Submission

to the

Productivity Commission

on the

Telecommunications

Universal Service Obligation (USO)

(Issues Paper)

August 2016

08-August-2016

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04-Aug-2016

Introduction

The Productivity Commission's Issues Paper on the Telecommunications Universal Service Obligation (USO), to me proved to be "very interesting" reading on several fronts that I will briefly elaborate in this Submission.

Virtually everything that I know first-hand from over 35 years technical, engineering, managerial and consultancy experience in most technical / engineering areas of the Australian telecommunications industry, spanning from 1966 through to now, is at odds with the content of this Issues Paper.

Having read through the Issues Paper it is very clear to me that whomever were commissioned to write and check the contents of that document have relayed a very superficial comprehension of the overall telecomms network infrastructure, particularly in the inland. There seems to be a total void of associated historical knowledge relayed about which technologies followed previous technologies and how / why this infrastructure is connected in the structures that it is.

In the past 20 years I have written several submissions to several Select Senate Inquiries and Regional Telecomms Reviews, and attended as a witness on many occasions where I have provided factual engineering content that would have had the potential to provide Australia with a first-class telecomms infrastructure, and a very healthy telecomms sector on the ASX, and zero requirement for the USO.

The subsequent Reports that come from these Inquiries are typically void of factual engineering content that was provided in the hearings. As a direct consequence we have massive losses in economic productivity and considerably shrunken GDP, simply because those involved in compiling Reports want them to "read smoothly".

These Reports typically skew off the pertinent facts but elaborate on the content of other Government-based reports that also have irrelevant and/or misleading content to fill those documents, which in turn unintentionally make these more recent reports even more misleading.

The Issues Paper is extremely light in any overview as to how the overall Australian telecomms infrastructure is structured. The overview pictures as given in Figure 1 on page 5 are stunningly simplistic, and very incorrectly treats the shown telecommunications services as entirely separate, which is grossly misleading.

The (Australian) telecomms network[1] is effectively an homogeneous infrastructure and all the commercial (retail) services are connected through a range of Customer Access Network (CAN) infrastructure technologies, where all these CAN infrastructure technologies are directly back-connected to the common (and nationally immense) Inter-Exchange[2] Network (IEN) to form one highly productive telecommunications network infrastructure[3].

[1] http://www.moore.org.au/comms001.htm
[2] In the past 20 or so years because of excessive USA influence, the terms "Backhaul Network" and "Core Network" are synonymous with "Inter-Exchange Network".
[3] http://www.moore.org.au/comms/01/20051102%20Telecommunications%20101.pdf

This Issues Paper seems to be totally oblivious that the IEN infrastructure even exists; and has the critical role in providing economic telecommunications retail services.

> *As an analogy, consider a human to be the telecomms. The Skin / Hair / Face / Fingernails are equivalent to Retail Products. The Muscles / Ligaments / Blood are equivalent to the Customer Access Network. The Skeleton / Brain / Nerves / Stomach / Heart / Lungs are equivalent to the Inter-Exchange Network.*

There is an old saying "**Garbage in - Garbage out**" that unfortunately seems to be highly applicable to this Issues Paper, because from what I know through decades of personal professional experience in a very wide range of telecomms technical, engineering and management roles with virtually every telecomms technology in Australia, this is extremely different than what is written in this Issues Paper.

In other words the references being used in this Issues Paper are totally incorrect and consequently the findings of this Issues Paper will again be totally incorrect and will be minimising productivity, not maximising productivity.

This Issues Paper now starts to explain (to me) how and why for so many years that so many telecommunications-based policies are so wrong for so many reasons and have cost Australia many tens of $Bn in wasted productivity.

Terms of Reference

In the **Terms of Reference**, the **Background** is extremely vague to the point of being misleading and it does not explain how Australia got into this economic mess. The few paragraphs below spell it out in plain English and are historically factual.

Background

Telecommunications technology in Australia has evolved gradually[4] over several decades (not quickly in the past decade or so). As these telecomms technologies have gradually evolved the overhead costs of telecommunications infrastructure has dramatically decreased, making what was a major cost centre into being a major profit centre if the end user costs were kept in line with the Cost Price Index (CPI), or annual inflation as both are highly comparable with each other.

In the early 1970s, Chile had a major problem with the USA where (Bell Telecomms) owned about 70% of the Chile telecomms infrastructure and were charging extortionate end user prices. (*This is now beginning to sound a lot like Australia*).

The Chilean Government acted to nationalise the telecomms infrastructure and the USA brutally retaliated by driving Chile bankrupt then warned the western economies to privatise their infrastructures or suffer the same fate as Chile.

This is the prime reason why both sides of the Australian Government have stupidly and very gutlessly "privatised" perfectly functional infrastructures, only to have these usurped by predominantly USA owned private equity businesses - at great expense to the productivity of the Australian economy, **over $200 Bn see below**.

[4] Appendix: **Recent Australian Telecomms Technologies** provides a brief and I believe factual overview of the telecomms technologies from about 1930 till the present.

In 1960, Australia had invested in Crossbar mechanical switching from Ericsson (Sweden), and then the Post Master Generals Dept. (PMG) totally re-engineered this technology to perfectly match the then Australian telecomms network and interface with thousands of manual Sylvester Switchboards, and several hundred exchanges based on Strowger / Step-by-Step mechanical switches.

The newer Crossbar technology was far lower maintenance and provided "alternate routing", to make far more productive use of the then Public Switched Telecomms Network (PSTN) than could be done by the earlier switching technologies. Australia became one of the first large land mass countries to have Subscriber Trunk Dialling, about 20 years ahead of the USA.

In the early 1970s, the Australian Telecommunications Commission (ATC) was one of several commissions spun out of the Post Master General's Department (PMG). This action proved a master-stroke because the ATC could get on with its business without requiring Federal Acts of Parliament for every major decision (buying vehicles, buildings, equipment etc.) that was happening in the PMG.

The PSTN was essentially the telecommunications "main roads and highways" between the telecomms switches that provides the distance connectivity - but has no subscribers / customers directly connected to it.

One of the major Productivity Blockers to the telecomms infrastructure in Australia is that those making the political decisions have a miniscule understanding of the end-to-end network connectivity and have consequently made grossly incorrect and extremely expensive decisions that have cost Australia many tens of $Bns.

In the 1960s the technology of transistors slowly emerged to gradually replace thermionic valve technologies. The development of Solid State integrated circuits followed transistors and by the mid 1970s digital computing (and digital switching) was emerging as very low overhead technologies.

These solid state and analogue and digital technologies did not require daily routine testing like their valve and mechanical brothers. The (USA) private sector gradually recognised that they could now make a financial windfall for themselves if they could "privatise" the telecomms infrastructures for themselves, just as they has done with the railways, and electricity in the USA.

It was really no surprise that the Davidson Inquiry was set up in 1980 to find reasons to justify the privatising of the then Telecom Australia Commission, which was spun out of the Post Master General's Department in 1975. At this time, Australia's telecomms infrastructure was recognised as one of the best in the developed world.

The Davidson Report was released in 1982 strongly pressing for Telecom Australia to be split up and privatised and to be "made efficient"!

This report recognised that Telecom Australia was in the process of re-engineering its switching hierarchy with Ericsson AXE digital switch technology with virtually nil overhead costs (which potentially made Telecom Australia far more "efficient" - without being split up) and that a high proportion of valve-based transmission equipment was now solid-state (which was far more reliable and made Telecom Australia far more "efficient" - without being split up).

This Report also recognised the "tyranny of distance" that was difficult to swindle because the inter-city distances in Australia are far larger than in Europe or the USA, and the inland population is considerably lower in international comparison, making the inland difficult to "privatise" with apparent profit, without outright lying.

The Davidson Report recognised that the structure of the telecomms network infrastructure in the State Capital Cities and their Suburbs (the "metropolitan" in telecomese) is significantly different than beyond the "metropolitan" areas.

Scope of the Inquiry

The primary policy question to be addressed in this inquiry is to what extent, in the evolving Australian telecommunications market, Government policies may be required to support universal access to a minimum level of retail telecommunications services.

What is really being said here is: Because the USO was entirely based around providing (equitable to metropolitan) working telephone services in inland areas where the maintenance costs are high, and telecommunications technologies are gradually moving from Voiceband to Broadband technologies, how can the cost of the USO be eliminated?

The Commission should also have regard to:

- the need for a durable framework that is flexible enough to accommodate technological changes;
- the role of, and impact on competition in relevant markets;
- contractual commitments that the Government has for the provision of the existing USO;
- the significant investments already made by Government, including in the NBN rollout;
- the current telecommunications regulatory framework and the Government's response to the 2014 Vertigan NBN Market and Regulation Report;
- additional policy reviews being undertaken by Government on a broader range of telecommunications consumer protections;
- relevant approaches adopted in other countries, particularly those with similar characteristics to Australia; and
- the report of the *2015 Regional Telecommunications Review* and the Government's response to that report.

The dot points below align with the dot points above:

- If Broadband technology can incorporate Voiceband technology then (fixed service) telephony becomes obsolete and irrelevant - voiding the USO.
- The prime purpose of the Davidson Inquiry (1980) was to put a Telecoms sector into the ASX. Instead of establishing competitive retail reselling businesses, the ensuing report came up with the worst possible economic / productive situation for Australia, that of horrendously expensive and extremely uneconomic and highly unproductive **competing infrastructures**.

- Because of the Davidson Report (1982), the Federal Government is committed to pay Telstra in the order of $300 M pa as long as the inland areas show a loss for the operation and maintenance of these (fixed) telephony services.
- Because the Davidson Report (1982) smashed the Telecom Australia infrastructure business efficiency parameters: economy of scale, no-duplicated infrastructures, in-house expertise etc., the Federal Government has now had to build the Broadband Access Network as yet another competing infrastructure body (the NBN) where this Broadband Access Network and the imperative Inter-Exchange Network would have been in place by 2010.
- Vertigan Market Report - Reference
- To date I have yet to see any Federal Government-based policy / review document that has accurate information about the nature and structure of the Australian telecommunications infrastructure.
- Australia has a virtually unique telecomms infrastructure that in no way aligns with that of the northern hemisphere - but unfortunately - because of Global Engineering and marketing being northern hemisphere based, publications like the McKinsey Cost Benefit Analysis for the NBN infrastructure rollout have used incorrect parameters - particularly for low density population situations - and come up with entirely inappropriate technologies - and not utilised existing inland telecomms infrastructure to make massive budget savings.
- Virtually all the hundreds of submissions into the 2015 Regional Telecomms Review were from inland homesteads complaining about the lack of Broadband and Voiceband facilities. My 22 page Submission[5] provided a wide range of inexpensive and highly practical / realistic solutions that would almost immediately alleviate these situations and in the short term, save the Federal Government upwards of $1 Bn. Here is my abbreviated **Conclusion**:

  In this submission I have provided a series of answers that go well beyond the nature of simply complaining but provide the root cause of the complaints causing the problems, and I have provided realistic solutions as to what can be done to fix the immediate problem, and prevent the problem from happening in the future.

  If you wish to discuss any of the above topics in any depth at all, then please do not hesitate to contact me.

  To date there has been absolutely nil response and the RTIRC had absolutely nil of my potentially productive and content included in this Report. Instead this report was void of direction to inexpensively fix the problems and minimise further cost to the Federal Government. **What more can I say???**

[5] https://communications.govcms.gov.au/sites/g/files/net301/f/Moore%2C%20Malcolm%20-%20Public%20Submission%20RTIRC%202015.pdf

What this Inquiry is About

This is a direct excerpt from the PC Issues Paper:

The current USO should be viewed within the context of market, technological and policy developments that have occurred over the last two decades, with the telecommunications market continuing to evolve.

- Reforms to the telecommunications sector have resulted in increased competition, with benefits to users in terms of lower prices and enhanced choice.
- Rapid technological change has led to a substantial fall in the price of telecommunications, with a vastly increased range, usage and demand for new services.
- There has been significant expansion in the availability, use and quality of mobile phone services, and increasing demand for broadband data services (including voice over internet protocol services). In contrast, demand for standard telephone services and payphones has fallen and continues to decline.
- The Australian Government's Mobile Black Spot Programme, funded by all levels of government, businesses and community organisations, is intended to improve mobile phone coverage and competition in regional and remote Australia.
- The Australian Government continues to roll out the National Broadband Network (NBN), which is intended to deliver broadband to all Australian premises using a range of technologies and subject to a wholesale capped price. The NBN effectively provides universal access to fixed broadband services (and, hence, to voice over internet protocol services).

Given these and other changes, the Government is concerned that the current USO is becoming less relevant and may not be effective.

With my extensive Australian telecoms industry experience, I would look at these above points in totally different light (matching point by point):

- As a result of very poorly positioned telecommunications sector reforms, extremely inefficient infrastructure competition has succeeded in very heavily crippling Australia's national productivity, because "economy of scale" efficiencies were virtually eliminated and even then, multi-duplicated infrastructures are also extremely unproductive / uneconomic for Australia.
- Significant but not rapid technology advances over the past 50 years have utilised silicon based technologies to radically reduce the overhead costs of telecoms and office equipment costs and maintenance costs, while dramatically increasing the bandwidth and distance parameters far beyond what was previously attainable, resulting in the productivity of the telecomms infrastructure to be far above what was ever conceived. Very little of this productivity saving has been passed through to the end user.
- Since about 1985, (digital) Mobile device technology has gone through five generations where each generation requires more bandwidth as the functionality of these devices has moved from Voiceband to include Broadband. Concurrently the use of Pay Phones has significantly dropped, but the use of Fixed line phones has dropped marginally as these lines are also shared for ADSL Broadband connectivity to a very high percentage of premises.

- One of the big negative productivity consequences of (telecomms) infrastructure competition caused by the Davidson Report in 1982 is the "digital divide" where most of the inland is severely under-supported with suitable telecomms infrastructure that would have facilitated very inexpensive Radio Base Stations - and prevented Radio Black Spots. **Without infrastructure competition, the savings here would far exceed $400 M pa for at least the last decade.**
- The NBN is being rolled out because the Davidson Report flatly failed to prove that "increased competition" would increase productivity - in fact the reverse has happened and this sham has cost Australia at least $86 Bn in direct loses to date, where the economy of scale of Telstra has been scuttled, Telstra has be sold with no increase in productivity as promised, the infrastructure rollout was minimised and consequently the very expensive NBN[6] has been raised to cover for the cost of the fundamentally flawed Davidson Inquiry / Report.

This chart selectively misses out on Texting - it is common for people to test before actually talking so missing out on this parallel media seems incomplete or misleading.

While fixed line phones may be appearing to decrease, it is how mobile phones are used that is the far more important criteria.

A gradually growing proportion of people have a fixed phone line with "naked" ADSL and use the Wi-Fi-connectivity of the ADSL Modem / Router to provide premises connectivity to their Mobile Phone. This way, the call effectively bypasses the expensive Mobile call charges and the Internet budget covers the costs.

[6] http://www.moore.org.au/senh/2010/NBN%20Business%20Case%202.pdf

Snapshot of the Telecommunications Market

Although the Australian telecommunications (retail) market may appear to be evolving rapidly the wholesale infrastructure that supports these range of retail products is relatively stable (and has no requirement to rapidly evolve) because this infrastructure supports a wide range of derived retail products.

Types of Services

The USO is fundamentally a non-metropolitan issue, and consequently, access technologies that are not outside the metropolitan areas (such as Hybrid Fibre Coax) have no place in this PC Issues Paper.

The PC Issues Paper has confused a range of Customer Access Network technology infrastructures with some Premises Local Area technologies and also confused a range of commercially available Retail Products as being infrastructures.

Further, the technical explanation of mobile device technology is confusing because these infrastructures also get mixed up with retail products.

The explanation about the role and purpose of the NBN includes a range of Customer Access Network technologies - but omits to explain how these isolated Access Network infrastructures are back-connected into the overall Australian telecomms network infrastructure and make a highly efficient (productive) telecommunications infrastructure for Australia's future.

This glaring omission about the Inter-Exchange (Backhaul) Network and how it is imperatively interconnected with several different Customer Access Network structures (at each end) to provide a conformal end-to-end telecommunications infrastructure (that in turn facilitates a range of through-connectivity platforms) which support a wide range of commercial retail products, fundamentally and clearly demonstrates that whomever wrote / signed off on this PC Issues Paper has virtually nil of the essential in-depth understanding about the Australian telecommunication infrastructure.

Consequently, if these people (and the people around them) are to make policy regarding the financing and future direction of the Australian telecommunications network infrastructure on behalf of the Federal Government; then the chance of this policy being productive and/or economic for Australia is extremely slim.

Put another way, since 1997 there have been well over 16 telecomms related Federal Government level Inquiries and Reports. In my professional opinion not one of these Reports has resulted in appropriate strategies and/or policies to fix the problems but further exasperate the existing problems.

Most Reports simply did not convey the imperative engineering knowledge into practical and sensible policies and consequently the policies to date have severely aggravated the poor telecomms connectivity situation and made what was relative inexpensive to be now extremely expensive - for all the wrong reasons.

Why Figure 1 is so Wrong

As mentioned above Figure 1 on Page 5 is at the best extremely misleading and simplistically incorrect[7].

