop the Competitive Regime in relation to telecommunication infrastructures and quickly adopt the Infrastructure Regime. This dramatic backflip in Government policy that would have direct implications to the Trade Practices Act; particularly with those sections involving telecommunications infrastructure – and competing infrastructure businesses like Optus, Orange/Hutchison, Soul, Vodafone, Macquarie, Opel etc.

Telstra would have to be split into two separate bodies Telstra (infrastructure) and Bigpond (retail reselling), and competing telecommunications businesses with infrastructure could be then coerced by the ACCC to sell their infrastructures over to Telstra and become competitive resellers (on a level playing field)! I believe that is the school definition for competition.

The simple results from my brief calculations will I believe have a knock-on effect that puts the ACCC in step with infrastructure business, so it should then protect Telstra (infrastructure) from national and international competitive predators, while fostering robust competition between wholesale resellers /retailers.

This strategy suggested above would be excellent for all Australians and Australian business, including the equities markets.

Appendix B – Telecommunications Life Expectancy



This is a simple graph showing that the average life expectancy of telecommunications equipment is dropping at a rate of about 0.90% per year/ per year. The markers were based on Crossbar, optical Fibre and digital switching. IP routers fit his same curve!

When it comes to Technology, the term 'future-proof' is competitive business slick for the term 'Infrastructure Life Cycle Management ". Getting this into perspective, when Crossbar switching was introduced into Australia in 1960, the low maintenance life expectancy was about 36 years; AXE switching in 1980 – about 30 years; Optical Fibre in 1987 – about 25 to 30 years, Hybrid Fibre Coax 1992 – about 27 years. Industrial grade equipment used in telecommunications has low maintenance and useful life cycles that have been dropping at an exponential rate of about 0.90% per year every year and currently in 2007 the life cycle expectancy is about 23.5 years for industrial grade switches, routers etc equipment being installed now.

The term 'future-proof' really means that competitive businesses must not install commercial grade equipment, as the low-maintenance life span of this much cheaper equipment is much shorter than industrial grade equipment!

Appendix C – Available Telecommunication Technologies

From my previous professional experience in the telecommunications industry, as a professional Electrical Engineer specialising in telecommunications equipment and network engineering, I have identified that each new technology takes about five years to implement, and about 10 years to mature, and the mature lifespan can run from about five to 40 years before it is obsolete. This has been well documented by me some years ago and the document "Australia's Converging Network Technologies", was presented to the Senate Hearing to Telecommunications in 2004 and a copy of this is on my Website at www.moore.org.au

For those that may find "Australia's Converging Networks Technologies" a little dated, here as an updated and simplified table that shows the Australian Inter-Exchange Switching and Transmission technologies in a table form:

Inter-Exchange Technology	Implemented	Effective	Matured	Obsolete
Crossbar Mechanical Switching	1960	1965	1970	1995
10C Analogue Switching SPC	1970	1975	1980	1985
AXE Digital Switching	1980	1985	1993	2005
DMS Digital Switching	1985	1990	1995	2000
S12 Digital Switching	1990	1995	2000	2010
IP Switching / Routing	1995	2000	2005	2040
FDM on pair/quad cable	1935	1940	1950	1980
FDM on Coax Cable	1950	1955	1960	1985
FDM on Point-to-Point Radio	1960	1975	1985	1990
PDH on Pair Cable	1980	1985	1990	2005
PDH on Coax Cable	1980	1985	1990	1995
PDH on Point-to-Point Radio	1985	1990	1990	1995
PDH on Optical Fibre	1985	1990	2000	2005
SDH on Point-to-Point Radio	1990	1995	2005	2015
SDH on Optical Fibre	1990	1995	2005	2040
ATM on Point-to-Point Radio	1990	1995	2000	2005
ATM on Optical Fibre	1990	1995	2000	2005
MPLS on Point-to-Point Radio	1995	2000	2005	2040
MPLS on Optical Fibre	1995	2000	2005	2040
Optical Fibre – Single Mode	1985	1990	1995	2040
Optical Fibre – DWDM	2000	2005	2010	2040
Optical Fibre – CWDM	2000	2005	2010	2050

Switching and Transmission Technologies in the IEN - Time

This table clearly shows that as from 2005, the only technologies in the IEN that will not be obsolete or very near obsolescence will be IP switching; and for transmission; Optical Fibre and point-to-point Radio.

