Submission

to the ACCC

on the

Wholesale ADSL

Service Declaration Inquiry

(Discussion Paper)

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Question 1a

1a Do you consider the ACCC's proposed assessment framework is appropriate for assessing whether declaring wholesale ADSL service would promote the Long Term Interests of End Users (LTIE)?

Defining Relevant Markets and Assessing the State of Competition

In reading through the ACCC Discussion Paper, in Section 2.1. (Legislative Framework), it is apparent to me that the prime intention of the Competition and Consumer Act (CCA) is to promote the Long Term Interests of End Users (LTIE), while concurrently promoting the commercial interests of competitive infrastructure providers.

There is an old saying that directly applies to this situation that has perpetuated in Australia from about 1973; "**You can't serve two master at one time**"!

It is exceedingly clear to me (with many decades of relevant experience in the Australian telecommunications industry) that ***the proposed ACCC's assessment framework is entirely incorrect in virtually every way possible***.

That is, the proposed assessment framework to assist the ACCC in assessing whether declaring a service has absolutely nil relevance, and nil association with efficient use and/or investment in the (telecommunications, or any other form of) infrastructure (i.e. the technology of ADSL in this instance).

The notion of "**promoting competition**" is fundamentally flawed, because competition comes from the needs of more than one end user requiring a limited availability **discretionary commodity**, definitely not from a third party Government Department with an extremely limited engineering knowledge about telecommunications infrastructure and Infrastructure Business mentality.

It seems to me that the ACCC is deliberately interfering with the competitive (telecommunications) market and infrastructure in areas where the "**players**" (for want of a pseudo-economic term for Retail Resellers with a controlling interest in the telecomms infrastructure and its deliberately stunted infrastructure rollout - hence the need for the NBN to fix up the massive shortfall of essential infrastructure), or "**access seekers**" as a legalistic and euphemistic renaming of what are **Retail Resellers** with a **Competitive Business** mindset that also have control of the Infrastructure scheduling and do not have an **Infrastructure Business** mindset to make this orderly and timely fashion but have arranged for alternate technologies in the Customer Access Network such as GSM4 etc, to deliberately gouge customers - particularly in rural[1] Australian areas for maximum shareholder value (and definitely ***not in the interest of promoting Australia as the first and primary priority***).

In the last 20 years, successive Federal Governments have run a litany of Select Senate and other Inquiries into many aspects of unacceptably poor provision of telecommunications infrastructure following the "de-regulation" and ultimate "privatisation" of the then Telecom Australia Commission (circa 1975).

There is an intrinsic and extremely expensive problem in that the ensuing (well over 14) Reports are totally without any Engineering substance, (even though in many

[1] https://www.facebook.com/groups/BIRRR/

cases considerable Technical and Engineering data and information was provided but lost in transfer). These useless Reports pander to continuing "competition", when it is now painfully obvious to me that "infrastructure competition" is the cause of the problem, and not the panacea. **Appendix 1 in this Submission oversights a few of these extremely expensive whitewashes.**

In 23 Sep 2013 the USA President stated[2] that Broadband is a "Core Utility" which effectively defines (declared) connectivity with the Internet infrastructure (in the USA); and putting this into Australian terms, Broadband connectivity an "Essential Service" not a discretionary commodity.

In other words Broadband connectivity is not a discretionary goods or service, it is an essential service, so the rules of Smith-based "fair economic competition" have absolutely nil place, and this places the ACCC well out of this jurisdiction.

Because of competition in what is in reality an infrastructure; all metropolitan areas (i.e. the State Capital Cities and their suburbs), are the major (internally accounted) Return On Investment (ROI) areas and consequently these areas are considerably over-supplied with a wide range of multi-duplicated (and therefore parallel) telecommunications infrastructures in an **extremely cost-inefficient** manner.

Also because of competition in what is really an infrastructure; all non metropolitan areas beyond the State Capital Cities and their suburbs are the major (internally accounted) ROI areas, and consequently these areas are considerably under-supplied with a narrow range of telecommunications infrastructures in **another extremely cost-inefficient** manner.

To put a figure on the cost of these reports:

"Privatising" Telecom Australia transferred about $14 Bn * 3 = $42 Bn into the private equity market - that now is largely out of Australia and now in USA Equity Houses. This money was since squandered during the Global Financial Crisis. The focus of Telstra (and associated "private interests") very quickly moved from maximising service delivery to minimising service delivery and maximising shareholder profit.

Privatising Telecom Australia broke up what is euphemistically called a "Natural Monopoly" where the massive economic efficiencies of "Economy of Scale" and "nil unnecessary duplication" make immense national savings and provide a considerably larger wholesale market at lower wholesale prices so that competitive businesses can maximise their competitive profit margins for their shareholders.

> *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.*

[2] http://arstechnica.com/business/2015/09/broadband-is-a-core-utility-like-electricity-white-house-report-says/

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.

It seems to me that part XIC of the CCA is totally inappropriate legislation because it seeks to promote competition to be in the long term interests of end users (LTIE) by declaring a product / service open to competition with the mindset that competition will make the product / service more widely available and far more reliable and at a lower cost to the end user. The opposite is proven fact.

Following standard (Smith) economics, if a number of competing telecommunications facility retail resellers are all selling the same / similar (discretionary) products then the price differential between wholesale and retail will be minimised (law of diminishing returns), and the retailers will look for ways of "cutting corners" to maximise their telecommunications sales / profits. So; geographic service delivery is minimised to maximum ROI boundaries, equipment is run way past its use-by date, false advertising is extensive, retail products are "bundled", service is contracted outside the country, training is removed from in-house, maintenance is minimised.

In an almost parallel situation fuel retailers can work in a cartel arrangement (like the fuel industry - which in reality is not discretionary if you own a vehicle) and retail fuel prices are (industry) "controlled" to ensure considerable retail and industry profits.

Chart 3.2: The description of "Cable" (implying Cable Internet) does not specify if this is with or without the inclusion of Pay TV as both retail products can be delivered provided over the common HFC infrastructure but Cable Internet requires considerably extra infrastructure (the inclusion of Broadband Routers).

Referring to the topic "Inquiry into the Australian Telecommunications Regulatory Regime" in this Submission, you will see that I have an intricate knowledge and understanding of exactly how this (and other telecomms infrastructure) is manufactured, engineered, designed, installed, commissioned and socialised for public and business use.

In 2005 I supervised the install of Telstra's rebuild of their Cable Internet infrastructure. This was not fully fleshed out but was made to provide about 1,000,000 premises with Broadband connectivity. If fully fleshed out this programme would have provide about 6,000,000 Cable Internet Services, but even then I seriously doubted the HFC infrastructure was adequately engineered - because it was rolled out in a competitive business mindset.