In part 1, The Public Switched Telephone Network (PSTN) was of a past analogue era (circa before 1940) when most connections were manually connected through switchboards and there was very little physical distinction between the technologies used in the CAN and the "Trunk" (long distance) network. The PSTN cannot handle "data" above 0.056 Mb/s.

To get this part 1 drawing into alignment, the demarcation point is really the interface between the CAN and the IEN , then it is practical to show a range of pair copper line technologies - including and excluding ADSL and pair gain systems.

Radio Base Stations as shown in part 2 are not back-connected by "wired Backhaul" but are usually back-connected with Single Mode Optical Fibre (SMOF) in the same manner as FTTN (Fibre to the (Remote) Node) and all of this is part of the CAN, not the "Backhaul" Network.

The "Mobile Switching Centre" is really a minor part of the Inter-Exchange (Backhaul) Network, but why is the "Mobile Switching Centre" shown at all when the service is effectively connected off the edge of the Inter-Exchange Network.

In part 3, the notion that NBN fibre connects to a (remote) node and then is by "copper wire / HFC" is very misleading. FTTN = Fibre to the Node (and then pair copper to the premises). HFC = Fibre to the Node (and then coaxial cable to the premises). In fact HFC means "Hybrid Fibre Coax"

The missing components of the HFC CAN infrastructure include the exchange-end Headend equipment that is in-turn back-connected to the "Backhaul" Network infrastructure (through Edge-routers).

Parts 3, 4, and 5 all show nil back-connection connectivity of the NBN block - it simply cannot be isolated as it has to be back-connected into the Inter-Exchange Network so connectivity can be made with other forms of Customer Equipment (e.g. Websites, mobiles, phones, remote sensors, fax machines etc.).

Part 4 is in all respects identical to part of part 2, so there is nil need to include the NBN term. In fact Telstra have a very substantial Fixed Radio Customer Access Network (DRCS and HCRC) that are extremely under-utilised and could provide extremely inexpensive and low latency Broadband exceeding 100 Mb/s bi-directional, and would put the expensive satellite strategy out of commission.

Part 5 is fundamentally correct except that the NBN is not the sole provider of Satellite connectivity and the back end of the NBN equipment is not shown to be connected in the Inter-Exchange (Backhaul) Network.

[7] http://www.moore.org.au/comms/01/20051102%20Telecommunications%20101.pdf

Consumer Trends

In physics and engineering one of the prime concerns is accuracy so we have standards and from those Standards we have sub-standards (with a larger degree of error). In every case that a piece of equipment is to be calibrated, the substandard is used as the reference, not another piece of equipment that has been calibrated to the sub-standard or a third (or fourth etc) piece of equipment that has an even longer trail to the sub-standard.

Why, because every time the standard is "removed" from the measurement the error promulgates and gets bigger and bigger, so the measure is unreliable.

This is a simple "Quality" issue, where the original information is sourced, not the most recent document that took its guidance from a most recent Report, and especially not from Reports that have been saying much the same thing year - after year after year - like the Select Senate Reports (that are seriously missing considerable data from inquiries because those writing these reports didn't comprehend the engineering behind the problems) and Regional Telecomms Reports (same issues), and from other Federal Government Commissions that very seriously lack telecomms engineering expertise in their ranks.

Just because the number of people (premises) now connected to fixed line phones has decreased in the last decade is not a reason to assume that this trend is common across all geographic areas - especially where mobile network connectivity is poor, congested and/or non-existent.

Quoting the ACMA 2015b reference is a really tall call unless the data can be accurately and consistently quantified into specific geographic areas that correlate with age demographics and business relationships.

It is now common practice for a high percentage of people that use mobile phones to text instead and/or before physically calling. It is also common practice for people to use the Internet instead of calling by phone to find out, and to log their mobile phone onto their Wi-Fi at home to connect via the Internet instead of via the Mobile Network.

Figure 3 seems to be void of Pay TV (HFC and Satellite), Website connectivity, Streaming, (good definition) Video Conferencing, Remote Surveillance. Again the data is only as good as the source, and if the ACMA source is deficient then why is the data included in the PC Issues Paper?

Considering that this section of the PC Issues Paper is all about providing data then there is plenty of very reliable data in the My.Broadband[8] website that clearly shows an extremely high percentage of inland premises (over 200,000 premises in inland villages and small towns) have nil ADSL connectivity yet almost all these premises are within 1100 m of their local switch where ADSL could be extremely inexpensively provided. ADSL has been around for over 15 years. So the question is why not?

This very inexpensive provision of ADSL2+M would not be in the interests of Telstra because: it seems Telstra's goal is to have all consumers connected by wireless (which is not covered by the USO but magically would be more than covered by the Radio Black Spots program (which is effectively the USO wolf in a sheep skin).

[8] https://www.mybroadband.communications.gov.au/

Radio Base Stations in the inland do not simply appear without being back-connected with SMOF cable. The roll out of inland SMOF cable was from about 1987 to 1993 and most of that cable is only 6 fibres (as far as I am aware), and engineered to back-connect the Small Country Automatic Exchange (SCAX) huts in villages, and towns - to provide replacement for ageing analogue quad cable.

Even then, the digital switches that through-connect in digital transmission systems that now use this SMOF cable to back-connect local telephone switches in these SCAX huts extremely under-utilise this inland SMOF cable.

To implement ADSL2+ services in these SCAX huts, inexpensive ADSL2+M mini DSLAM transmission systems would need to be installed and very inexpensively router back-connected to the Edge Routers in the Large Town / Country City interfaces into the Inter-Exchange Network. The PowerPoint reference[9] shows how.

This strategy[10] is really inexpensive and would put about 214,300 inland premises (536,000 people) on Broadband internet for about $50 M, **about 1% the cost of Satellite connections**, and these premises would then have Wi-Fi (from their own ADSL modem/routers), and be able to use 4G mobile phones directly logged onto their premises Wi-Fi and get fast and clean Internet connectivity.

With a little further strategic thinking; because of the Competitive Business mindset, old and wrong technologies of ADSL DSLAMs have deliberately installed in most Country Towns - so about 199,940 premises (500,000 people) have 6 Mb/s, 8 Mb/s or 12 Mb/s ADSL where their CAN (pair copper) line lengths are less than 1100 m and fully capable of 24 Mb/s.

Consider that if this large proportion of inland customers were then using ADSL2+ Broadband and it worked at 24 Mb/s for the very large majority of cases then this situation could jeopardise the USO gravy train, but a proportion of these potential Broadband customers would connect their mobile devices via in-house Wi-Fi.

Consider further - because these people would be using their in-house Wi-Fi to get 4G mobile connectivity, then this could go a long way to derail the potential new gravy train of the Radio Black Spots programme.

Service Providers

The overall Australian Mobile coverage is shown in Table 1 on page 11. This table only a minute correlation to the mobile coverage in the non-metropolitan areas that are in the so-called Radio Black Spots.

This table is interesting for several other reasons. Because mobile coverage has to include about 20% to 80% in "over-supply" to accommodate variations in people's locations with time, there is a certain degree of uneconomic "overbuild" that has to be included in every Radio Base Station.

Consider that a Mobile Radio Base Station has say 100 channels in it - this means that it will concurrently connect 100 mobile devices. With a safety margin of 20% the RBS coverage area would be engineered for 80 mobile devices (and 20 for occasional volume increases - like a bus going through the coverage area).

[9] http://www.moore.org.au/comms/03/201601inlandADSLinSCAX.ppsx
[10] http://www.moore.org.au/comms/03/201601inlandADSLbb.ppsx

Consider the 80% case, where about 64 channels would be used for standard operations and 36 "spare" channels would be available if for example: a few busloads stopped for lunch in a village.

The design engineering is very similar for fixed line services, but fixed line services do not require "spare" capacity as with mobile devices.

Consider that the (maximum) usage rate of a typical phone user is say 10% of the time, (0.1 Erlang) then for the simple fixed line services 1000 fixed lines could be back-connected to just 100 Inter-Exchange switch points.

Using the same route occupancy rules for mobile devices has to include the extra safety margin of 20% to 80% overbuild so that 1000 number would be cut back to 800 mobile devices for a 20% overbuild and to just 640 mobile devices for an 80% overbuild.

Competitive Business mindset people in these businesses will push for 0% overbuild and no coverage at all unless there is a big and fast ROI. This fully explains why the Radio Black Spots are "everywhere" in the inland and virtually nil in the metropolitan areas and why the primarily Telstra-driven push for the Radio Black Spots programme is in such earnest (and strongly supported by a Liberal Government to falsify the financial status by injecting extra funds as the Radio Black Spots programme as a flow-on from the USO which by now is exceedingly unpalatable to the general Australian public).

The table is interesting from another front: Multiple overbuild in all the wrong places!

Take the Metro:

	3G (as a %)	4G (as a %)
Telstra	100	95
Optus	100	89
Vodafone	99	87
Total Coverage	**299**	**271**

So, we have virtually 300% metropolitan coverage of 3G where 100% is ample, and we have 271% metropolitan 4G coverage where 100% is ample, virtually nil Radio Black Spots and mobile contracts that are far more expensive than fixed wire access contracts.

This very expensive Radio Base Station and SMOF cable back-connection infrastructure is grossly over-invested in the metropolitan areas.

Take the Non-Metro:

	3G (as a %)	4G (as a %)
Telstra	98	74
Optus	96	60
Vodafone	87	50
Total Coverage	**281**	**184**

So, we have virtually 281% non-metropolitan coverage of 3G where 100% is ample, and we have 184% non-metropolitan coverage where 100% is ample, several hundred very expensive Radio Black Spots and mobile contracts that are far more expensive than fixed wire access contracts.

This very expensive Radio Base Station and SMOF cable back-connection infrastructure is grossly over-invested in some locations (i.e. country cities) and totally under-invested in hundreds of Radio Black Spot locations (i.e. everywhere else). In other words, we already have paid very dearly for these Radio base Stations but the Competitive Business mindset people have deliberately put these "spare" Radio Base Stations in locations where there is already plenty of coverage by other Radio Base Stations.

Simple re-location of existing Radio Base Stations would very economically eliminate the Radio Black Spots, and use all this infrastructure to the best of its ability.

From the above logic, it makes absolutely no sense to have the Radio Black Spot programme funding Telstra or any other Competitive Business mindset organisation that is fronting as an Infrastructure Business.

A far more fiscally responsible strategy would be to Physically Separate Telstra / Optus / Vodafone etc., and pool all this telecomms infrastructure into one sub-government Commission (as the NBN). The sooner that the Commonwealth Public Servants wake up and make the move the better for Australia.

The Current Universal Service Obligation

If the current USO funding was halted, then I believe the allocation for dividends (in Telstra) would drop by the same amount, and the same story with the Radio Black Spots programme. In other words, the Federal (and other) Governments are deliberately propping up the dividend funding to prop up the share prices, to make the Telecomms sector somewhat attractive to the ASX and superannuation funds.

The other side of the very sad scenario is that in all this time since about 1982, (when the Davidson Report proposed the USO funding) the cost of technology has cavitated while the bandwidth availability has clearly outstripped demand (as shown under "Got it Wrong with the USO" - below) such that bandwidth and distance are no longer an issue (but they are because inland telecomms equipment was not proactively planned and installed).

By re-positioning this telecomms infrastructure under one economy-of-scale Federal Commission an immense range of efficiencies come into play that make the USO, Radio Black Spots and any other contrived Federal Government funding is minimised, (including the NBN fiasco) - where this (NBN) would be very quickly self-funded because a large range of (Competitive Business based) inefficiencies could then be removed, and most of those inefficiencies could be transferred into Competitive Business retail reselling (where they should be) and be highly efficient.

The Mobile Black Spot Programme

Got it Wrong with the USO

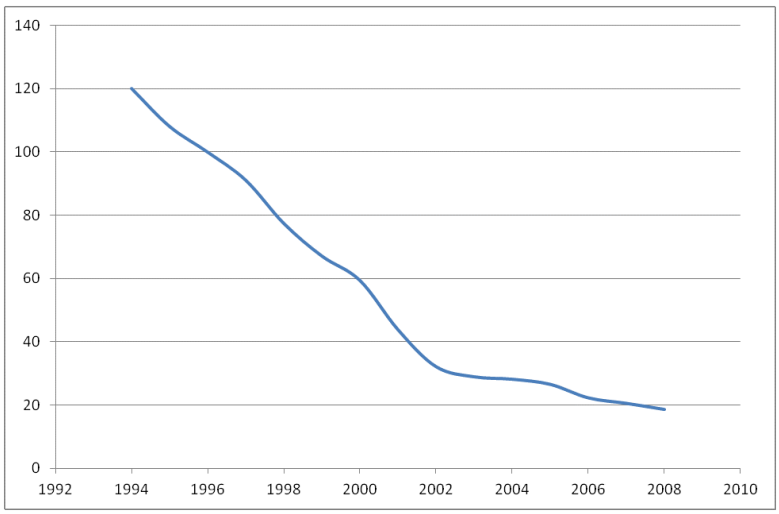
Telecom Australia was granted the USO courtesy of the Davidson Report (1982) to more than cover the operational costs of the inland telecommunications network - which at that time was primarily Voiceband telephony; and make the overall Telecom Australia "look to be profitable" so it could be sold off to equity houses as a front for putting a telecomms sector in the ASX.

At that time the man-hour overheads were immense because all equipment up to 1982 was mechanical and analogue, but with the inclusion of Ericsson AXE digital switching that started to be rolled out from 1980 and was completed by 1995; the overhead costs of regional and district switching plummeted.

In 1984, the technology of Single Mode Optical Fibre (SMOF) and its associated (digital) PDH technology absolutely cavitated the installation and operational costs of long distance transmission, such that be about 1990 an inter-state call was no more than a local call. The Inter-Exchange (Backhaul) Network[11] then went through some more metamorphosis to have a far wider bandwidths and at virtually nil cost.

In about 1993 the Alcatel System 12 switch technology was introduced and with this, there was literally no maintenance to be done in any of the 5010 telecomms sites - so the overheads costs further plummeted and all operations could be managed from only one site called a Global Operations Centre, and remotely controlled with virtually nil overhead maintenance costs.

The chart in Figure 4 of the PC Issues Paper shows the apparent drop in Retail costs as provided by the ACCC. In May 2008 I put a Submission[12] about the NBN and part of this is in the Appendix in this submission. From the engineering side, not only was the equipment much less expensive but the bandwidth was phenomenally larger also massively impacting cativating the overall infrastructure costs as show in my chart below (taken directly from the figures in the Appendix):



So, the end user costs have apparently dropped by 20% and the overhead costs had cavitated by about 80% - this is a massive discrepancy.

[11] http://www.moore.org.au/comms/05/20040702%20Backhaul%20Network%20Transmission%20Systems.pdf
[12] Appendix: Savings Due to Improved Technologies (May 2008)

On an aside note, I recall having a mobile phone monthly fee of $20 that had to get "upgraded - because the contract ran out", there is no way I can get back to my $20 monthly fee contract, so I am extremely sceptical about "cheaper service costs".

So, instead of installing extensive inland telecoms infrastructure to proactively minimise the overall costs in the future, and set up Australia as a very robust Internet connected nation, inland install and maintenance was minimised and the inland was let run down in much the same way as Toll Holdings ran New Zealand Railways into the ground[13] - where New Zealand Railways had to be Nationalised to stop the rot.

Putting it another way, I believe that initially Telecom Australia used the USO funding to maintain the inland network for telephony (and very little else), then as the technologies advanced and the overhead costs absolutely plummeted, the now Telstra were caught with a problem of ensuring the gravy train of the USO kept coming, so the Country Wide Division would have to continue running at a loss.

In the early 1990s I believe that some (Telstra Country Wide) General Managers were innovative and introduced Shop fronts in country cities - and their Regions started to show profits. At this stage I believe that all hell broke loose and the entire Country Wide Division was re-structured, shops closed and the course set to continue making a loss (to keep getting the USO gravy train).

Now - the number of (metropolitan) lines is dropping as people are moving to mobile phones, but the number of fixed line phones in country areas is remaining rather constant. The chart in Figure 6 of the Issues Paper is a blanket picture that is deliberately (intentionally) or in total ignorance missing the necessary data related to the USO (non-metropolitan) areas, which the USO Issues Paper is all about.

The problem for Telstra is that the NBN is rolling out Satellite and Radio Base Stations for Mobile Phone coverage in areas that deliberately will not cause any competition to Telstra (looks and smells very much like a cartel), but, in the next few years people will be moving to Broadband and incorporate Voiceband communications in the Broadband technology - effectively slicing off the reason for receiving the USO gravy train - which was based on Telephony.

So - what to do? Find a reason for the Federal and other Governments to come up with equivalent USO funding in the form of the Radio Black Spots programme (initiative) and very discreetly close off the USO (looks good) and announce the Radio Black Spots programme (looks really bad).

Alternatively - Stop paying shareholder dividends for a decade or so and put in the infrastructure that should have gone in more than a decade ago.

Alternatively - Physically Separate and focus on Retail Reselling with maximised profits, larger market and larger shareholder dividends. Merge the telecomms infrastructure and move Australia ahead with a very economic Infrastructure Business mindset putting in all the right infrastructures and with long term planning.