The table below follows on directly from the above table, but looks at the combination of Broadband IP with Pay TV (Multimedia) and Radio/TV Programme distribution networks. This table of particular significance as it links bearer physics to traffic utilisation to a lifetime.

IEN (Tx) Application	Implemented	Effective	Matured	Obsolete
Programme Distribution Coax	1945	1950	1975	1985
Programme Distribution p-p Radio	1960	1965	1975	1990
Programme Distribution Satellite	1980	1985	1990	2000
Programme Distribution Optic Fibre	1990	1995	2000	2030
Programme Distribution OF Systems	2005	2010	2015	2040
Telephony – Open Wire	1850	1855	1920	1930
Telephony – Loaded Cable	1920	1925	1955	1985
Telephony – Coax Cable	1950	1955	1960	1985
Telephony – Point-to-point Radio FDM	1960	1975	1985	1990
Telephony – Optical Fibre PDH	1985	1990	2000	2005
Telephony – Point-to-point Radio PDH	1980	1985	1990	1995
Telephony – Optical Fibre SDH	1990	1995	2005	2040
Telephony – Point-to-point Radio SDH	1990	1995	2005	2040
Telephony – Optical Fibre IP/MPLS	1995	2000	2005	2040
Telephony – Point-to-point Radio IP/MPLS	1960	1975	1985	1990
DDN – Loaded Cable	1965	1970	1975	1985
DDN – Coax Cable	1965	1970	1975	1985
DDN – Point-to-point Radio FDM	1965	1970	1985	1990
DDN – Optical Fibre PDH	1985	1990	2000	2005
DDN – Point-to-point Radio PDH	1980	1985	1990	1995
DDN/Internet – Optical Fibre SDH	1990	1995	2005	2040
DDN/Internet – Point-to-point Radio SDH	1990	1995	2005	2040
Internet – Optical Fibre IP/MPLS	1995	2000	2005	2040
Internet – Point-to-point Radio IP/MPLS	1995	2000	2005	2040
Pay TV Centralised Optical Fibre	1992	1995	2000	2005
Broadband Multimedia Centralised OF	1995	2000	2005	2005
Broadband Multimedia Remote OF	2005	2010	2015	2030
Broadband Multimedia 10G+ OF Systems	2010	2015	2020	2040

IEN Wholesale Application over Time and Technology

All of these IEN Transmission Applications have high bandwidth requirements, but each network structure is significantly different – and each network structure is optimally engineered for efficient distance-related and capacity-related transport.

It is obvious that each incremental system grows on the backs of the previous technologies, and this is one of the integrated synergies that brings in higher speed networks at ‘competitive prices’

(Explanation: “Competitive Prices” in this text specifically means prices that are commensurate with existing prices for similar service standards, and costing proportionately more for increased service standards. “Competitive Prices” in this text specifically does not mean prices that are moved by marketing and advertising strategies to fight/battle/war for a larger portion of the available market.)

In just the same way that the Inter-Exchange Network has technologically morphed over several decades, the Customer Access Network (CAN) has also technologically morphed over several decades, and this too was described in Australias' Converging Network Technologies

Again I have produced a rather simple table that takes the various CAN technologies through their life cycles, and this should set the scene for sensible CAN forward network planning / engineering.