Considering that DSL (ADSL) has a rise of about 10% in 5 years 4.5 M to 5.0 M and about 50% increase from about 2005 (about 2 M) subscribers, and about 200% increase from 2003 (about 0.3M) subscribers; there is a lot of rather useful data that is deliberately omitted from this chart 3.2 before 2010.

The time span of only 6 years for the various infrastructure technologies is far too short (in infrastructure terms) to make a value judgement because most of the base data going back to at least 1990.

Consider that ADSL was first rolled out in 1997, Cable TV became available in 1994, Cable Internet became available in 1999, FTTP became available from about 2000,

fixed wireless became available from about 1978, Mobile Wireless became available from about 1990, and Satellite became available from about 1980.

Table 4.1 is fundamentally optimistic - and rather misleading (3G)

Question 1b

1b That is, will the proposed assessment framework assist the ACCC in accessing whether declaring a service will promote competition in markets for Telecommunications services, achieve any-to-any connectivity and encourage efficient use and investment in infrastructure by which the service is supplied?

Put from another viewpoint, if an essential service (e.g. Broadband telecommunications anywhere in Australia) was readily available through a range of retailer resellers, then there would be no requirement for the ACCC to be promoting (fair) competition because if one retailer could not facilitate the service than another could. Why? Because the Telecomms infrastructure Commission would have an even spread of equivalent Broadband facilities all over Australia.

At this stage the XIC Legislative Framework becomes lost in Legal gobbledegook by people that have literally nil practical technical experience nor engineering knowledge about how the telecomms network in Australia (or elsewhere) is constructed and connected - and this vacuum of practical and engineering experience and knowledge goes a very long way to explain why the CCA is such a mess, so wrong and totally inappropriate.

This ACCC-based stupidity has cost Australia well over $200 Bn

Three False Points:

"**promoting competition in markets for telecommunications services**". For a start, telecommunications services these days (like postal letters and telegraphy, and semaphore of the past) are essential transport infrastructure, not discretionary.

Competition is very expensive because the overheads are extremely high. As Competition is increased so too the overheads increase, but at a much greater rate.

So, increasing Competition make this essential service considerably more expensive (that is: far less economic) and induces the "cutting of corners" (e.g. minimise maintenance and training) to maximise profits in the short term (e.g. a few years).

Causing telecomms "Infrastructure Competition" has radically changed the focus of Telecom Australia that was focussed on maximising available telecomms services and Quality for its end users (LTIE) to Telstra (etc.) to now maximise profits for "Shareholder Value" at the expense of Australia and at the expense of the LTIE.

> *In 1987 as a Supervising Engineer in the National Network Engineering Business Unit in Telecom Australia (which at that time was still very much customer focussed), I took on a massive project to "stabilise" the Voiceband (telephony) transmission through the entire national telecommunications network, which by then was a wide mix of several analogue and mechanical and digital infrastructure structures (and Optical*

Fibre was in its embryo stages of rollout in the Inter-Exchange Network infrastructure).

Before then, each State had their own set of Engineering Specifications for Customer Access Network (CAN) and Inter-Exchange Network (IEN) infrastructures, and these were wildly different.

*It took several months of cooperation (not competition) to bring all these specifications together, then a few years with several hundred Technical and Engineering staff to carry an immense number of National Work Specifications to align the equipment so that Fax and Modem and Voice calls could reliably connect and communicate with maximum clarity. (**Unlike the NBN Co promotions, none of this work was advertised**.)*

One of the outcomes of this very proactive Technical Engineering was that (connection) Service Quality was radically improved, paving the way several years later for inexpensive and reliable ADSL connectivity through the now significantly improved and standardised physical CAN.

A realisation of this project was that a very high proportion of joints in the pair-copper CAN infrastructure were of very poor workmanship, causing repetitive faults (particularly due to water ingress). The executive decision (above me) was to neglect maintenance to maximise (shareholder) profits.

It should be obvious that the Competitive Business mindset has no place in Infrastructure because the mindsets of these workforces from the lowest levels up to the CEOs are diametrically different with Competitive Business and with Infrastructure Business.

"**achieving any-to-any connectivity**" is really a catch-phrase from the early 1990s when it became apparent that telecommunications that had been basically telephony from about 1970 until about 1987 when it became apparent that voice-band modems could readily transfer data and the Internet was in its embryo stages, so that the concept of fixed line voice only telephony passed its use-by date.

In another almost concurrent front, the concept of "mobile phones" became a reality to replace the earlier two-way mobile to base-station connection. The technology of mobile phones moved in a slow transition from Analogue to GSM1 (digital - but really analogue and crappy voice transmission caused by a very narrowband digital encoding system that introduced unacceptably excessive quantisation distortion[3], which made the audibility of the received voice signal very hard to comprehend.

The next phase of mobile phones (GSM2) was a welcome relief but also had poor voice-band transmission caused by excessive quantisation distortion but had a data bandwidth that was "reasonable" for texting.

GSM3, GSM4 and now GSM 5 versions of mobile phones each sequentially use a much wider part of the electromagnetic spectrum in this "long term evolution". One of the problems caused by the introduction of GSM4 and GSM5 mobile phone technology was the need to use a large portion of the pre-allocated Ultra High Frequency (UHF) band that was previously allocated to UHF TV channels.

[3] https://web.njit.edu/~shi/courses/ECE789/ch2.pdf

This transfer of spectrum usage was understandable, but the auctioning of spectrum to the highest bidder euphemistically called the Digital Dividend[4] directly followed a USA initiated practice to raise revenue for the USA Federal Communications Commission (FCC). Auctioning this spectrum in Australia is unforgivable for the LTIE as the end user will have to ultimately pay for the (heavily over-priced) spectrum on top of the service connection costs as and competitive profits to the shareholders.

The technology development of Voice on Internet Protocol (VoIP) in the mid-1990s radically changed the face of telecomms infrastructure to move all voice transmission towards VoIP as soon as possible.

So, the catch phrase "**achieving any-to-any connectivity**" is now totally irrelevant to the CCA and to the ACCC as virtually all telecommunications technologies now use Internet Protocol (IP) in one form or another and as soon as possible - because this IP technology effectively achieves any-to-any connectivity without any intervention or part of the ACCC or any part of the CCA.