[13] http://www.moore.org.au/busn/02/privatecircle.ppsx

Got it Wrong with ADSL

Several years ago it became very apparent to me that ADSL technology was being rushed into service by Telstra and other Competing Businesses that were masquerading as Infrastructure Businesses.

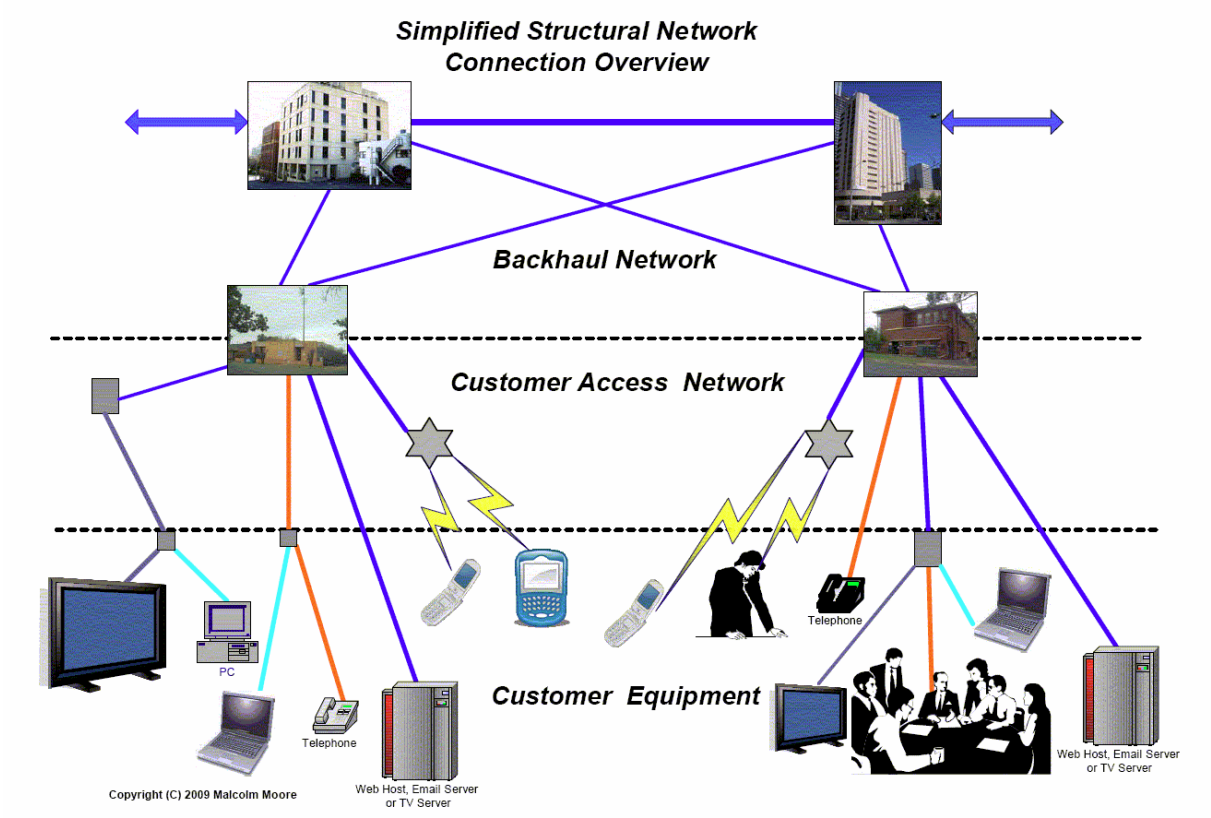
The first tell-tale mistake was that when ADSL[14] was initially rolled out - it was in the highest and fastest high return on investment (ROI) areas of the major capital cities and their suburbs ("metropolitan" areas).

Why, because a high return on investment (ROI) would be the fastest way to pay for the investment of early generation Digital Line Service Access Multiplexers (DSLAMs) in the short term.

First generation ADSL at nominally 1.5 Mb/s was a real quantum leap above Dial-up at 0.056 Mb/s maximum and had the potential to very inexpensively provide Broadband connectivity on pre-existing pair copper cables being used for fixed access telephony. Just shove it in and it works!

The product could be widely marketed / advertised and (most importantly) and, yes the metropolitan areas have a mesh (grid) of Inter-Exchange SMOF because the DSLAMs directly back-connect through "Edge Routers" into the conformal IP lowest level of the Inter-Exchange Network.

For those that have a serious lack in how the telecomms infrastructure is physically "layer" structured; the above paragraph is rather meaningless - but - it is imperative that this layered infrastructure is well-engineered critical for efficient, productive, effective or it is far from economic.



[14] The Appendix includes "An Outline about ADSL"

The above picture shows[15] very simplistically how the Customer Access Network is on the edge of the Inter-Exchange (Backhaul) Network. ADSL is shown near the left had side of the CAN (with an orange line, representing pair copper) connecting to a computer and phone (through a small block representing an ADSL modem and filter in the Customer premises equipment layer. The cyan (light blue) cable is Cat 5 as part of the LAN, blue is SMOF cable, grey is coaxial cable.

Note: there are no customers connected to the Inter-Exchange (Backhaul) Network.

The next generation of ADSL (6 Mb/s downstream) was considerably faster and because global manufacturing was in earnest the DSLAMs were considerably less expensive. These DSLAMs too, went into areas where the ROI was highest (to maximise shareholder value). Over the next decade this process repeated itself again (8 Mb/s) , and again (12 Mb/s) and again (24 Mb/s) - just like mobile phone technology!

The technology of ADSL is now well-matured and inexpensive - but - ADSL technology was definitely not a Universal Service that was rolled out to all Customer pair-copper lines. Instead of rolling out ADSL2+M for all the nation (as any infrastructure Business would do very economically), the country areas that are largely small businesses totally missed out.

Rather simple analysis of the My.Broadband data clearly showed that Villages and Small Towns got virtually no ADSL connectivity. This Competitive Business mindset ADSL lack of rollout crippled about 300,000 premises or about 750,000 people in the inland, and is costing Australia big time in Social Services, restricted communications and a comparatively lower standard of living.

DSLAM2+(M) equipment is now very inexpensive and readily available and because most premises in Villages and Small Towns are less than 1000 m from the Small country Automatic Exchange (SCAX) hut that would house this very inexpensive equipment, the downstream speeds would be consistently at 24 Mb/s.

The engineering reason why almost nil DSLAM2+M equipment has been installed in these 2545 Villages and 1136 Small Towns is that there is a very thin (almost non-existent) Inter-Exchange Network in the inland. The long term engineering planning is virtually zero!

The undoing was that (as far as I can tell) apart from testing for telephony services , there was nil ADSL specification testing done to ensure that the ADSL service has downstream speeds within 10% of the maximum speed (or some other similar criteria to ensure compliance with a reasonable customer standard).

If these competing businesses (i.e. Telstra etc.) were indeed really Infrastructure Businesses, then they would have ensured that every line would be measured for attenuation in the ADSL frequency band and re-engineered if not well within specification and further, when the DSLAM equipment was connected a system test would be in place to test and record the downstream speed and ensure it was well within the specified standard - so that there would be nil customer problems and the service would be as expected at the highest possible speed for that line length.

[15] http://www.moore.org.au/comms/01/20051102%20Telecommunications%20101.pdf

It goes virtually without saying that the Inter-Exchange Network connection through the Edge Router would have been engineered such that the chance for network congestion and switch congestion would be extremely low and not impinge on the DSLAM performance.

Got it Wrong with the Cable Internet

In late 2004, it became apparent that Telstra was threatened to be Structurally Separated because it had not provided Universal Broadband connectivity and I believe that panic set in.

Until this time Cable Internet technology was totally contained within the Hybrid Fibre Coax infrastructure that was strictly metropolitan-based, and structured from a single (geographically central) communications building (exchange site) per capital city - and coincidentally it was getting rather crowded. This was a serious lack of Forward Planning and all about maximised ROI for shareholders - all very characteristic of Competitive Business and nothing about Infrastructure Business.

In panic mode Telstra installed Cable Internet Broadband Routers in every metropolitan terminal exchange (about 400 of them nationally) and a lot of associated equipment (edge routers, Service Control Network (telemetry) structures etc., plus a total rebuild of all the metropolitan Inter-Exchange Networks in SMOF, plus major regional IP switches[16] as pairs in every capital city. I was contracted as the Supervising Engineer to manage the Sydney metropolitan rollout for about 124 sites.

This panic infrastructure build was not a full structure as it was nationally capable of about 6 M premises connections if fully fleshed out. This was a minimum build capable of about 1 M premises connections but all the racking and wiring was in place for this to be very quickly fleshed out to full capacity if push came to shove!

By 2006, the panic had subsided, and that was very fortunate because several years before, the HFC infrastructure was competitively rushed into service for all the wrong (competitive) reasons and "passed" far more premises than it was physically capable to be connected to and working reliably.

Got it Wrong with Mobile Phones

The technology of Mobile Phones has slowly morphed from Voiceband (circa 1990) to Broadband (now), a space of about 15 years and basically five GSM-based technologies - discounting Analogue (because there were no "digital" features), and forgetting GSM1 and GSM2 (because the radio frequency bandwidths were far too narrow and the linear predictive voice encoding with these technologies' very limited bandwidth could not provide clear voice communications).

While it looks far more like a new GSM technology comes out every four to five years, there is a blend of technologies that provides a mix of mobile device connections that has backwards compatibility in the Mobile devices. Much like ADSL, the technologies are interchangeable depending on the available telecomms infrastructure.

[16] http://www.moore.org.au/comms/05/20040702%20The%20Internet%20Protocol%20Network%20_IPN_.pdf

From the outside, this technology morphing appears to be fast, but each (of the workable and practical) GSM technologies has a lifespan of about 10 years to 20 years, or more. Currently the metropolitan standard is some GSM4 and GSM3, but the GSM3 will gradually be replaced by GSM5.

The re-fitting for a "new" technology e.g. from GSM2 to GSM4, or GSM3 to GSM5 is really a "drop-out drop-in" process that involves very little wiring in comparison to installing ADSL (where every CAN pair has to be individually terminated, cross-jumpered, transposed and re-terminated) or Cable Internet (where the whole HFC has to be re-engineered so that premises can be connected and not simply "passed").

Again like ADSL technologies and the Competitive Business mindset, the older GSM technologies are systematically transported to much lower ROI areas and re-installed instead of installing new equipment in lower ROI areas (and doing it right).

Paradoxically, the "lower ROI areas" as perceived by Competitive Business mindset / interests are the high "small business" areas that have great potential to maximise Australia's exports, and dramatically reduce Australia's foreign debit / balance of payments.

So, why would many of the inland areas be blotched with several hundred Radio Black Spots after over 25 years rollout of mobile phone connecting infrastructure?

The not so obvious answer is that most of these inland areas are bereft of Inter-Exchange (Backhaul) Network that could back connect radio base stations that provide the radio connectivity to mobile devices (usually along major roads).

Why? Because Competitive Business mindsets have a very short future plan and only invest where they can maximise short-term shareholder dividend value - and the expense of the Australian economy.

Telstra has been given the USO worth about $300 M pa for some decades, the cost of rolling out SMOF cable and its associated transmission terminals / routers has cavitated to be about $30k/km in the inland.

So about $100 M pa effectively accounts for about 3300 km of inland SMOF cable every year, or about 33 km of SMOF cable in the past decade. This would have more than laced the inland with a SMOF grid that would have made Radio Black Spots extremely inexpensive to mitigate.

Got it Wrong with Radio Black Spots

Any real Infrastructure Business would have had (engineer-based) Forward Planning done some years before (5, 10, 15 years) to ensure that there would be sufficient SMOF cable in the ground in the inland at least 5 years ahead and had plans in place for 10 and 15 years in advance - so that when the expected Radio Base Stations are rolled out, then the cable and associated network infrastructure would already be in place (and some spare too), so that if any Radio Black Spots were identified (even during the field testing), then these Black Spots would be attended to and corrected before or as the service is commissioned.

So here is the problem - Why have these Radio Black Spots been identified and frustrating the public, and where is the Forward Planning to proactively fix the problem before the public are aware of the issue?

The Federal / State / Local Governments should not be putting any money into the Radio Black Spot program because Telstra have proven they (and all the other Competitive Business telecomms companies masquerading as Infrastructure Businesses like wolves in sheep hides) are not putting the USO funding into maintaining and building the inland telecomms infrastructure.

The Telstra USO Performance Agreement

Clearly Telstra is not an Infrastructure Business, but a Competitive Business with shareholders, so it is the wrong business mindset to have infrastructure under its care, and the litany of consumer problems is a national disgrace that has gradually become worse with time as the cost of the equipment has decreased and the bandwidth has even more inexpensively increased.

The scare is that the number of fixed lines in country areas may decrease and this may curtail the USO gravy train funding, so another "performance agreement" is being sought to falsify future payments to Telstra - the Radio Black Spots programme. The USO and Radio Black Spots funding should all go to the NBN and the NBN must immediately stop advertising / promoting its products / services.

The Current USO

CUSO 1

How many USO standard telephone services are currently provided and where?

According to the Federal Government-run My.Broadband[17] website, the associated Excel Spreadsheet shows the fixed line telephone line (i.e. service) count for every Consumer in Australia, and the count by given be District Areas (DA), which are subsets of Exchange Switching Areas (ESAs).

Looking at these readily available Federal Government-based statistics in another view, the ESAs are totally representative of the associated Villages, Towns, Cities and Suburbs. Removing the Suburbs and Cities leaves the Towns and Villages, which are not in the metropolitan or densely populated areas, and effectively this is the answer as the detail here provides the USO standard telephone count at every location in Australia.

Looking at this very simply analysed data (information) in another light, the ADSL downstream speed provides very clear statistics of which areas have nil ADSL facilities for inexpensive Broadband connectivity to the Internet infrastructure.

CUSO 2

Who are the main groups of users of USO standard telephone services and payphones?

[17] https://www.mybroadband.communications.gov.au/

The answer for this is direct and very simple analysis from CSO1 and the Australian Bureau of Statistics (ABS).

CUSO 3

What are the respective shares of these user groups?

The answer for this is direct and very simple analysis from CSO1 and the Australian Bureau of Statistics (ABS).

CUSO 4

Aside from the rollout of the NBN, what are the major factors affecting the use of USO standard telephone services?

Reliable basic telecommunications is an Essential Service, not a Discretionary item.

Before 1982, the focus was to provide equitable telephony (telecommunications) services to every household - irrespective of the location.

Australia had one of the best telecomms infrastructure in the world, even though Australia was really struggling with WW2 debit for decades.

After 1982 the focus abruptly changed to provide shareholders with maxim dividends for their "investment" and only invest funds where the internal ROI was maximised (i.e. the cities)

After 1984 the technology of SMOF cavitated the cost of long distance transmission and concurrently provided immense bandwidth

By 1993, almost all inland transmission[18] (through the IEN) was through (new) SMOF providing very inexpensive and very reliable back-connectivity for the very large majority of nominally 5010 telephone exchanges in Australia - of which about 2545 are in Villages[19] and 1136 are in Small Towns and about 300,000 premises (or 2.5 people per premise[20]) really adversely affects about 750,000 people living in the inland, but not in inland cities (that is about "everybody")!

It is blatantly obvious to me (and it should be obvious to you) that splitting up Telecom Australia so that Australia lost its "economy of scale" infrastructure, and Privatising the broken up sub-infrastructures was fundamentally a monumental mistake that to date has cost $43 Bn in the sale of Telstra, immense lost productivity since about 1985, say about $2 Bn pa = another $62 Bn at least, totally unnecessary multi-duplicated infrastructures (HFC wasted at least $3.7 Bn not including duplicated Cable Internet = $4.5 Bn and counting, multi-duplicated unnecessary long haul transmission $1.5 Bn pa = $47 Bn and counting, the dropping of maintenance of low ROI infrastructures that have cost at least $10 Bn in USO costs to cover up the mistake, and the roll out of the NBN another $43 Bn and escalating very quickly.

Then there is the **Radio Black Spots program (about 0.3 Bn pa) which is rapidly escalating to replace the USO** (no surprise both are about the same value) and

[18] http://www.moore.org.au/comms001.htm
[19] http://www.moore.org.au/comms/03/201601inlandADSLinSCAX.ppsx
[20] http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1301.0~2012~Main%20Features~Households%20and%20families~56

continue to cover up for the monumentally expensive mistake of privatising Australia's essential service of telecommunications.

This greed for mindless privatisation has crippled Australia's national productivity - particularly beyond the high ROI capital cities...

CUSO 5

What will be the impact of the NBN rollout on the provision of USO standard telephone services, particularly once the NBN rollout is completed?

In my professional opinion as a very experienced telecomms engineer and with considerable hands on-experience in Australia over 35 years, the McKinsey based plan for the NBN beyond the capital cities is fundamentally incorrect and needs to be urgently revisited and substantially re-directed to provide a far more economic outcome with a far higher network capacity in the inland.

CUSO 6

What are the major factors affecting the use of payphones?

Location, alternate telecommunications services and public ownership.