Customer Access Technology	Implemented	Effective	Matured	Obsolete
Open Wire Line	<1900	1900	1900	1970
Twisted Pair Cable	1940	1950	1980	2000
PGS Loaded Pair Cable	1940	1950	1970	1990
PGS VFHA – Pair Cable	1985	1990	1995	2005
PGS Remote Line Mux	1985	1990	1995	2000
PGS Remote Int Mux	1990	1995	2000	2005
PGS DDN 64 kb/s	1980	1985	1990	2000
PGS MegaLink 2 Mb/s	1980	1985	1990	2005
PGS ISDN 2 Mb/s	1980	1985	1990	2005
PGS Frame Relay 2 Mb/s	1980	1985	1990	2005
PGS Frame Relay 155 Mb/s	2005	2010	2010	2010
PGS Analogue Radio Conc. Sys.	1975	1980	1985	1990
PGS Digital RCS	1980	1985	1990	1995
PGS HCRC	1985	1990	2000	2010
Hybrid Fibre Coax (HFC)	1992	1995	2000	2010
HFC Analogue TV	1992	1995	2000	2005
HFC Digital TV	2005	2010	2010	2010
HFC IP/Internet (DOCSYS 2)	1997	2000	2005	2010
HFC IP/Internet (DOCSYS 3)	2007	2010	2020	2030
PGS **ADSL** DSLAM (IP)	1997	2002	2007	2017
PGS **ADSL** 2 / 2+	2005	2007	2017	2022
PGS **ADSL** on p-p Radio	2005	2010	2010	2015
Mobile – Analogue	1980	1985	1990	1995
Mobile – Digital GSM	1990	1995	2000	2005
Mobile – CDMA	1995	2000	2005	2010
Mobile – WCDMA (3GSM / IP)	2000	2005	2010	2030
Broadband – FTTNode 2 Mb/s (**ADSL**)	2002	2007	2007	2017
Broadband – FTTN 155 Mb/s (**ADSL**)	2005	2010	2010	2010
Broadband – FTTPremises 30 Mb/s	2000	2005	2010	2040
Broadband – FTTP 155 Mb/s	2005	2010	2015	2040
Broadband – FTTP 1 Gb/s	2015	2020	2025	2040
Broadband – FTTBusiness 2 Mb/s	1990	1995	2000	2005
Broadband – FTTB 155 Mb/s	2000	2005	2010	2020
Broadband – FTTB 1 Gb/s	2010	2015	2020	2040
Broadband – CWDM	2000	2010	2015	2050

CAN Technologies over Time

This list of CAN transmission technologies is non-exhaustive, but it does show that just like its' diametrical associate (the IEN) the bearer technologies are also moving towards optical fibre (OF) and radio, and the CAN data rate speeds will only increase when the IEN and inter-

continent networks have sufficient data speed capacity. Note that I believe that FTTN is a very poor technology choice because it is expensive and short range compared to FTTH, and FTTN is a very short term solution compared to FTTH.

It is truly unfortunate that the ACCC (and I believe the DCITA) both use the same and severely outdated "PSTN / Mobile / ISDN / Internet" Connectivity Model, which I believe does not align with the current Australian telecommunication network structures. One consequence of this incorrect Connectivity Model is that the Telecommunications Report provided to the ACCC makes what I believe are a range of grossly incorrect determinations and conclusions. It further amazes me that after all these years, nobody in the DCITA, ACMA or ACCC have spoken up and actively questioned the validity of this very outdated PSTN / Mobile / ISDN / Internet Connectivity Model.

This very outdated PSTN / Mobile / ISDN / Internet Connectivity Model shows the PSTN (which was reality is a combination of the IEN and the fixed wire CAN), the Mobile (which in reality is a combination of the IEN and the mobile radio CAN), the ISDN (which is in reality a Pair Gain System on a fixed wire CAN), Internet (which in reality is the IEN in combination with most CAN technologies), HFC (which is the CAN part of cable Internet and Pay TV (HFC) – but this fails to mention the very major IEN component), etc.

The "PSTN / Mobile / ISDN / Internet" Connectivity Model even fails to show how and where these network structures interconnect, and how and where competitive networks connect. One could be forgiven for naively thinking that there could be excess optical fibre that could be 'switched on with the flick of a switch' to provide FTTH, and not comprehend that almost all of this optical fibre is utilised is part of the IEN – because the IEN somehow does not get a mention in the annual ACCC telecommunications reports!