"**encouraging the economically efficient use of, and investment in, the infrastructure by which the services are supplied**". In a practical economic sense, this statement means: ***"to prevent the duplication of telecommunications infrastructure"*** (as happens as a matter of course in a competitive business environment), and ***"to provide a consistent rollout of telecommunications infrastructure"*** so that non-urban (i.e. where the perceived internal ROI is lower than in densely populated urban areas) areas are not telecommunications infrastructure deserts.

> *In 1993/4 the notion of Pay TV came to Australia and overnight (as though somebody had whispered onto both CEOs ears), Optus and Telstra went into what could only be called "fierce competition" to roll out their respective Cable TV Hybrid Fibre Coaxial (HFC) CAN infrastructures.*
>
> *Both competitive telecommunications businesses had project teams working 7 days per week, month after month, spying on each other and changing engineering plans day-to-day; with equipment being rush-manufactured, flown in on priority services and delivered with urgency.*
>
> *My understanding is that this really rushed competition cost Telstra about $2.5 Bn and Optus about $2.2 Bn; there was about an 85% infrastructure duplication and about 80% of the metropolitan area (State Capital Cities and their Suburbs) were passed.* ***NB: "Passed" is not "Connected"!***
>
> *If this was 100% duplicated (for 80% coverage) then the total cost would have been about $5.0 Bn, and if this was 100% metropolitan covered, then the total would have been about $6.25 Bn or about $3.13 Bn each.*
>
> *Every 10% increase in competition (increased priority, overtime, rescheduling, re-engineering etc.) runs project costs up by at least 20% in a compound (not simple) fashion. Well-managed infrastructure projects include a small percentage of "slip time" to cater for contingencies, but competition very quickly obliterates project order and financial stability.*

[4] http://www.computerworld.com.au/article/461104/australian_government_misses_1_billion_digital_dividend_auction/

> *These competitive projects were running at about 40% overtime etc., so the overall project costs were easily 110% over the baseline of an orderly run project using infrastructure business guidelines.*
>
> *In other words, no thanks to competition, this total, non-duplicated infrastructure should have cost about $3.13 Bn / 2.1 =* ***$1.5 Bn for 100% metropolitan coverage - including the coax wiring to all premises that were "Passed" and not "Connected"*** *(a very subtle and very expensive competitive "cutting corners" practice that is now really costing the Federal Governments as the NBN has purchased and is using this old technology).*

This is one of many examples in the Australian telecommunications arena that I could provide that very clearly demonstrate that having any form of competition in what is infrastructure business is a very costly and extremely inefficient practice.

This example and other competitive infrastructure examples have been brought up in several Select Senate inquiries relating to telecommunications, but strangely (because these examples included small amounts of technical and engineering details) nothing of these examples have reached the associated Select Senate and other Reports.

In a real sense, the ACCC should be promoting the serious reduction of infrastructure competition to dramatically increase productivity - because this action would effectively re-rail the very delusionary "competition is good - more competition is better" mantra being fog-horned from the ACCC.

Economic Irrationality in the ACCC

In reading the ACCC Wholesale ADSL Discussion Paper there seems to be an ACCC mindset focus that introducing or increasing competition is a panacea that apparently will decrease end user costs, stop (or minimise) natural monopoly blockage of services and produce a larger range and scope of what are essential electronic transport service facilities, in particular, using ADSL technologies.

With a Competitive Business mindset the term "Monopoly" implies a cornering of the retail market so that prices can be gouged from end users (to pay maximum prices), so the profit margin for the retail resellers is maximised.

> *From about the mid-1860s to about 1900 there was a tremendous consolidation of privately owned railroads in the USA that culminated in Western Union Railroad[5] having a large majority ownership and consequently an "economy of scale" that made operating costs proportionately lower and efficiencies rocketed.*
>
> *The industrialists / bankers that were involved at the top end of these infrastructure business acquisitions and mergers became extremely wealthy by a range of competitive business mindset trading and end-user gouging that sat very uncomfortably with the USA Congress, and the then recent USA Civil War had polarised their thinking with revenge.*

[5] https://en.wikipedia.org/wiki/History_of_rail_transport_in_the_United_States

> *In 1890, the USA Congress; mindlessly, and with very polarised thinking, introduced the Sherman Antitrust Act to physically break up large infrastructure businesses (operating as competitive businesses) to prevent their "large economy of scale efficiencies" from being effective as retail competitive (Monopoly) businesses and gouging the end users for what were fast becoming essential products and services.*
>
> *In the USA, these inconceivably stupid "anti-competitive monopoly" laws have been taken out of text to create multiple pseudo competitive businesses by (grossly incorrectly) breaking up the extremely efficient infrastructure business of "economy of scale" railroad infrastructure, and in the process also create a considerable number of far less internally efficient "competitive" businesses.*
>
> *The bankers and industrialists that controlled these large infrastructures then got their revenge by "floating" these infrastructure businesses on the Stock Markets and insider traded to make much bigger profits - and in the process bought out / compromised most of Congress.*
>
> *It is this polarised mindless Sherman Antitrust Act that has been blindly adopted into Australian Federal Law as the basis of breaking up very efficient (national) infrastructure businesses and this has cost Australia very dearly on the Global market: (AWB comes to mind).*

With a Competitive Business mindset "Monopoly" also means a cornering of the Wholesale market (by a monopoly retail reseller) so that the Wholesale prices can be bottomed out such that the primary producer (for example the recent milk supply in Australia) cannot produce the goods and make a profit to sustain ongoing farming and grazing business.

With an Infrastructure Business mindset[6] the term "Natural Monopoly" is where the one national provider has the ability to provide as wide a range of goods and services as possible, with a minimum of internal profit and a minimum of cost to the end users; so that the external profit of end users can be maximised.

Virtually all Government Departments are Infrastructure Businesses; where they provide a maximised and extensive range of goods and services at a minimum of cost so that the Commercial (competitive) businesses and the Community that use these infrastructure products and services can be highly productive (and pay tax to externally fund the Government Departments).

*"The infrastructure operator (**without the correct Infrastructure Business mindset but with the incorrect Competitive Business mindset**) may (**will**) also have lower incentives to invest in maintaining or upgrading its infrastructure, to adopt new technology or innovations that improve service quality, and to expand the capacity of its network as a result of limited competitive pressures".*

Promoting Competition: Crippling Economic Efficiency

In reading this section it seems to me that the ACCC is in an area where it is way out of its depth of understanding and knowledge about the telecommunications infrastructure and how this infrastructure relates to the deliberately missing chapters

[6] http://www.moore.org.au/busn/02/infrcomp.ppsx

of Western Economics that would have described how Infrastructure Business works and why the mindset of Competitive Business is diametrically opposite to that required for Infrastructure Business.