CUSO7

What are the main benefits and costs of the current USO?

The main benefit of the USO was always, and still is, to make the geographic lower ROI areas appear to be financially profitable so that privatisation of Australia's telecommunications infrastructure could be very dishonestly pushed through.

There have been no benefits from the USO funding, because all the benefits came through technological advances.

In most cases these technological advances have been delayed for many years, and/or old equipment from higher ROI urban locations have been "handed down" and re-located into lower ROI areas to minimise the operational costs and provide a minimum of service standards, but retail the USO funding

The direct cost to date is in the order of $10 Bn and counting, the indirect cost of privatising Australia's telecomms infrastructure is **outlined in CUSO 4 above to be at least $203 Bn and escalating.**

CUSO 8

How effective is the current USO in meeting its objective of being 'reasonably accessible' to all people in Australia on an 'equitable basis', wherever they reside or carry on business?

This is a loaded question because whomever came up with this either is oblivious to over 16 Select Senate and other similar Inquiries in the past 20 years that have provided no substantial solutions even though many of these Inquiries had plenty of relatively simple engineering strategies put to them and literally nothing of value has reached these Reports.

The cause of the problem goes back to 1980 where the concept of the USO was raised to sell off a perfectly working Telecomms Commission so that private equity shareholders could get into the "rivers of gold" and strip the telecoms infrastructure works program.

As a direct result of this grand theft, funds have gone to shareholders instead of infrastructure and the Federal Government has propped up the low ROI areas with the USO (about $10 Bn to date) to make these "look profitable". This strategy also failed but it got much worse in later years because the rollout of Broadband technology was delayed about 15 years, so a subsequent Federal Government put up the equivalent of what Telstra was sold for ($43 Bn) to fill the massive void caused by privatising the infrastructure.

Considering that is would cost about $0.81 Bn to roll out about 27,000 km of 144 strand SMOF cable throughout the inland including this being substantially connected as Backhaul and shared as non-urban FTTP, (and provide substantial Backhaul between centres, and provide the FTTN capability for Radio Base Stations) I would say the current USO and NBN are total rorts.

CUSO 9

To what extent is the current USO consistent with promoting competition and innovation in the telecommunications sector?

In terms of an Infrastructure Business mindset, if funding telecomms low ROI infrastructure to provide consistent (wholesale) connectivity on a national basis provides a larger scope of wholesale connectivity that can be resold through the Competitive Business mindset Retail Resellers; then the USO / NBN funding is promoting retail reselling competition.

It is up to the Competitive Business mindset retail resellers to innovate in their expensive advertising and marketing to increase their market share at the expense of other retail resellers and at extra cost to the end users.

In my professional experience and opinion, I have seen how and why infrastructure competition is horrendously expensive, extremely uneconomic and extremely unproductive.

To minimise NBN/USO costs to the Federal government and maximise productivity for Australia; the entire telecommunications infrastructure must be under one sub-Government Commission with an Infrastructure Business mindset (certainly not a Competitive business mindset.

This simple two-level structure provides optimum retail competition matching the ASX / shareholders needs with a maximised retail reselling market, and a maximised wholesale supply of robust and reliable telecommunications infrastructure that requires virtually nil Government funding, and a minimum of regulation.

CUSO 10

Has the current USO affected competition positively or adversely?

The USO is there to support fixed telephone infrastructure where the wholesale ROI is negative, the USO is not there to provide competitive commercial retail reselling.

CUSO 11

Has the current USO discouraged innovation or created distortions that have affected the use, quality and reach of telecommunications services in Australia?

It is not the USO, but it is the privatisation of the telecomms infrastructure that has changed / replaced the business mindset from an Infrastructure Business mindset to a Competitive Business mindset that has discouraged innovation or created distortions that have affected the use, quality and reach of telecommunications services in Australia.

The wholesale telecomms infrastructure must be under one sub-Government Commission as an Infrastructure Business (mindset) . The Retail reselling part must be physically separate and be as a Competitive Business (mindset).

Other Current Policies and Programs

CPP 1

What other current government policies and programs interact with the current USO or may be seen as acting as a substitute for the USO?

Since the USO was instigated in 1982, the telecommunications infrastructure in Australia has gone through a complete metamorphosis where in 1982 it was analogue transmission with mechanical switching, and very few "features" such as Calling Line Identification (CLI) was technically feasible.

CLI was not a technically practical consideration until the whole telecomms Inter-Exchange Network was communicating the signalling with Common Channel Signalling No 7 (CCS7) instead of Channel Associated Signalling (CAS) - and that really did not happen until about 1988 - 1990 some seven years after the USO was struck, when CLI was a far-fetched dream.

With the mass transformation beyond Subscriber Trunk Dialling that happened by about 1968 in Australia and about 1990 in the USA (note that Australia as an infrastructure business was decades ahead of the USA - the champions of privatisation for all the wrong reasons), the amount of Operator and Directory assistance was severely curtailed, and most is now done offshore - even though the dialect is particularly difficult to comprehend - Telstra simply does not listen to its customers.

One of the technical features of CCS7 is the ability to retrieve itemised call records that now (because we have very powerful and very inexpensive computing that did not start to be practical until about 1990) can be used to correlate and structure itemised billing.

The term "Customer Service Guarantee" is a disgrace that has no place in the Infrastructure Business mindset - because this is the core KPI and everything else is dependent on this (in other words **the customer comes <u>first</u>**).

The term "Customer Service Guarantee" is a painful thorn in the face of any Competitive Business because the core KPI is all based around making profits for the shareholders and everything else is dependent on this (in other words **the customer comes last**).

It is extremely clear to me that if "safeguards" are needed to make compliance then the wrong business model is being used. With the right business model all the safeguards (and more) would proactively be in place and regulation is totally unnecessary, and unwarranted.

Telstra / Optus etc. are all now Competitive Business mindset corporations with their first priority on maximising shareholder profits at the expense of the end users (customers) and minimising service wherever possible.

Competitive Businesses spin off their low / negative ROI business units to maximise shareholder profits. The inland (i.e. non-metropolitan) areas of Australia are a Loss Centre, so it makes absolutely nil commercial sense for this infrastructure to be held onto by Telstra / Optus.

The NBN should immediately take over all non-metropolitan telecomms infrastructure from Telstra etc., and receive the USO and Radio Black Spot funding; immediately roll out in the order of 25,000 to 25,000 km of inland 144 strand SMOF cable to form a loose inland grid that would be the infrastructure foundation to handle Australia's impending high capacity Internet connectivity problems. provide a low latency alternative to Satellite, provide non-urban FTTP facilities, provide back-connectivity for Radio Base Stations, and provide for inland business development - e.g. northern Australia (as alluded to by the then Abbott Government - but the plan was a pipedream that was not fleshed out or considered in depth).

CPP 2

What are their main benefits and costs?

Cynically, the USO offsets costs dividends.

CPP 3

How effective are these policies and programs in achieving their objectives?

The Federal Government has been asking this same question from about 1997 onwards - they have been told time and time again that it does not work and still they keep "kicking the dead horse". ENOUGH...

If you don't believe me (that the horse died in about 1990 and no amount of USO etc will re-incarnate it) then check my litany of Submissions[21] relating to telecomms failings in Australia to Federal Governments Departments dating from 1997 (near the bottom of the reference webpage until about 2010).

[21] http://www.moore.org.au/senh001.htm

Rationales and Objectives

RO 1

Are the underlying rationales for the current USO still valid in today's evolving telecommunications market?

The USO was set up in the Davidson Report (1982) to deliberately provide significant Federal Government funding to Telecom Australia Commission as the then infrastructure owner of the inland telecommunications infrastructure with the primary intent to deliberately mislead potential investors into purchasing shares in the intended to be privatised telecomms infrastructure.

Although the Davidson Report sighted many access technologies (including pair copper, Pay TV, Satellite and terrestrial radio), the major technology in 1980 / 1982 was fixed wire telephony. Dial-up modems were in their infancy and Fax machines did not really get going until about 1984.

The name of Universal Services Obligation (USO) is also deliberately misleading (most probably again to mislead potential investors and the public in general), in that the wording of the USO is specific about "telephone" and not "telecommunications", and in that light it really should have been called the Telephony Services Obligation (TSO), but Universal has an air of grandeur about it.

RO 2

Can the NBN be treated as an alternative (wholesale) USO service?

If the USO were to be re-written as "telecommunications" instead of "telephone" to truly reflect "Universal" then the whole funding has to be totally re-considered to include all forms of Broadband (and Voiceband) technologies.

This situation would then ask what Broadband-capable infrastructure already exists in the inland and why Telstra has not reconfigured this infrastructure to make it Broadband capable.

In an almost similar mindset, the NBN (superfast Broadband) infrastructure is based on 25 Mb/s and above, and Telstra (with USO funding) has deliberately avoided rolling out very inexpensive ADSL2+ broadband infrastructure into over 2000 inland villages for an estimated cost of about $50 M.

There are two massive problems here:

- If Telstra did roll out (very inexpensive) ADSL2+ into over 2000 villages then this would jeopardise the USO gravy train because these inland areas could start to become profitable.
- The McKinsey's Cost Benefit Analysis as used for the Blueprint for the NBN infrastructure was done using northern hemisphere templates that in no way matched the Australian inland (hence the call for totally unnecessary and extremely expensive satellites).

RO 3

What is the justification for funding two sets of infrastructure (the NBN and the current USO standard telephone service) in the highest cost areas?

It is very clear to me that very few people (even in the Australian telecommunications industry) have any comprehension that the NBN is not a functional telecommunications infrastructure but a series of partial access network infrastructure sub-sets that are separately back-connected by the Telstra Inter-Exchange (*Backhaul in USA slang*) Network (IEN).

It is also very clear to me that whoever wrote this PC Issues Paper has a virtual nil comprehension of the massive size of the Inter-Exchange Network. The Diagram in Figure 1, Page 5 demonstrated this severe lack of engineering comprehension by virtually omitting what is the prime telecomms real estate in the inland.

Consider that in Australia there are several tens of thousands of km of country highways and main roads / railroads, and thousands of km of suburban arterial roads. Alongside almost all these roads are optical fibre cables and in these terminate in to over 5010 switching sites, only 400 of these sites are in the major State Capital cities and their suburbs. Like the roads, these switches are in four hierarchical layers / levels where the lowest level connects to the Local Switches that interface with the Broadband / Copper CAN / Mobile Phone Radio Towers etc. and the highest level connects with competitive carriers and international circuits.

These two sets of infrastructure are joined at the worst possible economical location (a Point of Interconnect). It would be far more productive to have Telstra physically separated so that it can focus on Retail Reselling for its shareholders and have the NBN and Telstra (and all other telecoms infrastructure in Australia brought into one sub-Government Telecomms Commission), eliminate the USO, and eliminate the requirement for Points of Interconnect (POIs).

The current USO-funded standard telephone service (as it is put) is in reality the inland telecommunications infrastructure that is almost all owned by Telstra, but it is running at a "loss" so that the USO will not be removed from the books.

RO 4

What evidence is there to support the rationales?

The fact that the NBN is using Satellite for relatively isolated (with respect to the northern hemisphere) demographics (that the engineering / marketing is based on) **is screaming out** that there is a severe lack of (available) inland Inter-Exchange Network SMOF cable in the ground ready to back connect local switches (to provide very inexpensive ADSL and long-term reliable FTTP) and provide very inexpensive Radio Base Station connectivity for mobile device connectivity in the inland.

RO 5

For example, are changes in technologies reducing the costs of providing telecommunications services in regional and remote areas?

Australia has absolutely blown a fantastic chance to utilise technology like the Ngara[22] intelligent point-to-multipoint broadband radio system that was researched (but as usual, not developed) by the CSIRO - and make this developed technology available world-wide.

[22] http://www.sief.org.au/Documents/RP/NgaraFinalGeneralReport.pdf

Why? Because the terms of reference for the McKinsey's Cost Benefit Analysis were drafted by Multi-national telecomms manufacturing businesses that put themselves in the box seats to pick up the telecomms equipment sales.

> *Part of my professional career was with Nortel Networks (a then very large multi-national telecommunications equipment manufacturing and marketing corporation with global manufacturing and marketing facilities) as a Bid Manager - having the technical experience, engineering knowledge and management expertise to put people and data together in Bids for Tenders and orchestrate a range of documents, events and situations to secure sales of telecommunications equipment.*
>
> *Part of my brief would be to be across which "accounting firms" that would be assisting a range of Government bodies, and I was a direct conduit for our facilities and brochures to be more than readily available to ensure a maximum of flow-on sales - not always what the Tender needed, but what would give the highest ROI for the manufacturers. It's called "Business"!*

Using Satellites for the inland infrastructure really suits the northern hemisphere satellite businesses, but is horrendously expensive and totally inappropriate for inland Australia because there is already a huge amount of SMOF cable that is extremely under-utilised in the inland that could very inexpensively utilised to provide very low latency and highly reliable Broadband infrastructure.

In the past 15 years I have provided a wealth of telecomms engineering expertise to several Select Senate Inquiries and other similar telecomms Inquiries, that if taken up, this knowledge would have saved Australia many $Bn and provided the most cost-effective inland telecomms Broadband infrastructure, necessary to really build Australia's GDP while significantly reducing the costs of inland Social Services.

Even now, following the My.Broadband[23] website that included an Excel Worksheet that provided basic ADSL downstream speeds; some relatively simple analysis on that 95,000 row spreadsheet showed where ADSL technology is working properly. Far more importantly this Excel Worksheet clearly where (which cities, towns, suburbs et.) the very high proportion of localities where ADSL technology is operating well under expectations, and why the productivity / performance is so poor.

The most striking analysis of this Worksheet was the understanding that an extremely low number of the 2545 Villages (up to 250 premises) and 1136 Small Towns (up to 1040 premises) in the inland have absolutely nil ADSL facilities.

Virtually all the premises in the Villages and Small Towns are within 1100 m of their Local Switch - Small Country Automatic Exchange (SCAX) hut, and if DSLAM2+(M) equipment were installed in these huts, then virtually 100% of these premises would very inexpensively (about 1% the cost of Satellite connections) connect at 24 Mb/s.

To further implicate the absolute stupidity and gross loss of national productivity by invoking competition into the Australian telecommunications infrastructure, is the notion of using Satellite technology (which is literally huge money being shovelled off-shore for very little return), when we have pre-existing and reliably working Digital

[23] https://www.mybroadband.communications.gov.au/

Radio Concentrator Systems (DRCS) and High Capacity Radio Concentrator (HCRC) technology that has not been upgraded since the late 1970s.

The DRCS and HCRC technologies use existing masts and antenna to have point-to-point "hops" of upwards of 80 km totally a maximum of 660 km and 22 Homesteads per system to provide telephone connectivity to outback Homesteads.

By re-vitalising the technology in these old but reliable systems the full 50 MHz bandwidth would be available to very inexpensively provide reliable and low latency Broadband that is well in excess of 150 Mb/s bi-directional to several hundred of the most isolated Homesteads in Australia and get these Homesteads off Satellite.

In a very similar mindset, the inland of Australia did (last decade) require at least 20,000 to 50,000 km of SMOF cable to be run (trenched in) between the vast majority of inland country centres[24] with high capacity "spurs" out to the coast.

Apart from arranging this SMOF cable to be manufactured in several inland localities in Australia, (which would go an awfully long way to build the Australian economy) this SMOF cable would provide the necessary Internet highways that are desperately missing to interconnect all Australian inland localities with a loose grid of extremely robust Inter-Exchange Network high capacity Internet infrastructure.

The direct offshoot of this IEN infrastructure is that because 144 strands are in these cables, these strands can be "shared" in the same sheath for both IEN and CAN functionality creating an extremely economic (inexpensive) and highly productive inland infrastructure. These 144 strand SMOF cables can be trenched in to pass close by Homesteads and provide very inexpensive non-urban FTTP[25] up to over 45 km from the nearest Local Terminal Switch. In more remote situations two strands can hop up to 160 km to connect with Homesteads.

Telstra has proven it is certainly not going to make any productivity improvements to the inland telecomms infrastructure unless it's arm is really forced to let go of shareholder dividends (and the USO), and has embarked on rolling out Radio Base Stations because these contracts will lock the end users into very costly contracts.

In a very similar "virtual cartel" the NBN is extremely careful to not encroach on pre-existing Telstra Broadband Access Network infrastructure, and it was "interesting" just how quickly Telstra pulled out of installing ADSL technology once the NBN was announced.

RO 6

To what extent are there market-based alternatives to the delivery of universal services through the current USO?

Refer to the answer in RO 6. I could show how an investment of about $1Bn in the inland would have a ROI exceeding $100 Bn for Australia.

Over the past 18 months the Facebook BIRRR website has thousands of extremely agitated would-be inland Broadband connections, which to date these people have been amazingly courteous and thankful that they can (after much wrangling and

[24] http://www.moore.org.au/senh/2010/NBN%20Business%20Case%202.pdf
[25] http://www.moore.org.au/comms/20130412%20Inexpensive%20Non-Urban%20FTTP.pdf

sufferance) get a pitiful standard of Broadband by either Satellite or 4G and have a monthly budget that is horrendously expensive and small. Only recently these people arranged for Telstra to not charge for Education associated Broadband usage, which when you think about it shouldn't be an issue until you realise that their monthly budgets are very small ($120 / 8 GB) and extremely expensive compared to metropolitan Broadband ($60 / 1000 GB).

What amazes me is that the Class Action Lawyers have not formulated a national Class Action against the staff in ACMA / PC / ACCC etc. for dereliction of duty.

RO 7

What evidence is there to support social or equity based rationales?

Refer to the answer in RO 5.

RO 8

What should be the objectives of any new universal services policy?

1 Stop the USO right now
2 Stop the Radio Black Spots right now
3 Stop the NBN doing any advertising or promoting
4 Put the non-metropolitan telecomms infrastructure into the NBN

RO 9

Are objectives such as universal availability, affordability and accessibility appropriate?

Again, with the correct (Infrastructure Business) mindset - i.e. a Government Commission that does not have a mindset to be spun off / privatised - these objectives are core KPIs and therefore are their top priority.

Broad Policy Options

BPO 1

What policy options should be considered in addressing universal services objectives?

Broadband connectivity is an infrastructure[26], so infrastructure measures (not competitive measures) should be used to calculate the value and ROI for Broadband (in every form - FTTP, 4G, 5G, ADSL, VDSL, Wi-Fi etc.), and these wholesale prices must be geographically consistent throughout Australia.

This value must be in terms of wholesale (i.e. roll out costs plus maintenance, plus lifecycle management plus a timely replacement schedule).

BPO 2

Is there a single policy or combination of policies that should be considered? What are their benefits and costs?

[26] http://www.moore.org.au/busn/02/CompetitionInfrastructure.ppsx

The big benefit of not having a USO or Radio Black Spots program (or whatever false reason can be "justified" to channel substantial funding into the private sector for apparently putting in infrastructure that) would have been done far more productively and far more economically life-cycle managed entirely out of the private sector.

BPO 3

Which countries should be considered in relation to any new universal services policies in Australia?

The first consideration is a country that has a directly comparable inland population density - this rules out Germany, New Zealand and Czech Republic.

The second consideration is a country that is "telecommunications isolated" from other countries - so this rules out Finland and Canada.

That leaves no countries in the PC Issues Paper that are relevant for consideration to justify USO / Radio Black Spot financing and this financing must be taken from shareholder dividends.

BPO 4

What aspects of their universal services policies should be considered?

None of these countries compare with Australia - so no universal services policies should be considered at all.

BPO 5

Which evaluations or reviews shed light on the benefits and costs of different policies?

There is ample evidence in this submission that very clearly sheds light on the intended fraudulent practice of offsetting funds (USO / Radio Black Spots - call them what you like) to maximise shareholder dividends, but not make proactive remedial network rebuilding in low ROI areas that would / could be also used as much higher ROI highways to proactively make the telecomms infrastructure far more efficient and lower cost than it currently is.

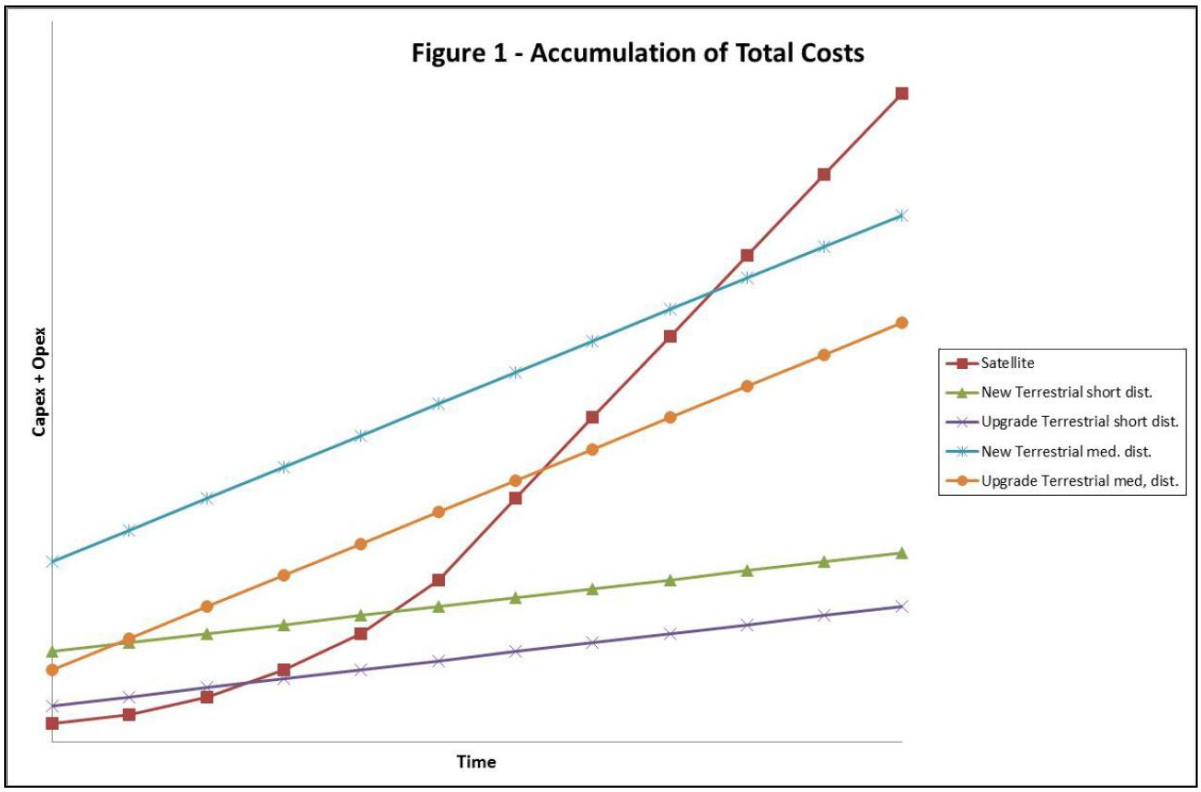
Check with Telstra and see how little SMOF cable has been trenched into the inland since about 1994 (over 20 years ago), and 2004 (over 10 years ago).

Rolling out a substantial 27,000 km of SMOF across the inland (Australia is only 2,500 km wide) would cost in the order of $810 M, and would set up Australia for high capacity Internet[27] for the next 50 years, and be far more valuable than the Radio Black Spots programme, which is a kneejerk reaction to the USO being closed.

This seemingly useless SMOF Inter-Exchange Network grid would get rid of satellite dependency (costing far more than $810 M every five years) and provide very inexpensive back-connections facilities for Radio Black Spots to be proactively eliminated at a small fraction of the current budget, and provide the Broadband

[27] http://www.moore.org.au/comms/03/201607ACCCsubADSLdeclareMM.pdf

connectivity for a revitalised Digital Radio Concentrator System[28] to deliver well in excess of 100 Mb/s (bi-directional) and alternatively provide very economical Non-Urban FTTP[29] and Urban ADSL[30] to thousands of Homesteads and urban premises anywhere in Australia.



Crouch: Satellite is by far the worst (most expensive, highest overhead) telecommunications medium.

BPO 6

Could the 'optimal' policy option for Australia be no USO?

Yes, and this should have happened in 1982.

[28] http://www.moore.org.au/comms/03/201606RevitalisingtheDRCS.ppsx
[29] http://www.moore.org.au/comms/20130412%20Inexpensive%20Non-Urban%20FTTP.pdf
[30] http://www.moore.org.au/comms/03/201601inlandADSLinSCAX.ppsx

Scope

Scp 1

What types of services should be included in any universal services policy?

Nil

Scp 2

Should current USO services - the standard telephone service and payphones - continue? If not, what alternatives to these services should be considered?

No. Re-read this submission and the recent submission[31] to the ACCC

Scp 3

Given the ubiquitous nature of mobile services, should fixed line services remain the focus of the USO?

Mobile device services are only ubiquitous (commonplace everywhere) in major urban areas, so this question is inappropriate because this PC Issues Paper is all about inland areas where there are many (on-road) locations that do not have mobile radio coverage, and nil elsewhere.

There are however, in the order of 750,000 premises in the inland of Australia that have fixed line services, of which most are in Villages, and Small Towns - but without any ADSL facilities - even through these premises are typically less than 1,100 m from the local SCAX huts - that could - very inexpensively - have ADSL2+ fully operational and use premises Wi-Fi to have 4G connectivity for mobile devices.

Considering that the USO is about $300 M pa and the cost of this and associated equipment plus installation costs come to about $50 M (about 2 months of USO), and virtually all these premises would take up the contract for Broadband connectivity, which would pay for itself in about 3 months - NOTHING HAPPENS!

This is a disgrace and Telstra should be stripped of the USO and stripped of the Radio Black Spots fundings and stripped of the entire telecomms Infrastructure.

Scp 4

Given emerging market, technological and policy developments, what areas of market failure should be targeted by any new universal services policy?

The market is economic failure by the Select Senate Committee clerks, the Regional Review clerks, the ACCC, PC and other Government Departments that have not acted to keep the private sector out of the telecommunications Infrastructure Business area. The private sector has its economic place in Retail Reselling and Manufacturing (outside Research and Development).

Scp 5

Should there continue to be a voice services safety net for particular user groups and, if so, what would be the best approach to providing this?

[31] http://www.moore.org.au/comms/03/201607ACCCsubADSLdeclareMM.pdf

When the telecommunications was being operated by a sub-Government Commission as a wholesale delivery Infrastructure Business[32], i.e. before about 1985, there was nil requirement for any "safety net", or discrimination between any user groups because these issues were proactively and very productively managed as part of the continuous Quality improvement process - which is impossible within a Competitive Business environment because "Compliance" where minimum standards are used , that causes the requirement of "safety nets" to protect end-users.

I will be happy to discuss with you on the best approach in providing this.

Scp 6

Which particular user groups (for example, Indigenous communities) and locations (for example, remote locations) should be targeted by any universal services policy?

None - see the above answer.

Scp 7

What are the telecommunications needs of these particular groups?

This is all proactively managed in my answer to Scp 5

Scp 8

Should telecommunications users in regional and remote locations reasonably expect exactly the same service quality and price (including usage) as those living in cities irrespective of the cost of provision?

Yes, and I can demonstrate how this can be very economically done.

Unfortunately, because telecommunications privatisation has systematically moved far away from providing ubiquitous services and multi-duplicated services in higher ROI areas we have been in the Second Best[33] situation for some decades, and the telecommunications sector needs a complete micro-economic reform. (And I can guide this process .)

Scp 9

What should be the criteria for the inclusion or exclusion of particular telecommunications services, user groups and locations?

[32] http://www.moore.org.au/busn/02/CompetitionInfrastructure.ppsx
[33] http://www.moore.org.au/busn/02/TheoryoftheSecondBest.pdf

Quality

It seems to me that the meaning of the word "Compliance" has been very euphemistically replaced with a totally different word called "Quality", because the associated questions are all about "minimum standards" / "protection" / "reasonable" / "consumer protection" etc that are all about minimum compliance and absolutely nothing to do with the real meaning of "Quality[34]".

The underlying problem is that the USO, or NBN, or Mobile Black Spot, or whatever funding programmes are all about funding for infrastructure - and that is an Infrastructure Business issue that has absolutely nil to do with Compliance, and everything to do with Quality.

In fact, if Quality was used properly in this infrastructure environment then there would be absolutely nil requirement for compliance or external regulation, as Quality processes and practices would self-regulate and provide maximum service standards at a minimum overall cost for a maximum coverage of locations - and the situation is exactly the opposite to this.

So, the term Quality is being deliberately used as a lie to falsify the acceptance of minimum compliance and just avoiding crippling regulation and that means no compliance if at all possible.

Compliance has its place in Retail Reselling - the Competitive Business side of economics - but certainly not here.

Qual 1

How should the benchmark for minimum standards of quality be set for universal services?

This is "Engineering 101" and ACMA (and its predecessors) was provided this information about 30 years ago from the then Telecom Australia.

There should be no infrastructure based benchmark[35] for "minimum standards" but service connectivity standards that consistently exceed expectations - this is the TQM approach.

The minimum standards strategy is all about retail reselling, which is all about minimum compliance with the laws. That's why cowboys and cowgirls (used car sales, politicians, drug dealers, gamblers etc.) belong in the competitive market and cannot be trusted. This is Competitive Business territory, certainly not Infrastructure Business territory.

Qual 2

Are existing consumer protections applicable to telecommunications services provision reasonable?

The Total Quality Management (TQM) education that I was very well-educated on is a very far cry and poles apart from the minimum Quality Standard (e.g. ISO-9002

[34] https://en.wikipedia.org/wiki/W._Edwards_Deming
[35] http://www.moore.org.au/busn/02/CompetitionInfrastructure.ppsx

etc.) that has plagued Australia from about 1997 and caused a raft of regulation-laced "protections" based around minimum provisions.

TQM involves continuous and regular revision at all levels of everything - to the very top of executive management itself. (No guesses who got rid of TQM in most competitive business in Australia at about 1998 and very quickly introduced ISO compliance ASAP).

With TQM in place (in an Infrastructure Business mindset), the consumer protections are naturally fostered, and service provisions are naturally and deliberately well above what is "reasonable". A common Quality approach is to put yourselves in the end-users boots and see the problem from the end-users perspective, then work through every issue to ensure that every end-user expectation is exceeded.

Qual 3

Is there scope to make these measures more efficient or cost-effective?

If the telecomms infrastructure is brought together as one national infrastructure business (body) and not scattered about in several privately controlled competitive businesses then there is a very wide scope to perform. **Otherwise - No.**

> *During 1988 - 1996 my national team of engineering and technical specialists developed a very wide range telecommunications measures and practices to continually improve the telephony-based engineering standards relating to (customer) Service Quality (in Telstra only).*
>
> *Each State had their own CAN Voiceband specification and these specifications had immense variations between each other. None of these specifications included the audio bandwidth - although this was the prime purpose of the Voiceband (mainly pair copper) CAN at that time. These specifications were brought into one common standard and included practical Voiceband limits and nationally applied in total co-operation.*
>
> *Initial testing proved that the equipment used for Voiceband testing was not impedance matched to the physics of the pair copper cable. New test equipment was researched and manufactured (in Melbourne) to facilitate accurate and reliable field testing and measurement.*
>
> *Further testing proved that the then new T200 phone was incorrectly engineered for general premises and substantial physical improvements and circuit changes were proactively made in full co-operation to the production line make these phones reliable, and free of audio problems.*
>
> *The whole of Australia's pair copper CAN was proactively and systematically "re-engineered" to ensure that nationally it complied with the Voiceband specifications. Every area that was doubtful was proactively remediated and brought well within specification - dramatically reducing customer complaints far below the previous stagnant results.*
>
> *Because there were several different technologies for interfacing the CAN into the Inter-Exchange Network, all these interfaces were proactively re-engineered to match the pair copper or pair gain systems as required - virtually eliminating echo.*

Mobile phones also had "Black Spots" that could be proactively identified by early GIS technology and referred to the infrastructure builders so pockets of the then metropolitan areas did not frustrate customers.

There was no drive to "comply" because the Quality approach far exceeded minimum compliance in every case and was far more economic being proactive than picking up the legal and regulatory scraps after compliance failures.

Privatisation forces for more shareholder profit was a direct collision course with real Quality so now there are walls of very expensive and totally unnecessary regulation that perfectly fits the ISO Compliance system of minimum Service Quality standards.

To get a gauge of this: count the cost of multiple Select Senate Inquiries and their meaningless Reports, the cost of Regional Telecomms Inquiries and their toothless Reports, the cost of the Networking the Nation fiasco, the cost of the very flawed "Business Initiatives", the cost of the USO, the cost of The Radio Black Spots, the cost of the NBN, the cost of the TIO and its rocketing complaints list. **This waste due to privatisation is currently in the order of at least $300 Bn**.

There is a massive scope to make these measures far more efficient and functional - but not under the privatised Competitive Business mantra / mindset.

Qual 4

Should consumer protection requirements be replaced or supplemented by transparent reporting by retail service providers?

Transfer all the telecomms infrastructure into one Commission; let TQM replace ISO 9002 etc, and the consumers will never need protection. This is very easy, is really efficient, is very economical and extremely productive.

Universal Service Providers

In reading this through it was like reading the Fairy Tale about Cinderella. You have the obvious answer staring at you in the face and you are looking everywhere else for the answer.

The Prince is the inland public managing the farms and other primary production and bringing up the next generation of Australians.

The Ugly step-Sisters are Telstra / Optus etc all greedily Competing to take what is not theirs and also fight with each other, and give very little.

Cinderella is the Infrastructure Business - current living near the kitchen fire, being stripped of assets, a future and being run into the ground by the Ugly Step-Sisters.

The glass slipper does not fit the ugly step-Sisters no matter how much they force this slipper (and virtually break the infrastructure) and they compromise, cheat and deceive to get what is really not theirs (the USO etc).

The glass slipper (the Infrastructure) is a perfect fit for Cinderella and the Ugly step-Sisters are really best suited to retail reselling - and they are charming in this role!