If increased competition is good, the it would follow that setting up a second ACCC in competition with the existing ACCC would make increased efficiency!

Question 2

2. What are the relevant markets for the purpose of this inquiry and the application of the LTIE test?

There are two diametrically opposite business mindsets (**Infrastructure Business**, and **Competitive Business**) that work with each other with entirely opposite business mindsets to:

1. very efficiently roll out the (ADSL part of the) infrastructure in a wholesale basis and
2. retail resell the wholesale ADSL technology infrastructure as a product to provide an essential service.

My reference "**Innovating Highly Efficient Business Systems**"[7] and its associated references "**The Privatisation Circle**"[8] and "**Competition V Infrastructure**"[9] very clearly demonstrates in PowerPoint Shows where Competition has its place to be efficient and why Competition gets into the wrong areas of Infrastructure and why and how the Competition mindset kills Infrastructure from being efficient.

Both of these PowerPoint shows can be skipped through in a couple of minutes (and I can almost guarantee that none of the Universities will have this full explanation of how the market really works in any of their courses)!

So, with this understanding these two markets have to be looked at with entirely different visions (not just the commercial retail vision).

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[7] http://www.moore.org.au/comp001.htm
[8] http://www.moore.org.au/busn/02privatecircle.ppsx
[9] http://www.moore.org.au/busn/02infrcomp.ppsx

Question 3

3. Is it appropriate to consider both wholesale and retail markets?

If you read through the short references provided in the links for Question 3 then you should understand that I have an entirely different view of how Competition really works and you should then understand how the Wholesale Market (in the case of the Australian Telecommunications **Infrastructure**) is essentially the Infrastructure Wholesale selling point to the many Retail Resellers (who would / should be on the ASX).

With this new understanding it then becomes obvious that having **competitive Infrastructure** providers (Telstra / NBN / Optus / Vocus / TPG etc.) is by far the most inefficient business scenario possible Economic structure for the Australian economy.

The logical conclusion to make telecommunications industry highly efficient in Australia is to Physically Separate Telstra, Optus, Vocus, TPG etc., and leave their commercial Retail Reselling components alone (and on the AXS) and merge all the telecommunications infrastructure into one Sub-Government Infrastructure business as a Commission.

This simple restructure will remove a large range of intrinsic inefficiencies and cause the infrastructure to be rolled out at maximum speed, with a minimum of engineering confusion and with the best methods and practices that will eliminate the requirement for major (and totally unnecessary rebuilds - like the NBN and a series of no outcome inquiries) **saving the Federal Government well over $200 Bn and radically building the GDP**.

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Question 4a

4a. What is your view about the substitutability between different broadband products?

The Meaning of "Broadband Products"

All "Broadband Products" are really "Broadband Customer Access Network Infrastructure Products" that are described by the (Broadband) technology used in the Customer Access Network (CAN), but in complete ignorance that these technology products cannot work in isolation of the associated telecomms network infrastructure **that intricately includes the Inter-Exchange (Backhaul) Network.**

These "Broadband Products" all connect through the physical Customer Access Network (CAN) and at the Local Exchange site then back-connect into the Inter-Exchange (or "Backhaul" in USA slang) Network (IEN) through what is effectively an "Edge Router" that is an Internet Protocol (IP) Switch interfaces at the edge of the IEN and the CAN. My reference **Telecommunications 101**[10] outlines this structure.

What is not discussed (or raised / comprehended) in this Discussion Paper is that if there is "Broadband Competition" then these "Broadband Products" of infrastructure competition infrastructure cannot be simply connected at the Local Exchange sites into the mainstream IEN because they are owned by competing carriers, and these transmission circuits have to pass through a long distance network maze to back-connect (switch in) at a **Point of Interconnect** (POI) that may be upwards of 1000 km from their customer base location.

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

With the one Infrastructure Business for Australian Telecommunications network, the POI is effectively located at the International Gateway Switches in some capital cities. This frees up a lot of the inland telecommunications network to be used for traffic that does not have the "trombone" connect back and forward to get next door.

Broadband Expectations

The term "Broadband" is a very loose term indication connectivity with the Internet Protocol (IP) infrastructure so that through-connectivity to terminal equipment (website servers, email servers , video conferencing equipment, texting servers etc.), at the other end of the telecommunications infrastructure can be provided with virtually nil personal telecommunications expertise.

The expectation is that the response will happen with very little delay (low latency) so that voice / video conferencing is not appreciably delayed and that video screens will fill within a second or two from a Webhost / server.

With through-connectivity to Websites, the expectation is that the local downstream connection will be plenty fast enough to throw up the Web page to the local device (mobile Phone, Tablet, Personal Computer, TV screen etc.) with a minimum of delay and virtually instantly show a video from the Website or referenced Webhost without the picture sticking and jerking, or the sound being obviously distorted.

Because audio can be compacted with VoIP and similar algorithms (MP3, FLAC etc.) the nominal bandwidth of Audio conferencing can be dramatically cut and much the same story with Video (MP4 etc). These encoding practices have to a very large degree minimised "the need for speed"!

In most cases the downstream data rate (from "the Internet" to the Premises) needs to be considerable faster because usually most "upstream" data is keyboard strokes or pictures being sent - and these do not have to go at lightning speed. With this engineering realisation the technology of ADSL made a lot of common sense and set the path for generations of telecommunications infrastructure.

On another front, as shown in the Appendix of this submission "Overview of ADSL", the maximum downstream speeds of ADSL over pair copper has jumped in large quantum steps (with the length of useful connectivity also jumping much shorter as maximum downstream speeds became "fashionable").

By about 2000, the expected downstream speed was 12 Mb/s but that was not realised until about 2002 with ADSL2 and not rolled out until about 2005.

By about 2010, the expected downstream speed was faster than 12 Mb/s but in reality not much faster; though I am sure that the Competitive Business mindset would have been pushing for 24 Mb/s (or 25 Mb/s or 50 Mb/s and even 100 Mb/s)

In a very interesting phenomenon, the NBN Co. (which is supposed to be entirely an Infrastructure Business) has a massive advertising department that would put most of the fashion Retail reselling shops in Sydney and Melbourne to shame. Infrastructure Businesses do not advertise - something is structurally wrong here.

The NBN very heavily advertises Broadband connectivity starting at 25 Mb/s (note: not 24 Mb/s, ADSL2+ which is virtually identical to 25 Mb/s in all respects), and the NBN deliberately isolates itself from the pre-existing ADSL2+ technology!

So, instead of very quietly getting along with the job of rolling out the Broadband Infrastructure that Telstra and Optus should have rolled out from about 2000; the NBN Co is now rolling out an array of pair-copper technology mixes that will be short lived because (Cat 3[11]) pair-copper is one of the worst technologies available for Broadband electronic transmission.