> *My father was a country Lawyer who spent a lot of his time resolving problems for others - often with nil compensation for his efforts.*
>
> *During one of our "walks" he told me that if a problem is complex to resolve then the resolution strategy is incorrect. From this point - stop - go back and tackle the problem from another point of view.*
>
> *With the correct resolution strategy the complex problem will be very simple to resolve.*
>
> *I have used this innovative work strategy many times in my 50-year working career to come up with a range of synergetic strategies that are simple and easy to implement.*

The Telecommunications USO Productivity Commission Issues Paper is right up the alley with every paragraph / strategy / notion / move described in that PC Issues paper being ugly and difficult - and therefore wrong.

The answer is obvious to me (primarily because I have the data from decades of experience, the information learned from analysing this data, the knowledge from analysing this information for some decades and the wisdom from analysing the historical knowledge in what works and what does not.

The Issues Paper refers to the USA system for universal service providers (and I shuddered because I know how poorly that works).

The fundamental problem is having competitive service providers because this situation is inherently extremely inefficient and the competitive overheads, resultant of lost economy-of-scale efficiencies are enormous.

It is like trying to win a 100 m race but you are running backward and in stilettos (and blindfold), while everybody else is in track gear and running sprigs. It could probably be faster to run 300 m in the other direction in stilettos and a blindfold, but the chance of causing serious collateral damage is extremely high.

USP 1

How should universal service providers be determined?

1 Infrastructure Business mindset only
2 Sub-Government Commission only
3 Total telecomms network in their care.

USP 2

Should there be competitive tendering for the provision of services?

What??? An Infrastructure Business would naturally develop and maximise the services totally eclipsing any need for competitive involvement at all.

USP 3

Should a provider of last resort be designated and if so, on what basis?

There would never be a "last resort" situation with an Infrastructure Business running / operating / funding this (wholesale) telecoms infrastructure.

USP 4

What incentives are required to ensure that a provider of last resort operates at minimum cost?

What??? Competitive Business is inherently far more expensive than co-operation as is the standard business practice in an Infrastructure Business, so the **Theory of the Second Best**[36] comes into play and there is no way that anybody with any real business nous would ever allow a private competitive operator to be involved with any "Universal Services" funding.

Why would you let Dracula be in charge of the Blood Bank?

USP 5

Is imposing reporting requirements on universal service providers as to who uses the services technically feasible?

Or - If we push just a little harder - do you think that the glass slipped will actually fit either of the Ugly step-Sisters????

USP 6

What, if any, requirements should apply to all service providers?

If the shoe fitted - then there would be nil requirements - because a single national Telecomms Infrastructure Business would proactively develop and produce infrastructure-based measures, equipment roll-outs and practices to produce results well ahead of requirements.

Other Policy Issues

OPI 1

How might technological neutrality be implemented under any new universal services policy?

We have had decades of Competitive Businesses models competing to provide (minimum) universal services and the results are disastrous - so why keep going down this same direction when any other direction is better?

OPI 2

How frequently should any universal services policy be reviewed, particularly given rapid changes in technology?

[36] http://www.moore.org.au/busn/02/TheoryoftheSecondBest.pdf

Now this is a very interesting question because from where I stand, the technologies are not rapidly changing but progressing through in a logical sequence since about 1966.

One rapid change was the introduction of Single Mode Optical Fibre (SMOF) in April 1984, where the spaning of hops between repeater / regenerators jumped from a few km to over 60 km in a matter of weeks.

Consider the cost of a regenerator is say $100,000 and trenching cable costs $30,000 /km. Pick a 1000 km span and that is $30 M for the trenched cable. Now consider the regenerators are spaced at 4 km, so there are 250 regenerators at $100,000 each which works out at $25 M so the project costs $55 M

Now (a week later) the regenerators can be spaced at say 12 km, so the regenerator cost is about $8.3 M and the total project cost is $38.3 M a saving of about 30%

Now (a week later) the regenerators can be spaced at say 22 km, so the regenerator cost is about $4.5 M and the total project cost is $34.5 M a saving of about 37%

Now (a week later) the regenerators can be spaced at say 45 km, so the regenerator cost is about $2.2 M and the total project cost is $32.2 M a saving of about 41%

Now (a week later) the regenerators can be spaced at say 65 km, so the regenerator cost is about $1.54 M but - we now do not need regenerators because we are going straight into transmission terminal equipment in a single hop and the total project cost is $30 M a saving of about 46%

Dense Wave Division Multiplexing (DWDM) came in about 1998 at 40 Gb/s but making that equipment is now considerably less expensive, and we are now in the 1000 Gb/s range some almost 20 years later.

Recently, IBM came up with a very inexpensive method of terminating SMOF strands directly into GaAs chips, where before this cost up to about $300 per terminal. Soon $1 optical (SMOF) terminations will be standard

Small Form Profile (SFP) SMOF connectors that include the electronics are now a worldwide standard that plug in directly to Network Routers - completely negating the need for optical transmission equipment in mast over land situations in Australia. These came out in about 1996 and were expensive the price has gradually cavitated since then.

When you work in the technical area like telecommunications and data logistics the technologies do not change fast - when you meet the technologies from outside as a rank outsider these technologies appear to change very fast.

Retail products can and do change quickly - just like fashion items and these are really best suited to competitive business retail resellers.

OPI 3

What other issues should be considered with respect to universal services policies and video?

To minimise the confusion - video is an application of a Broadband facility, and the Broadband facility is based on technology - which does not change fast. (See OPI 2)

Funding

The Issues Paper refers to the USA system for universal service providers (and I shuddered because I know how poorly that works). In the USA by far the highest number of bankruptcies per population is due to their privatised medical service providers that have maximised (essential) service costs. It is not that medical care is not very good, but the costs (**funding**) in the privatised medical system in the USA are gigantic, and for all the wrong reasons, primarily because the essential service of medical care in the USA is not run as an Infrastructure Business[37] (as it is in virtually every other country in the world), but run as a Competitive Business.

> *In 2014 I had a critical heart problem while doing "Seniors Exercises" that resulted in me having two stents inserted into the arteries in each side of my heart - a process that took about 30 minutes on average for each stent (over three separate procedures / operations and four admissions to hospital in a four-week period).*
>
> *The "essential service" cost (in Australia) for all this with our medical insurance the end cost was $0 If this situation had happened in the USA then the "universal service" costs[38] would be well over $100,000 and counting. In the USA the cost of Medical Insurance is extremely high, making it a major component of a salary package, and those on wages simply cannot afford these ongoing insurance costs.*

The intrinsic problem with having a Competitive Business mindset in charge of any Essential Service is that it does not take long for the management to realise that these "Essential Services" in competitive business language are "Cost Centres" - that is - they do not make a raging profit, these make losses.

The next intrinsic problem is that the Profit and Loss (P&L) accounting procedures used in Competitive Businesses is **entirely internal accounting**, so with this very "focussed" (blinkered) financial vision, the Accountants break up the business into "Business Units" in total isolation of each other and then score each "business unit" in terms of profitability.

No real prizes here, because almost instantly it becomes rather obvious that the high ROI areas (in telecommunications) are the non-essential (retail) service products where the discretionary end user prices can be gouged (mobile phones, texting, video watching, mobile video watching).

So to even further maximise shareholder profits a sizable portion of the profits is put in to marketing and advertising these high ROI retail products and concurrently some funding is put into increasing the availability of these high ROI infrastructures. Compounding this highly uneconomic situation, other competitive infrastructure

[37] http://www.moore.org.au/busn/02/CompetitionInfrastructure.ppsx
[38] http://health.costhelper.com/stents.html

providers also duplicate this high ROI infrastructure in the same geographic areas, resulting in a very inefficient national management of essential services.

Meanwhile the low ROI areas (and cost centres) are left to run down by deliberately minimising maintenance and minimising infrastructure rollouts because these "cost centres" impinge on shareholder profits.

The real problem is that these low ROI (telecommunications) products and services have a very different demographic than the typical high population density, urban high ROI demographic, and competitive businesses see only the internal accounting figures, which in reality is less than 50% of the overall economic picture.

Highly profitable Competitive Businesses ride on the foundations of excellent Infrastructure (Businesses).

The technology of tarred roads (which co-incidentally tar is a primary (major) waste product of petrol and diesel fuel) as an infrastructure provides the platform for the competitive sale of a range of road transport vehicles. Tarred roads and SMOF cable have a lot in common with each other (apart from running beside each other in more heavily populated areas).

Rather recently, the Abbott Liberal Government announced the apparent innovation of developing northern Australia for agriculture, where this had not been done before. When asked about business communications the rather inept Government response was to use the NBN satellite.

This was a very embarrassing situation because nobody in the Government (or staff) had fleshed out the obvious fact that there is basically nil business-grade telecommunications infrastructure more than about 100 km inland of the Australian coast. Why - because the high ROI products and services are in the major coastal cities, and the rest is commercially seen as a "cost centre".

Very clearly, the private sector running the telecommunications infrastructure is an awful fit (a worst case situation) - particularly in the inland where there is chronic undersupply and in the coastal / cities - where there is chronic oversupply. The fit is so bad that the private sector has requested ongoing funding (that now is in the order of $300 M pa, or $10.2 Bn to date and counting) in the form of the Universal Services Obligation (USO) just to maintain inland fixed phone services since 1982.

Since 1982, telecommunications overhead (maintenance) costs have all but zeroed, the available bandwidth has rocketed (0.14 Gb/s to typically 1 Gb/s or more a >700% increase), the number of fixed line phones (primarily in the non-metropolitan areas) have fallen by about 20% because the number of people with a survivable standard of living in country areas has plummeted (and far fewer Homesteads are occupied).

Since 1993 the rollout of SMOF cable literally ceased, and a very high percentage of that six strand very inexpensive SMOF cable is used for 2 Mb/s back connections for telephony local switches in about 3680 SCAX huts.

The real problem is that Telstra is now finding it very difficult to come up with believable reasons to justify being "gifted" $300 M pa for doing virtually nothing.

Consider if a simple ongoing programme to replace long-haul radio (particularly in Australia's north of NSW border) was put in place from 1993 and allocate say $50 M of the USO for this ongoing build. Basically 144 strand SMOF costs about $30,000 / km including terminal equipment (into pre-existing buildings) to put in the ground and in service, and virtually nil ongoing costs from that.

$50 M pa equates to about 1700 km of trenched cable per year. Since 1993 (now 23 years for 2016) this would equate to about 38,300 km of Inter-Exchange Network capacity gone missing.

In other words, virtually all the long-haul radio systems (that are susceptible to weather and other solar conditions) would have been replaced by extremely high reliability SMOF, and this infrastructure would have set up Australia (in particular Northern Australia) for the next century.

But there is more: Because this inland high capacity Inter-Exchange Network structure is missing:

- The NBN has had to be introduced at a funding cost far exceeding the nominal $43 Bn and counting.
- The NBN is being incorrectly operated as though it is a Competitive Business and is prioritising short term high ROI infrastructure instead of prioritising long term low ROI infrastructure - which is not circumventing other Federal Government funding to make the NBN funding nationally economical.
- Developing the North of Australia is a standing joke because the telecommunications infrastructure is AWOL (missing without acceptable reason)
- SMOF Cable that was installed to date has very little "spare capacity" because it was budgeted using Competitive Business (immediate use) thinking, so these cables routes cannot be through-connected to provide alternate route paths.
- There are now an immense number of Radio Black Spots that will be very expensive to correct because the intended SMOF cable to back-connect these locations is AWOL (was intentionally never installed).
- Thousands of Homesteads cannot be connected with very economic Non-Urban FTTP because there are no nearby SMOF cable through routes.
- Thousands of Homesteads do have nearby SMOF cable but these cables were budgeted using Competitive Business (immediate use) thinking, and there are no spare fibres for very inexpensive Homestead FTTP connectivity.
- Thousands of Villages do not have ADSL connectivity (impacting on about 700,000 urban people in the inland).
- The alternate of Satellite connectivity is high latency which is a very big negative when trying to run a small business (such as a Station).
- Strategically, the defence of Australia is critically impacted by a critical lack of very reliable, alternate routed SMOF based telecommunications throughout the inland.
- There is no way that Website hosting can be established outside the main city centres in the South-east of the Australian mainland that are through-connected with high capacity SMOF transmission systems.

The situation is irrefutable that since Telecom Australia was moved into the private sector to justify a telecomms presence on the ASX, even though the newer technologies have cavitated overhead costs and provided a wealth of retail products and services never possible before; the cost to the Australian economy is now far greater than before.

In hindsight, only the Retail Reselling part of Telecom Australia should have been moved into the ASX and the Infrastructure component of Telecom Australia should have remained a sub Government Commission. It is extremely easy and astoundingly cost-effective to re-structure by Physically Separating: Telstra / Optus / Vodafone TPG / Vicom etc., group all the telecomms infrastructure under the one sub-Government Commission, and let the Retail reselling thrive on the ASX.

Having Competitive (privatised) Business minded companies / corporations manage the telecommunications infrastructure is a very close parallel to having Dracula looking after the Blood Bank. All the blood/money stocks have been drained and he is now desperately on the lookout for more blood/money, while the patients are fast dying from lack of essential telecomms infrastructure.

The fundamental problem is having competitive service providers because this situation is inherently extremely inefficient and the competitive overheads, resultant of lost economy-of-scale efficiencies are enormous.

Am I the only person who can clearly see this???

Fnd 1

How should the costs of delivering universal services be determined or benchmarked, and by whom?

The benchmark costs of delivering Universal Services , Radio Black Spots, NBN etc., **must be done purely by External Accounting** (total financial benefit to the Commercial Businesses and the Community) that use these services. This includes at least the differential costs of medial, education, Social Services, Mental health, ability of small businesses to be established, profitability of small businesses etc. in the areas affected.

The Federal Government Departments have the tools and facilities and staff at their disposal to accurately perform External Accounting - so the answer here for who must do the accounting is a real no-brainer!

Fnd 2

Who should pay for the costs (and wear the regulatory burden) of delivering universal services?

Look at this situation from another angle. The reason for regulatory burden is totally because the private (greed) sector needs to be regulated and regulation cost money that could be used much better for other purposes.

If the private sector does not have its hands in the telecommunications infrastructure, then the costs in the delivery of Universal Services i.e. fixed and mobile (Broadband) telephony / Internet are directly converted into assets that by nature are assisting private sector businesses to make substantially more profitable business, which in

turn produces far more tax that funds the Telecomms Commission that in turn optimally rolls out the best telecomms infrastructure in a timely manner.

Fnd 3

Is it reasonable that telecommunications users in regional and remote locations do not bear more of the actual infrastructure costs of providing telecommunications services?

Elsewhere in this submission (and in other submissions[39]) I have pointed out that Australia desperately needs an extensive inland grid of (144 strand / 72 strand) SMOF cable forming an extensive inland Inter-Exchange Network loose grid for high capacity Broadband Internet inter urban connectivity to form the foundations for **Business Beyond Capital Cities**.

In all the time that Telstra / Telecom Australia has had the USO - virtually nothing had happened since 1993, and considering that Telstra has been funded in the order of $300 M pa since then (totalling about 6.9 Bn) if only $50 M were allocated to growing the infrastructure with inland SMOF cables for the long-term future then this would have created about 38,000 km of inland high capacity SMOF-based network that would have totally voided the need for Satellites and the need for the NBN and (shock horror) made the inland network potentially no longer a "cost centre".

Fnd 4

What should be the main mechanisms used for funding the delivery of universal services?

The Federal Government manages tax which is re-distributed into essential services. If the NBN can stop masquerading as a Competitive business get back to being an Infrastructure Business, and the "Cost Centre" of inland telecomms that Telstra is always moaning about can be wrenched out and handed to the NBN (for nil cost or transfer fee, then the Federal Government funding should be directed to the NBN to put in inland infrastructure as the priority.

Fnd 5

What is the role of government in funding social policy objectives?

Everything, because this funding has no place in the private sector.

Fnd 6

What should be the basis for determining any industry levy?

Nil.

Fnd 7

How should any user co-payment for services be determined?

Nil.

[39] http://www.moore.org.au/senh/2010/NBN%20Business%20Case%202.pdf

Fnd 8

Should there be means testing for users to access universal services?

Basic telecommunications is an essential service - not a discretionary product, so means testing is totally inappropriate and I really wonder who raised this question and why it was not removed before publication of the Issues Paper.

Fnd 9

Should a universal service fund be established, particularly, to address new or future changes in technology and in consumer needs and preferences?

Very deceptively, the Radio Black Spots Programme has sided up to the now rather sick USO and like a python snake is strangling and eating the USO whole.

Since 1984 the technology of SMOF (combined with a swathe of other silicon-based technologies) has totally transformed Australia's (and the rest of the world's) telecommunications infrastructure to be very inexpensive, wideband, extremely reliable and require virtually nil maintenance.

Telecom Australia / Telstra and all other private telecommunications infrastructure providers have consistently and repetitively not put in the imperative and appropriate inland telecomms infrastructure that would alleviate the USO expenditure, and build the network with a long-term plan.

Everything in these privatised telecommunications businesses is based around short term maximised ROI for shareholder dividends - including the calling for the financing of a Radio Black Spot Program.

The sooner that the people in the Productivity Commission wake up to the fact that they are being taken as absolute fools by the private telecomms sector the better.