Per length: Single Mode Optical Fibre (SMOF) is substantially less expensive than insulated twisted pair-copper and SMOF has a bandwidth that far exceeds pair-copper, and SMOF has an attenuation that is far less than pair-copper.

> *Both Telstra and Optus (at least) should each be both charged at least $43 Bn to cover the Infrastructure Business costs of the NBN Infrastructure rollout as a direct result of the gross inefficiencies caused by Privatising this infrastructure and the resultant Competitive Businesses not proactively building the future infrastructure - but instead running existing infrastructure into the ground for maximised short-term shareholder value.*
>
> *The Federal Government is covering up the yawning hole in the gross inefficiencies of Competitive Business economics and the Australian people (and Australian businesses) are paying through their teeth for this massive economic failure and in lost GDP.*

By about 2020 I believe the expected downstream speed will be in the order of 24 Mb/s and by 2030 the <u>expected bi-directional speed</u> will be 35 Mb/s.

Some Basics on ADSL

Very unfortunately, the ACCC Wholesale ADSL Declaration Discussion Paper has an extremely vague and rather misleading description of ADSL technology in its "Appendix B: Overview of DSL". I have re-written this section of the ACCC Discussion Paper to include the very basic necessary engineering detail and included this in the Appendix of this Submission.

Complicating this matter further, the term "**Access Seeker**" is used in a legalistic misrepresentation of what is really a very unhealthy combination of a "Telecommunications **Infrastructure Provider**" and a "Competitive (Telecomms Service) **Retail Reseller**" - **which concurrently serves two opposing masters** and is probably the reason that this ACCC Discussion Paper is such a mess.

Substitutability Between Broadband Technologies

With absolutely nil thanks to the <u>gross inefficiencies of **infrastructure competition**</u>, the metropolitan areas have been liberally over-supplied with far too much very expensive Broadband Access Network infrastructure and the non-metropolitan areas have been absolutely starved of essential Broadband connectivity.

Put another way, because the Competitive Business mindset uses potential (Internal) ROI and short term thinking (i.e. <2 years) for its profitable business direction, the cheapest fast money is in the metropolitan areas. Because the infrastructure is multi-

[11] Cat 3 = Category 3 twisted wire transmission standard ideal only for Voice Communications because of excessive crosstalk at frequencies above telephony Voiceband.

duplicated by "competitive" providers they inherently have far too much Broadband Infrastructure in the metropolitan areas that is extremely under-utilised.

Conversely, the non-metropolitan areas have far too little Broadband Infrastructure and are starved of doing modern business because these infrastructure tools are missing, which is a drain on Australia's GDP.

Providing the bundled, averaged per-month costs for different forms of retailed Customer Access Network (CAN) based Broadband connectivity products that have equivalent reliability, speed and latency; irrespective of the locality in Australia, then there is direct substitutability between different broadband products.

Compounding on this because a large amount of Government business and social interaction is via the Internet infrastructure, a very high amount of the inland population are Internet connectivity starved. Consequently a high percentage of these people cannot have the necessary Government-based social support to make them highly productive and free of Welfare (Social Services) support.

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Question 4b

4b. What is the substitutability between fixed-line broadband technologies with different data rates?

Competitive ADSL Blind-Man's Bluff

In general - totally thanks to the stupidity of a Competitive Business mindset where the shallow thinking is: "if it makes money then do it" instead of an Infrastructure Business mindset "doing it once and doing in right"; the vast majority of ADSL2+ DSLAM Nodes are located in the wrong geographic areas (to "make money")!

This ADSL technology is being extensively under-utilised because the ADSL2+ (24 Mb/s max downstream) technology cannot perform optimally with large urban Customer Access Network pair copper cable longer than about 2500 m because the speeds is already down to about 12 Mb/s downstream.

In the Appendix of this Submission under "Sorting out the Demographics" I, have shown that the My Broadband data indicates that as of December 2014, there are about 11,000,000 fixed pair-copper Customer Access Network lines in Australia and about 4,570,000 of these lines are in the Metropolitan areas, but nationally about 7,200,000 lines are in (urban) geographically large Exchange Switching Areas (ESAs).

Also in the Appendix of this Submission under "Understanding ADSL Data Speeds" I have shown that for geographically large Urban Exchange Switching Areas (ESAs) the average pair-copper cable length in these CAN infrastructures is nominally about 2900 m. (So about half the total cable lengths in these ESAs are in excess of 2900 m.)

At about 2500 m, the effective downstream speed from ADSL2+ technology (24 Mb/s max), has fallen to about 12 Mb/s and 2500 m relates to about 35% of the total

Premises count in these ESAs. So about 65% of the total Premises in these ESAs are beyond 2500 m and incapable of 12 Mb/s downstream speeds.

From about 3000 m onwards the effective downstream speed from ADSL2+ technology (24 Mb/s max), has fallen to about 8 Mb/s and 3000 m relates to about 52% of the total Premises count in these ESAs.

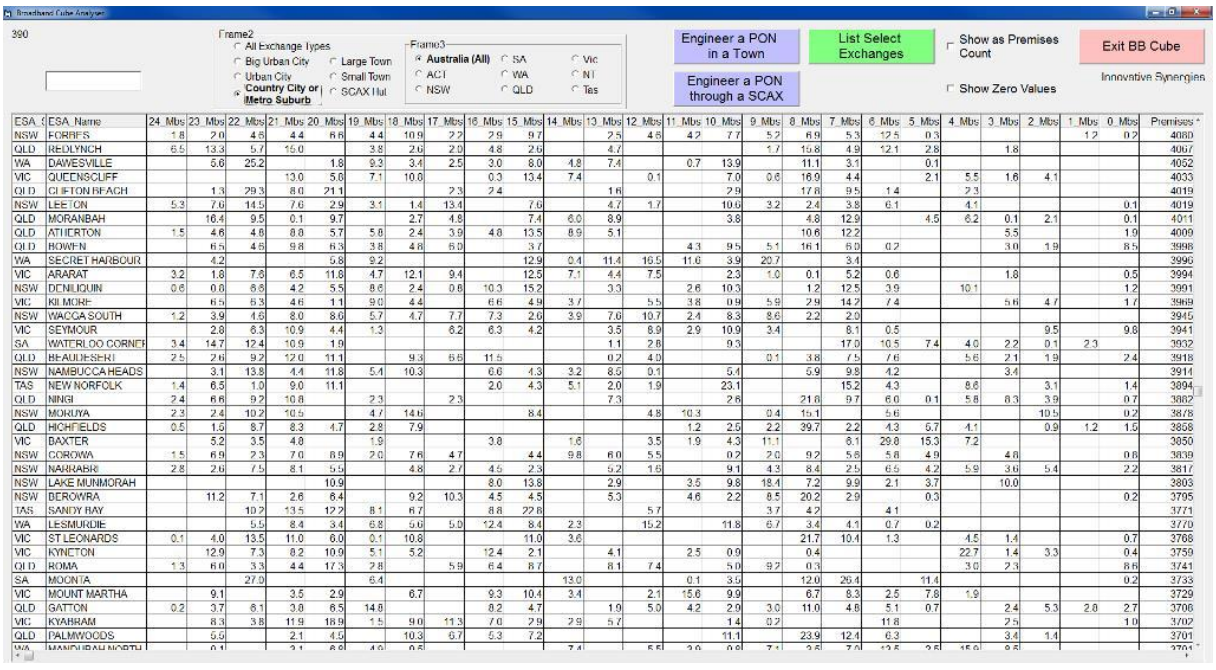
So about 48% of the total Premises in these geographically large Urban ESAs are beyond 3000 m and incapable of 8 Mb/s. These Premises should ideally be connected with ADSL1 technology DSLAM equipment in the Local Exchange sites.

Between 2500 m and 3000 m the percentage of Premises is about 52% - 35% = 17%, meaning that these Premises should be connected with ADSL2 DSLAM technology as they are capable of connecting at between 12 Mb/s and 8 Mb/s and that's it!

With CAN pair cable shorter than about 2500 m connected to ADSL, these DSLAMs should (must) be ADSL2+ technology so that the downstream data speeds can exceed the 12 Mb/s limit and use the pair-copper to the best of its capability!

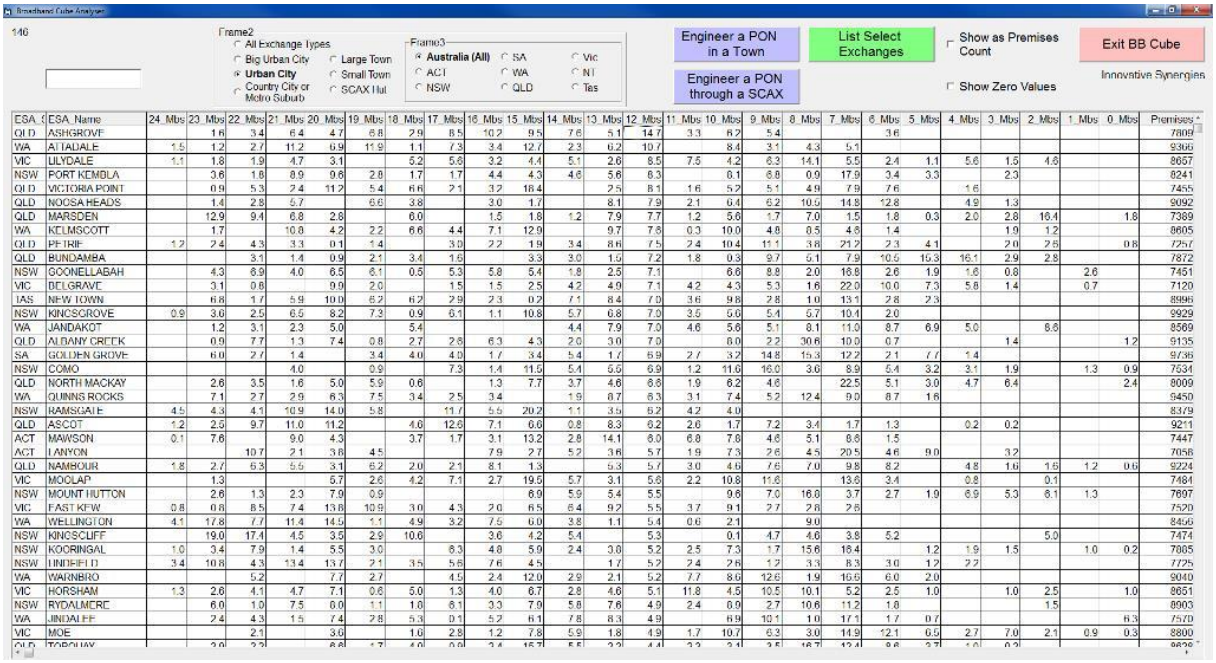
Only about 8% of the Premises connected in these ESAs are less than 1100 m and therefore capable of 24 Mb/s, the rest of the ESA gets much slower downstream Internet connectivity.

A quick look at some data that is transferred from the My Broadband website (Excel "Database") for ADSL is shown in the picture below. There is a large contingent of measured ADSL technology downstream speeds at about 7 Mb/s to 9 Mb/s, indicating that in much of these not so large localities ADSL1 technology is being used excessively where ADSL2 and ADSL2+ would be a far better fit for thee CAN infrastructures.