There is a very simple and straightforward process that potentially will rip Australia out of foreign debit very quickly and that is the Physical Separation of Telstra / Optus etc., and put all the infrastructure under one Sub-Government body (Commission).

Implementation and Transition

The way I read the PC Issues Paper, it is all about transferring the hard to credit USO into what will become far harder to credit Radio Black Spots programme, using the technology transition / advancement from Voiceband to Broadband as the carriage to justify the intent of the fraud.

Although the transfer of monetary rights seems simple, the complication is that Telstra has not made any substantial improvements to the inland telecommunications network since about 1993 and this has had an immensely negative impact on the GDP of Australia costing far more than the USO several times over.

In terms of telecommunications infrastructure, I believe the misappropriation since 1982 is in the order of $200 Bn and counting and transferring this into the cost of increased Social Services and lost potential GDP would easily exceed this by five times (i.e. $1,000 Bn) and we wonder why Australia is in debit....

Further complicating this issues is that Australia still has a desert of an inland telecomms infrastructure that should have been totally re-wired with SMOF to build Australia's future.

It is clearly obvious that there is no long-term planning because if there were, then Telstra would have rolled out an immense amount of SMOF cable in the past decade plus in the inland to prevent the possibility of Radio Black Spots being an issue.

Why - because with this SMOF cable in the ground alongside most roads it would be extremely inexpensive to put in the pickoff points for Radio Base Stations several years in advance of the requirement for actually putting in these Radio Base Stations.

> *In 1983 as a "Junior" Class 1 Engineer, I spent about 3 months in Forward Planning, working out the entire local switching area for Regentville (south of Penrith in NSW). At that time this was farms.*
>
> *We worked with the Local Council and State Governments to figure out how many phone lines would be required and even at that time what other technologies could come into play - including Mobile Phones - which at that time were in their infancy, and Optical Fibre was a pipedream.*
>
> *Several years later that suburb became fully functional and from other areas of my then Engineering work (in National Network Investigations) there were cable shortage problems with the north side of Penrith (Cranebrook) which had also grown at about the same time where hundreds of potential customer could not connect because CAN cables were not provisioned several years before in the Forward Planning stages.*
>
> *There is absolutely nil excuse for Radio Black Spots and Telstra should have used its Long Term Planning (if it still exists) and Forward Planning areas actively involved to identify and circumvent such problems well before they ever existed.*

IaT 1

How will agreements relating to the current USO affect the implementation of, and transition to, any new universal services policy?

The first transfer must be the removal of the inland infrastructure "cost centre" that is dogging Telstra to the NBN at nil cost nil rent and nil transfer fee, nil connection fee.

From there, all the funding must then go the NBN and to proactively structure the least cost engineering plan to install Radio Base Stations in these "black spot areas.

IaT 2

What impact will the timing of the NBN rollout have?

Follow Iat1 and the answer is Nil.

IaT 3

Is there a need to review current governance arrangements?

Yes - and they must be answerable through the TQM basics, that way the need and cost of governance ./ regulation is virtually zeroed.

IaT 4

What should be the role of state and territory governments?

This is a Federal Issue - not a State or Territory Government issue, so the State and Territory Governments should not need to be involved at all. The fact this question is brought up shows the gross incompetence in the current system that is characteristically being run by a private concern and has broken all the measures, and those governing this practice have not acted in incredibly strong evidence.

IaT 5

What other matters should be considered in relation to implementing and transitioning to any new universal services policy?

From what I have read in this USO PC Issues Paper, it appears that the decision was made to pass the USO over to the Radio Black Spots programme before the PC Issues Paper was drafted and that is extremely unproductive, very deceptive and bordering on being grossly dishonest, but other factors come into play.

From what I have read and comprehended in this PC Issues Paper, it is rather clear to me that those that compiled this have an extremely limited knowledge of the overall telecommunication network in Australia, and a virtual nil knowledge about Infrastructure Business (although those working in the PC are themselves in an Infrastructure Business).

It was not until I had worked in an infrastructure business environment for over 20 years and then moved into the commercial / competitive business world for another 5 years or so that I really started to question why the working parameters were so radically different; where doing something in the commercial world was considered to be really wasting money and doing the same thing in an infrastructure business was considered extremely economic (and vice versa).

Then the pennies hit home - these two business models are 180 degrees opposite to each other but fit together like two hemispheres to form a solid economy. This was never part of the Economics courses - but it made rock solid sense.

If you would like to discuss any part of my Submission the please do not delay to contact me and I will be happy to make the time and work through whatever issue needs further resolution.

Conclusion

Having worked through the entire Productivity Commission Issues Paper on the Telecommunications Universal Service Obligation (USO), there are several observations and recommendations that I would very strongly recommend be put in place to better Australia's economic and asocial future.

Observations

1. The original Universal Services Obligation (USO) came out of the Davidson Report in 1982.
2. The intent of the Davidson Report was to split up and privatise the entire Telecommunications infrastructure in Australia so that Australia could have a Telecommunications Sector on the ASX.
3. This report praised "Competition" as the catalyst for privatisation to make the telecommunications infrastructure "efficient".
4. At that historical time, Telecom Australia (and a few other communications-based Business Units) had been split off the then Post Master General's Department, isolating the shared shop-front arrangement with the Post Offices.
5. The PMG / Telecom Australia "Shop Front" was literally void of a product range because the only technologies technically available were Posts, Telegraphs and Plain Old Telephones (POTs). *PABXs were in their real infancy.*
6. The original intent of the USO was to assist the privatisation of the then Telecom Australia, because the inland telecommunications infrastructure ran at a substantial loss.
7. The value of the USO was based on the cost of the inland operational loss so that the "Cost Centre" of inland / "non-metropolitan" telecommunications could be taken off the (Internal) P&L Accounting to make Telecom Australia look far more "profitable" to the private sector.
8. In 1980 / 1982 telecommunications transmission technologies were extremely expensive because of high attenuation over distance and extremely limited (analogue) bandwidth and a very high percentage of switching was mechanical.
9. Telecom Australia had a very large technical workforce because the switching equipment was mechanical, and the transmission equipment was analogue, and all this equipment required regular daily maintenance.
10. The technology of Single Mode Optical Fibre (SMOF) for extremely efficient digital (and analogue) transmission became technically possible in April 1984, took a couple of years to be commercially developed and started to be very extensively rolled out in 1986 through to 1993.
11. Digital Switching, first introduced in 1980 was economically inefficient until about 1990 when the synergy of SMOF-based Digital Transmission technology resulted in virtually zero maintenance overheads, and it was these this was the only reason that Australian telecommunications became "efficient".
12. Second generation Digital Transmission (SDH etc) and Second Generation Digital Switching (System 12 / DMS100) introduced in from about 1993 at very significantly increased the transmission bandwidth for virtually nil cost and provided an extensive and inexpensive platform for another range of wholesale facilities that translated to a wide range of retail products and services.
13. The Mobile Phone platform gradually morphed (1993 - 2016) from unacceptable Voiceband to Broadband over five overlapping GSM technologies (now 5G).

14. Because of fierce infrastructure competition in 1993/1994, Hybrid Fibre-Coax (HFC) based Pay TV services were very uneconomically installed in capital cities / suburbs (metropolitan) areas with a high percentage of premises "passed" but not "connected" without substantial rework.

15. From about 1997, five ADSL technologies (1.5 Mb/s, 6 Mb/s, 8 Mb/s, 12 Mb/s and 24 Mb/s) using existing pair copper CAN were very sequentially and very selectively installed to favour high ROI metropolitan areas at the expense of the inland country areas, leaving over 700,000 non-metropolitan premises capable of 24 Mb/s ADSL but without any ADSL (inexpensive) Broadband infrastructure.

16. About 1999, Cable Internet was introduced over the pre-existing HFC, then in 2005 the entire Broadband Router headend configuration was totally restructures to handle up to 6 M premises but built for only 1 M premises.

17. Third generation transmission and switching (IP and VoIP) was introduced in about 2002 again very significantly increasing the transmission bandwidth for virtually nil cost, and created a conformal IP Inter-Exchange (Backhaul) Network infrastructure that negated the requirement for Points of Interconnect (POIs).

18. From about 2005 a general move by the younger generations to move to Mobile Phones instead of using Fixed (wire connected) Phones, changed the retail marketing to drop pair copper (and hopefully FTTP) in favour of far higher consumer profits through Mobile contracts of "bundled" services.

19. From 2010 a general move for Laptop computers and Mobile Phones to be premises connected by Wi-Fi (from ADSL / Cable modems).

20. The telecommunications infrastructure gained major efficiencies purely because of massive technology advances - well after the 1980 / 1982 Davidson Report.

21. Competing telecomms based infrastructure businesses have multi-duplicated infrastructures in major urban areas (in particular Radio Base Stations), creating an extremely inefficient economic situation.

22. Similarly - in most non-urban areas where the (internally accounted) ROI is perceived to be low, the telecomms infrastructures are aged and totally insufficient to maintain an equitable telecommunications service.

23. The telecommunications infrastructure is extremely inefficient purely because of the very high commercial overheads and gross inefficiencies caused by privatised competing infrastructures.

24. The birth of the NBN is a direct result of gross economic inefficiencies brought in by incorrectly privatising and splitting up what was a very efficient infrastructure business.

25. **Numerous Select Senate Inquiries / Reports and Regional Telecomms Reports have failed to report that the Australian Telecomms industry consists of two diametrically different business components, Wholesale Infrastructure Business and Retail Reselling Competitive Business with diametrically opposite measures and KPIs.**

Recommendations

Australia needs to rapidly move away from having very uneconomic and highly inefficient) competing telecommunications infrastructures to having one Sub-Government Commission as a highly efficient Infrastructure Business to manage the entire Australian Telecommunications infrastructure, and remain having several efficient competing telecommunications Retail Resellers on the ASX.

For this to happen, Telstra. Optus, Vodafone, TPG etc need to be Physically Separated so that the wholesale telecommunications infrastructures are physically removed from these commercial competing businesses and the combined telecommunications infrastructures will then form one conformal telecommunications infrastructure with standard wholesale pricing to facilitate commercial competitive retail reselling.

This process needs to be direct with the complete telecommunications infrastructures being totally and immediately transferred to the NBN within 1 year.

As a goodwill gesture each non-metropolitan premises is worth about $100 and each metropolitan premises or mobile service is worth about $200.

Telecomms services retail resellers can then purchase (rent) Wholesale quantities of services from the NBN at standard fixed wholesale prices for each technology, and retail resell individually in a competitive market.

The NBN (strictly as an Infrastructure Business - not as a Competitive Business) will restructure the entire Australia telecommunications network to be conformal, where multi-duplicated infrastructure components can be rationalised and re-located in a most economical manner to provide the necessary connectivity.

The economic savings gained through converging these highly inefficient, unproductive and uneconomical network structures will far exceed the costs of the USO, or Radio Black Spots program, and have immense knock-on effects that will significantly reduce Social Services / Medical / Welfare costs and significantly reduce the cost of the NBN, and set up Australia for growth and new careers (jobs).

It is recognised that there is a general trend from Voiceband to Broadband connectivity and the Inter-Exchange (Backhaul) Network has been based on IP for several years, which directly facilitates a range of Customer Access Network (CAN) technologies beyond pair copper to SMOF and SMOF / radio.

The inland is desperate for immediate Broadband connectivity. There are about 3680 Small Country Automatic Exchange (SCAX) huts associated with Villages and Small Towns in the inland impacting on about 700,000 people - but only a very small proportion of these SCAX huts have ADSL facilities - even though in the vast majority of cases the premises are less than 1100 m away and capable of 24 Mb/s ADSL2+.

Over 300,000 inland premises attached to these 3680 SCAX huts need to be immediately connected with inexpensive mini-DSLAM2+ equipment. The back-connecting SMOF cable from these SCAX huts needs to be fully utilised to carry 1Gb/s or 10 Gb/s instead of 0.002 Gb/s.

Australia's future economic and productive development hinges on the farming and grazing / mining / manufacture development in the North. Since about 1993 there has been very little new SMOF cable rolled out. Most of inland Queensland / NT / WA/ SA is "radio-connected" with very little high capacity SMOF cable. There are no alternate high capacity SMOF transmission systems beyond the major capital cities.

The NBN (as FTTP) is being rolled out in high ROI areas where there already is a significant presence of through-connect Inter-Exchange (Backhaul) Network infrastructure. This entire program needs to include at least 27,000 km of SMOF Backhaul throughout the inland to prevent the situation of (inland) Radio Black Spots or other very poorly planned infrastructure issues from occuring.

Malcolm Moore JP BE(Elect)

Appendix

Recent Australian Telecomms Technologies

This Public Switched Transmission Network (PSTN)[40] originally grew as a star structure of overhead open wire "Junctions" between each suburban Post Office and the General Post Office (GPO) where manual operators worked Sylvester switchboards at all these locations to connect end-users through this "Junction" or "Transit" to other switchboards and then through more overhead open wires to the distant premises.

Calls that needed to connect beyond a city-based District were "Trunked" back to the GPO and back-connected to the distant District's Switchboard for connection to the subscriber in that distant town or city.

In the metropolitan areas, these "Junction" distances were typically 5 to 30 km and considering the wire used for these Junctions was thick an end-to-end connection could be a series of back-to-back Junctions forming a "Transit" connection through several Sylvester switchboards to connect the customers at each end and make a through connection.

In country areas, these "Junction" distances were typically 10 to 200 km and suffered considerable transmission attenuation. From about the 1920s, thermionic valve amplification technology made telephony practical for long-haul calls and almost concurrently the technology of Step-by-Step subscriber controlled switching gradually started to replace Sylvester switchboards but only in metropolitan areas.

By the mid 1930s, most urban streets had telephone poles everywhere, filled with crossarms of open wire pairs connecting premises, business and the Post Offices. The situation was becoming untenable and the solution was to use much thinner (insulated) pair copper cable and bury these cables under the footpaths (using manual labour almost everywhere), and took about 25 years to do.

The much thinner wire in these twisted pair technology cables had a far higher attenuation per unit length, resulting in the frequency response to be very "muffled". The solution was to "load" these junction cables with little coils at regular intervals to flatten the frequency response (up to about 3.2 kHz), so that sibilances (the "esses" and "tees' etc.) would be clearly heard.

By the mid-1950s all metropolitan areas had their local exchange behind their Post Offices (or very nearby), and a mesh of interconnecting loaded Junction cables that were largely switched using step-by-step technology. These local exchanges each had a star structure of "Exchange Switching Area" (ESA) network that connected from the local exchange to thousands of premises.

In the country areas, the villages, towns and cities all had their local exchanges located in the rear of the Post Offices (or nearby) but were star-connected by either (amplified) loaded Junctions or by relatively new Frequency Division Multiplex (FDM) equipment using quad cable (or even coax cable). These local exchanges each had a star structure of "Exchange Switching Area" (ESA) network that connected from the local exchange to the nearby premises.

[40] http://www.moore.org.au/comms/04/20030323%20The%20Customer%20Access%20Network.pdf

A very high proportion of this telecomms technology (before 1980) was researched, developed and manufactured in Australia, for Australians, primarily because Australia was on the other side of the world and physical transport was a really major issue.

The Public Switched Telecomms Network (PSTN) was based on the open wire telephone pole technology of the pre mid-1930s but since then a series of technology advances have physically separated the Customer Access Network (CAN) away from the Inter-Exchange Network (IEN) to form two entirely differently structured but highly inter-connected network infrastructures.

Because the mechanical switching function results in considerable wear and tear this requires regular daily maintenance, the overheads costs were expensive. Similarly with long-haul analogue transmission most of this equipment used thermionic valves that aged with use again requiring regular daily maintenance. The then newer long-haul analogue transmission of the mid late 1960s used transistorised / solid state technologies that were significantly more stable requiring far less maintenance.

For Local Exchanges, the concept of digital switching technology provided a direct and extremely low maintenance interface between the pre-existing analogue Customer Access Network (CAN) and the (soon to be) digital Inter-Exchange Network (IEN) - which had to be totally rebuilt with digital transmission technologies (and in the late 1970s this was not a developed technology).

The 1980s rollout of Ericsson Digital AXE exchange technology was stunted from inception because all the transmission technologies used in the IEN to interconnect these digital switches were "analogue" using Loaded Cable or Frequency Division Modulation (FDM), based on 4 kHz channel spacing as had been done from the late 1930s and was the world standard in the late 1970s.

The first technology breakthrough (for metropolitan areas) was the use of 2 Mb/s "digital regenerators" that used two pairs of previously loaded cable where the loading coils were replaced with a small 2 Mb/s regenerator.

So, instead of connecting two voice circuits with two junction pairs, the 2 Mb/s "quad" connected 30 voice circuits. Economically, 15 times more **(1500%) productivity** was immediately available through implementing 2 Mb/s digital regenerators to replace loading coils - and the interfacing to the digital switches was direct and simplistic.

Long-haul transmission was very expensive because the transmission losses per unit length in coaxial / quad / pair cables was high and the bandwidth was very limited, meaning that very expensive repeater stations had to be installed at regular (short) intervals, (typically 4 to 8 km depending on technology and bandwidth) and the option of point-to-point radio was also extremely expensive to install and maintain. (*This was all part of the PSTN and I have not even reached the Customer Access Network (CAN) infrastructure problems yet!*)

In 1980 the Telecom Australia Research Laboratories (TRL) were leading the world in researching the now common technology of Optical Fibre transmission as a possible alternative to Coaxial Cable because Optical Fibre had the potential to have a far wider bandwidth, but the through loss (attenuation) per unit length made it comparatively (to pair coax / copper) useless and very expensive.

The massive technology breakthrough came in early 1984 when a certain part of the "light" spectrum in Single (transmission) Mode Optical Fibre (SMOF), with a particular type of silica as the core and a "step gradient" silica cladding ensured a very high internal reflection that resulted in a very low attenuation per unit length.

In April 1984, the useful "hop" distance for SMOF technology very quickly jumped from about 4 km to 7 km to 22 km to 40 km to 70 km and concurrently the manufacturing technology for making SMOF cable plummeted. Virtually overnight the Davidson Report "tyranny of distance" issue was obliterated.

> *In late March 1984, I was "rhetorically tasked" to engineer the structure of the proposed Melbourne - Sydney Optical Fibre System and all its Wayside Stations. At the time, this was the biggest Telecom Australia "pie in the sky" project, I was a Class 1 (junior) Engineer, with 17 years technical and engineering experience, on rotation for one year to "learn".*
>
> *At the onset - it was clear to me that the cable path would have to follow the existing coaxial cable route (and use the same repeater / regenerator huts) - but suddenly everything changed!*
>
> *Word came through from TRL in early April 1984 that the digital regenerator spacing could be increased such that I need use every second repeater hut, then every third, then fourth then virtually nil regenerator huts. In a space of about 4 weeks, this new SMOF technology could span from city to city (over 60 km) in almost all cases.*
>
> *So, I changed focus and studied the content of the existing 7 tube coax system and married this into the proposed 31 strand SMOF cable, then aligned the Inter-Exchange Network switching connectivity for the Wayside stations (inland en-route cities) to be optimised for the future.*
>
> *In this study, it became immediately obvious that the amount of digital traffic was increasing at a far greater rate than the dedicated telephony traffic. My estimation (in 1984) was that by 2000 the digital traffic would exceed the telephony traffic - and this proved to be very close to reality.*

From 1985 to 1993, almost the entire inland telecomms long-haul IEN infrastructure was converted from radio and coax / quad cable to SMOF technology. The cost of maintenance plummeted and profitability soared, and ***nothing of this massive productivity increase had anything to do with privatisation.***

Concurrent with this massive shift to SMOF, the technology of FDM was dropped like a hot brick and very rapidly replaced by Plesiochronous Digital Hierarchy (PDH) as the then transmission technology of choice. The beauty of PDH was that it plugged straight into digital telephony-based switches with very little fuss, and FDM was totally incompatible with digital switches.

In the background of this digital IEN transformation was the dawn and rapid growth of Dial-up data connectivity, which was small in 1984, but with the development of one-chip LSI modem technology and the concurrent dawn of Fax technology was far more rapidly rising than fixed line telephony. Many businesses put in an extra telephone line entirely for Fax / modem Dial-up connectivity.

Because of the previous massive investment in (mechanical) Crossbar technology from 1960 and the imperative to have digital connectivity to analogue fixed line Customer Access Network, and the relatively high cost of AXE digital exchanges for local switching (i.e. interfacing between the (digital) IEN and the (analogue) CAN), Telecom Australia embarked on a potentially far less expensive hybrid technology - Loop Multiplexers at local (switching) exchanges.

A Loop Multiplexer (Loop Mux) is an inexpensive 2 Mb/s (E1) PDH interface to 30 channels of Voiceband (2-wire) analogue connectivity connected with Channel Associated Signalling (CAS) digital signalling, that directly back-connects into an AXE digital switch or a 2 Mb/s digital transmission system into an AXE digital switch.

By simply gutting the "Group" stages of Crossbar switches and back-connecting the Subs-Line concentrator part of the remaining Crossbar switch technology - the CAN loop signalling (as used by fixed line phones) is directly interfaced by the Crossbar line switch and the voice channel is interfaced by the Loop Mux into the digital Inter-Exchange Network, and the mechanical maintenance is virtually eliminated.

Again, this relatively simple re-structuring of existing telecomms equipment brought about a significant increase in productivity that again had absolutely nil to do with privatisation and 100% to do with technology advancement.

Apart from virtually nil maintenance, digital switching quickly advanced from Channel Associated Signalling (CAS) as used in (Strowger) Step-by-Step, (Ericsson) Crossbar and (STC / Alcatel) 10C technologies - and Sylvester manual switchboards; to Common Channel Signalling (CCS7), where one 2 Mb/s channel carries all the switching connection and network health data between switches.

This CCS7 technology in the mid 1980s was a radical departure from CAS technology that opened up a world of productivity that could only be dreamed of. Switches could remotely report switch congestion, and route congestion so that other switches would not congest these switches.

The Telephone User Part (TUP) of CCS7 contains a lot of subscriber "call data" that again radically improved productivity, purely because of technology advances. The whole process of call metering was revolutionised once all Local Exchange switches were "parented" from digital switches that had CCS facilities.

Instead of taking photos of meter arrays (with tiny numbers in them) in many thousand Local Exchange all over Australia on a regular basis, the whole technology took a simple and gigantic step and electronically transferred the CCS7 TUP metering data directly into electronic billing, with an extremely low error rate.

On the global scene, the introduction of Large Scale Integration (LSI), Surface Mount components, multiple layer printed boards, robotically manufactured assemblies and recognised world-wide engineering standards ushered by the ITU and other bodies heralded the introduction of Global Engineering / Manufacturing and Marketing, which decimated the Australian electronics manufacturing industry by about 1990.

In about 1992, Telecom Australia took another technology step and introduced the Alcatel System12 digital switch (and the Nortel DMS100) to wipe out the remaining mechanical switches and provide another level of switching / network flexibility including the notion of number portability.

While the switching technologies had rapidly advanced, PDH transmission in the IEN was becoming problematic because PDH is not "quite" synchronised and virtually nil of the earlier AXE switches were synchronised; causing errors in Fax / data transfers.

The technology of PDH was also somewhat "bandwidth limited" in comparison to the newer Synchronous Digital Hierarchy (SDH) so a large proportion of the Inter-Exchange Network's major highways were re-engineered and re-built using SDH transmission equipment on the same SMOF cable as before.

Nationally synchronising the clocking of the Telstra network was relatively simple and synchronising the clocking of AXE exchanges was then straightforward.

So again, by introducing contemporary transmission technology, the bandwidth of existing major SMOF cable routes was extended from say 0.14 Gb/s to 2.5 Gb/s for very little outlay and about a 1780% increase in throughput.

Meanwhile in the land of the Customer Access Network (CAN) nothing had really changed from about the mid-1930s when most urban open wire was put into pair copper cables and buried - and it worked for telephony most of the time.

In the late 1980s end-to-end connectivity became unacceptable (even though the Davidson Report had assured that the splitting up of an efficient economy of scale infrastructure and ensuing privatisation would have substantial "efficiency" benefits). *The only "efficiency" benefit that I could recognise was funds for replacement infrastructures being "efficiently" diverted into shareholder dividends.*

> *As a direct consequence of unacceptable end-to-end Voiceband performance, I was seconded in 1987 into Network Investigations with an unprecedented degree of autonomy to "fix the national problem".*
>
> *The prime cause of poor Voiceband clarity was that nobody really understood that transferring from open wire technology to pair cable technology also introduced a massive change with CAN impedances, that when combined with the introduction of digital switching line interface technologies and a new incompatible common phone (T200) all collided to form a perfect storm.*
>
> *Each State had their own CAN specifications - all based on line signalling and not on voice transmission.*
>
> *It took about two years full time with seven National Working Groups of technical and engineering specialists to identify, localise and eliminate a large range of access network flaws and CAN / IEN interfacing incompatibilities that had been steadily compounding from about 1940.*
>
> *The biggest ongoing problem turned out to be Quality maintenance procedures with the Customer Access Network performed by Lines / Field staff. Several unsatisfactory work practices were banned. Field Staff were to be trained for Quality processes but the Executive decision was for Field Staff to work to a time rate (to maximise shareholder value in the short term) and then Field Staff were contracted with virtually nil training.*

This mindless "privatise" mindset goes a very long way to explain why the Customer Access Network is an ongoing maintenance nightmare.

Mobile phone technology became practical in the mid-late 1980s and this radio / SMOF access technology was another very expensive mistake that was the result of competitive businesses each unnecessarily over-duplicating each-others access networks. ***We are now up to the 5th generation mobile phone technology and still the productivity message has not got through!***

Pay TV via the Hybrid Fibre Coax (HFC) Access Network and its follow-on Cable Internet are largely irrelevant in this submission as the prime focus is not in the metropolitan areas , but in the non-metropolitan areas. The HFC infrastructure for the Pay TV came out of 1992/1993 as fiercely competitive (and therefore extremely low productivity situation) that was very poorly engineered, rather under-scoped and heavily duplicated - and now the NBN is picking up the expensive scraps and paying for what Telstra and Optus should be paying the NBN.

By about 1996, the realisation struck home that data was a high percentage of the Inter-Exchange Networks traffic (bordering on 40%) and that packetised data was standard, and that the Internet Protocol was becoming the defacto standard.

So, instead of fighting the torrent, the push from the Global Manufacturers (not the telecomms engineers because most of them had been replaced by lawyers and marketing types), was to re-package the existing SDH long-haul transmission systems to carry IP, with "Edge Routers" to interface into much of this far more now flexible Inter-Exchange Network (IEN).

As though "Manna from Heaven" the technology of Voice on Internet Protocol (VoIP) became commercially practical by about 1998 and the Telstra IEN was already unified to transport IP, so all that was needed was IP conversion routers / software at the Local Switches to provide direct VoIP connectivity.

Again the productivity gain is that VoIP can carry at least 300% more circuits compared to long held call - all to do with technology and absolutely nothing to do with competition.

In the late 1990s, the new technology of ADSL over existing pair copper became a reality. At the Local Exchange end of the pair copper cable, a Digital Service Line Access Multiplexer (DSLAM) is installed between the Local (telephony) Switch and the Main Distribution Frame (MDF) so that the pair copper lines can be directly connected to the DSLAM, and the Local Switch connects to the back of the DSLAM.

The "top" of the DSLAM connects into the Inter-Exchange Network through an Edge Router to get connectivity into the mainstream Internet infrastructure for all the ADSL interfaced customer access lines in the DSLAM.

As described in my recent Submission to the ACCC, as far as I know, the customer Access pair copper lines were never re-engineered for ADSL, but simply slapped into service with virtually nil commissioning, resulting a in huge amount of totally unnecessary and very unproductive work for the TIO.

There is a litany of service locality problems with ADSL (caused by focussing on the highest ROI areas and deliberately avoiding the apparently low ROI (country) areas)

that could have been entirely avoided if this ADSL technology had been rolled out as an infrastructure business instead of a competitive business.

This competitive ADSL debacle has resulted in a very unproductive situation that has culminated in a series of Select Senate Inquiries and Regional Telecomms Reports that have all deliberately avoided answering the real question: ***"This is infrastructure, so why are competitive businesses with the diametrically wrong mindset involved with installing and wholesale controlling this infrastructure?"***

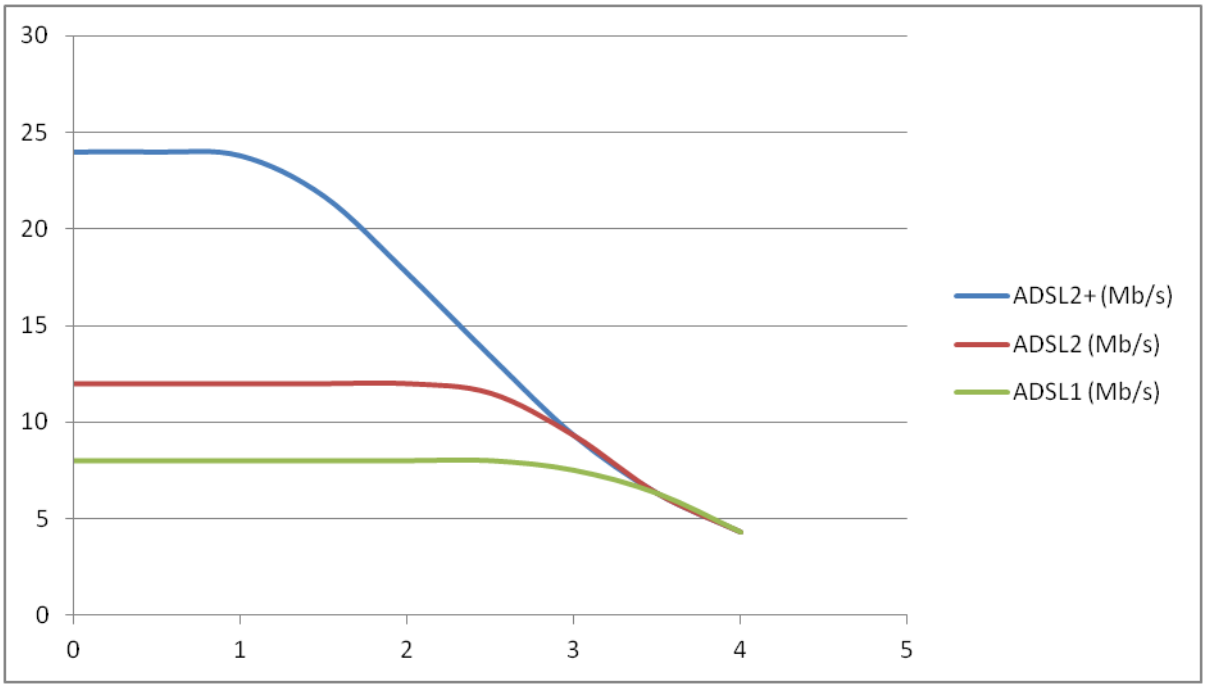
Since 2005, very little has changed with telecomms infrastructure, except that the throughput has significantly increased with the far more widespread use of Dense Wavelength Division Multiplexing (DWDM) so now 40 Gb/s per fibre pair is reasonably standard for long haul (distance) telecomms routes.

An Outline about ADSL

The technology of ADSL has progressed with quantum steps[41] as outlined here:

Date	Common Name	Standard ITU Name	Downstream (Mb/s)	Upstream (Mb/s)
1999	ADSL	G.992.2	1.5 Mb/s	0.5 Mb/s
1999	ADSL1	G.992.1	8 Mb/s	1.3 Mb/s
2002	ADSL2	G.992.3	12 Mb/s	1.3 Mb/s
2005	ADSL2+	G.992.5	24 Mb/s	1.4 Mb/s
2008	ADSL2+ (M)	G.992.5 Annex M	24 Mb/s	3.3 Mb/s

The technology of ADSL uses Broadband frequency spectrum on the pair-copper cables well above the Voiceband frequency spectrum used for telephony. The ADSL Upstream frequency spectrum sits well above the telephony band and just below the much wider ADSL Downstream frequency spectrum. The ADSL Downstream frequency spectrum sits just above the Upstream frequency spectrum and extends to over 1,100 kHz for ADSL, ADSL1, and ADSL2; and over 2,200 kHz for ADSL2+.



[41] https://en.wikipedia.org/wiki/Asymmetric_digital_subscriber_line

The Downstream data rate is intrinsically limited by the available ADSL higher frequency Downstream spectrum bandwidth; which is comparatively is far more attenuated (muffled) because of the line cable characteristics.

The above graph descriptively shows how the downstream speed (in Mb/s on the Y axis) for ADSL1, ADSL2 and ADSL2+ relates with pair copper line distance (in km on the X axis). This graph is based on the standard 0.40 mm pair copper as used for most Australian urban telephony where the maximum length is 4100 m (4.1 km) in urban situations as the urban physical limit for Voceband telephony.

Upstream data speeds are minimally affected by length because that part of the ADSL frequency spectrum is in a lower frequency range than the Downstream part of the ADSL spectrum. Consequently, the Upstream spectrum is far less attenuated (muffled) than the Downstream ADSL frequency spectrum, so the Upstream spectrum is generally is far less affected by induced noise and/or crosstalk from other pairs in the cables - in comparison to the Downstream frequency band (spectrum).

Savings Due to Improved Technologies (May 2008)

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
							#DIV/0!	#DIV/0!
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							#DIV/0!	#DIV/0!

The above 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 normalised 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%.

These figures seriously challenge the philosophy that competition is the prime reason for improved business performance. Many economists 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

Yet again these 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?* By cutting the 50% discounted figures by another 50% - the technology based cost reductions should appear as 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 is entirely due to savings through 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 by the then Minister of Telecommunications, IT and the Arts (Helen Coonan) in her speech at the Press Club in 2007. 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 that the Productivity Commission will 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 finding will have direct implications to the Trade Practices Act; particularly with those sections involving telecommunications infrastructure – and competing infrastructure businesses like Optus, Orange, Soul, Vodafone, Macquarie, Telstra etc.

Telstra may 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 may 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.

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