ESA_S	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
NSW	FORBES	1.8	2.0	4.6	4.4	6.6	4.4	10.9	2.2	2.9	9.7		2.5	4.8	4.2	7.7	5.2	6.9	5.3	12.5	0.3				1.2	0.2	4080
QLD	REDLYNCH	6.5	13.3	5.7	15.0		3.8	2.0	2.0	4.8	2.0		4.7				1.7	15.8	4.9	12.1	2.8		1.8				4067
WA	DAWESVILLE		5.6	25.2		1.8	9.3	3.4	2.5	3.0	8.0	4.8	7.4		0.7	13.9		11.1	3.1		0.1						4052
VIC	QUEENSCLIFF				13.0	5.8	7.1	10.8		0.3	13.4	7.4		0.1		7.0	0.6	16.9	4.4		2.1	5.5	1.6	4.1			4033
QLD	CLIFTON BEACH		1.3	29.3	8.0	21.1			2.3	2.4			1.6			2.9		17.8	9.5	1.4		2.3					4019
NSW	LEETON	5.3	7.0	14.5	7.0	2.9	3.1	1.4	13.4		7.0		4.7	1.7		10.0	3.2	2.4	3.8	6.1		4.1			0.1		4019
QLD	MORANBAH		16.4	9.5	0.1	9.7		2.7	4.8		7.4	6.0	8.9			3.8		4.8	12.9		4.5	6.2	0.1	2.1	0.1	4011
QLD	ATHERTON	1.5	4.6	4.8	8.8	5.7	5.8	2.4	3.9	4.8	13.5	8.9	5.1					10.6	12.2				5.5			1.9	4009
QLD	BOWEN		6.5	4.5	9.8	6.3	3.8	4.8	6.0		3.7				4.3	9.5	5.1	16.1	6.0	0.2			3.0	1.9	8.5	3998
WA	SECRET HARBOUR		4.2			5.8	9.2				12.9	0.4	11.4	16.5	11.6	3.9	20.7		3.4								3996
VIC	ARARAT	3.2	1.8	7.6	6.5	11.8	4.7	12.1	9.4		12.5	7.1	4.4	7.5		2.3	1.0	0.1	5.2	0.6			1.8			0.5	3994
NSW	DENILIQUIN	0.6	0.8	6.6	4.2	5.5	8.6	2.4	0.8	10.3	15.2		3.3		2.6	10.3		1.2	12.5	3.9		10.1				1.2	3991
VIC	KILMORE		6.5	6.3	4.6	1.1	9.0	4.4		6.6	4.9	3.7		5.5	3.8	0.9	5.9	2.9	14.7	7.4			5.6	4.7		1.7	3969
NSW	WAGGA SOUTH	1.2	3.9	4.6	8.0	8.6	5.7	4.7	7.7	7.3	2.0	3.9	7.6	10.7	2.4	8.3	8.6	2.2	2.0								3945
VIC	SEYMOUR		2.8	6.3	10.9	4.4	1.3		6.2	6.3	4.2		3.5	6.9	2.9	10.9	3.4		8.1	0.5				9.5	9.8		3941
SA	WATERLOO CORNER	3.4	14.7	12.4	10.9	1.9							1.1	2.8		9.3			17.0	10.5	7.4	4.0	2.2	0.1	2.3		3932
QLD	BEAUDESERT	2.5	2.6	9.2	12.0	11.1		9.3	6.6	11.5			0.2	4.0			0.1	3.8	7.5	7.6		5.6	2.1	1.9	2.4		3918
NSW	NAMBUCCA HEADS		3.1	13.8	4.4	11.8	5.4	10.3		6.6	4.3	3.2	8.5	0.1		5.4		5.9	9.8	4.2			3.4				3914
TAS	NEW NORFOLK	1.4	6.5	1.0	9.0	11.1				2.0	4.3	5.1	2.0	1.9		23.1			15.2	4.3		8.6		3.1		1.4	3894
QLD	NINGI	2.4	6.6	9.2	10.8		2.3		2.3				7.3			2.6		21.6	9.7	6.0	0.1	5.8	6.3	3.9		0.7	3882
NSW	MORUYA	2.3	2.4	10.2	10.5		4.7	14.6			8.4			4.8	10.3		0.4	15.1		5.6				10.5		0.2	3878
QLD	HIGHFIELDS	0.5	1.5	8.7	8.3	4.7	2.8	7.9							1.2	2.5	2.2	39.7	2.2	4.3	0.7	4.1		0.9	1.2	1.5	3858
VIC	BAXTER		5.2	3.5	4.8		1.9			3.8		1.6		3.5	1.9	4.3	11.1		6.1	29.8	15.3	7.2					3850
NSW	COROWA	1.5	6.9	2.3	7.0	6.9	2.0	7.6	4.7		4.4	9.8	6.0	5.5		0.2	2.0	9.2	5.8	5.8	4.9		4.6			0.6	3839
NSW	NARRABRI	2.8	2.6	7.5	8.1	5.5		4.8	2.7	4.5	2.3		5.2	1.6		9.1	4.3	8.4	2.5	6.5	4.2	5.9	3.6	5.4	2.2		3817
NSW	LAKE MUNMORAH					10.9				8.0	13.8		2.9		3.5	9.8	18.4	7.2	9.9	2.1	3.7		10.0				3803
NSW	BEROWRA		11.2	7.1	2.6	6.4		9.2	10.3	4.5	4.5		5.3		4.6	2.2	8.5	20.2	2.9		0.3				0.2		3795
TAS	SANDY BAY			10.2	13.5	12.2	8.1	6.7		8.8	22.8			5.7			3.7	4.2		4.1							3771
WA	LESMURDIE			5.5	8.4	3.4	6.8	5.6	5.9	12.4	8.4	2.3		15.2		11.8	6.7	3.4	4.1	0.7	0.2						3770
VIC	ST LEONARDS	0.1	4.0	13.5	11.0	6.0	0.1	10.8			11.0	3.6						21.7	10.4	1.3		4.5	1.4			0.7	3768
VIC	KYNETON		12.9	7.3	8.2	10.9	5.1	5.2		12.4	2.1		4.1		2.5	0.9		0.4				22.7	1.4	3.3		0.4	3759
QLD	ROMA	1.3	6.0	3.3	4.4	17.3	2.8		5.9	6.4	8.7		8.1	7.4		5.0	9.2	0.3				3.0	2.3			8.6	3741
SA	MOONTA			27.0			6.4					13.0			0.1	3.5		12.0	26.4		11.4					0.2	3733
VIC	MOUNT MARTHA		9.1		3.5	2.9		6.7		9.3	10.4	3.4		2.1	15.6	9.9		6.7	8.3	2.5	7.8	1.9					3729
QLD	GATTON	0.2	3.7	6.1	3.8	6.5	14.8			8.2	4.7		1.9	5.0	4.2	2.9	3.0	11.0	4.8	5.1	0.7		2.4	5.3	2.8	2.7	3706
VIC	KYABRAM		8.3	3.8	11.9	18.9	1.5	9.0	11.3	7.0	2.9	2.9	5.7			1.4	0.2			11.8			2.5		1.0		3702
QLD	PALMWOODS		5.5		2.1	4.5		10.3	6.7	5.3	7.2					11.1		23.9	12.4	6.3			3.4	1.4			3701
WA	MANDURAH NORTH		0.1		2.1	8.9	4.9	0.6				7.4		5.5	2.9	0.9	7.1	2.8	7.0	12.5	2.5	15.9	9.8				3701

This is not an isolated incidence of the wrong technology connected in the wrong cables - consider there are about 390 Country Cities / Metropolitan Suburbs in this set of listings, all with between 2400 and 7000 Premises per locality!



ESA_S	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
QLD	ASHGROVE		1.6	3.4	6.4	4.7	6.8	2.9	8.5	10.2	9.5	7.6	5.1	14.7	3.3	6.2	5.4			3.6							7809
WA	ATTADALE	1.5	1.2	2.7	11.2	6.9	11.9	1.1	7.3	3.4	12.7	2.3	6.2	10.7		8.4	3.1	4.3	5.1							9366
VIC	LILYDALE	1.1	1.8	1.9	4.7	3.1		5.2	5.6	3.2	4.4	5.1	2.6	8.5	7.5	4.2	6.3	14.1	5.5	2.4	1.1	5.6	1.5	4.6			8657
NSW	PORT KEMBLA		3.6	1.6	8.9	9.6	2.8	1.7	1.7	4.4	4.3	4.6	5.6	6.3		6.1	6.8	0.9	17.9	3.4	3.3		2.3				8241
QLD	VICTORIA POINT		0.9	5.3	2.4	11.2	5.4	6.6	2.1	3.2	18.4		2.5	8.1	1.6	5.2	5.1	4.9	7.9	7.6		1.6					7455
QLD	NOOSA HEADS		1.4	2.8	5.7		6.6	3.8		3.0	1.7		8.1	7.9	2.1	6.4	6.2	10.0	14.8	12.8		4.9	1.3				9092
QLD	MARSDEN		12.9	9.4	6.8	2.8		6.0		1.5	1.8	1.2	7.9	7.7	1.2	5.6	1.7	7.0	1.5	1.8	0.3	2.0	2.8	16.4		1.8	7389
WA	KELMSCOTT		1.7		10.8	4.2	2.2	6.6	4.4	7.1	12.9		9.7	7.8	0.3	10.0	4.8	0.5	4.8	1.4			1.9	1.2			8605
QLD	PETRIE	1.2	2.4	4.3	3.3	0.1	1.4		3.0	2.2	1.9	3.4	8.6	7.5	2.4	10.4	11.1	3.8	21.2	2.3	4.1		2.0	2.6		0.8	7257
QLD	BUNDAMBA			3.1	1.4	0.9	2.1	3.4	1.6		3.3	3.0	1.5	7.2	1.8	0.3	9.7	5.1	7.9	10.5	15.3	16.1	2.9	2.8			7872
NSW	GOONELLABAH		4.3	6.9	4.0	6.5	6.1	0.5	5.3	5.8	5.4	1.8	2.5	7.1		6.6	8.8	2.0	16.8	2.6	1.9	1.6	0.8		2.6		7451
VIC	BELGRAVE		3.1	0.6		9.9	2.0		1.5	1.5	2.5	4.2	4.9	7.1	4.2	4.3	5.3	1.6	22.0	10.0	7.3	5.8	1.4		0.7		7120
TAS	NEW TOWN		6.8	1.7	5.9	10.0	6.2	6.2	2.9	2.3	0.2	7.1	8.4	7.0	3.6	9.8	2.8	1.0	13.1	2.8	2.3						8998
NSW	KINGSGROVE	0.9	3.6	2.5	6.5	8.2	7.3	0.9	6.1	1.1	10.8	5.7	6.8	7.0	3.5	5.6	5.4	5.7	10.4	2.0							9929
WA	JANDAKOT		1.2	3.1	2.3	5.0		5.4				4.4	7.9	7.0	4.6	5.6	5.1	8.1	11.0	8.7	6.9	5.0		6.6			8569
QLD	ALBANY CREEK		0.9	7.7	1.3	7.4	0.8	2.7	2.6	6.3	4.3	2.0	3.0	7.0		6.0	2.2	30.6	10.0	0.7			1.4			1.2	9135
SA	GOLDEN GROVE		6.0	2.7	1.4		3.4	4.0	4.0	1.7	3.4	5.4	1.7	6.9	2.7	3.2	14.8	15.3	12.2	2.1	7.7	1.4					9736
NSW	COMO				4.0		0.9		7.3	1.4	11.5	5.4	5.5	6.9	1.2	11.6	16.0	3.6	8.9	5.4	3.2	3.1	1.9		1.3	0.9	7534
QLD	NORTH MACKAY		2.6	3.5	1.6	5.0	5.9	0.6		1.3	7.7	3.7	4.6	6.8	1.9	6.2	4.6		22.5	5.1	3.0	4.7	6.4			2.4	8009
WA	QUINNS ROCKS		7.1	2.7	2.9	6.3	7.5	3.4	2.5	3.4		1.9	8.7	6.3	3.1	7.4	5.2	12.4	9.0	8.7	1.6						9450
NSW	RAMSGATE	4.5	4.3	4.1	10.9	14.0	5.8		11.7	5.5	20.2	1.1	3.5	6.2	4.2	4.0											8379
QLD	ASCOT	1.2	2.5	9.7	11.0	11.2		4.6	12.6	7.1	6.0	0.8	8.3	6.2	2.6	1.7	7.2	3.4	1.7	1.3		0.2	0.2				9211
ACT	MAWSON	0.1	7.6		9.0	4.3		3.7	1.7	3.1	13.2	2.8	14.1	6.0	6.8	7.8	4.6	5.1	8.6	1.5							7447
ACT	LANYON			10.7	2.1	3.6	4.5			7.9	2.7	5.2	3.6	5.7	1.9	7.3	2.6	4.5	20.5	4.6	9.0		3.2				7058
QLD	NAMHOUR	1.8	2.7	6.3	5.5	3.1	6.2	2.0	2.1	8.1	1.3		5.3	5.7	3.0	4.6	7.6	7.0	9.8	8.2		4.8	1.6	1.6	1.2	0.6	9224
VIC	MOOLAP		1.3			5.7	2.6	4.2	7.1	2.7	19.5	5.7	3.1	5.6	2.2	10.8	11.6		13.6	3.4		0.8		0.1			7484
NSW	MOUNT HUTTON		2.6	1.3	2.3	7.9	0.9				6.9	5.9	5.4	5.5		9.6	7.0	16.0	3.7	2.7	1.9	6.9	5.3	6.1	1.3		7697
VIC	EAST KEW	0.8	0.8	8.5	7.4	13.8	10.9	3.0	4.3	2.0	6.5	6.4	9.2	5.5	3.7	9.1	2.7	2.8	2.8								7520
WA	WELLINGTON	4.1	17.8	7.7	11.4	14.5	1.1	4.9	3.2	7.5	6.0	3.8	1.1	5.4	0.6	2.1		9.0									8466
NSW	KINGSCLIFF		19.0	17.4	4.5	3.5	2.9	10.6		3.6	4.2	5.4		5.3		0.1	4.7	4.6	3.8	5.2				5.0			7474
NSW	KOORINGAL	1.0	3.4	7.9	1.4	5.5	3.0		6.3	4.8	5.0	2.4	3.0	5.2	2.5	7.3	1.7	15.6	16.4		1.2	1.9	1.5		1.0	0.2	7805
NSW	LINDFIELD	3.4	10.8	4.3	13.4	13.7	2.1	3.5	5.8	7.6	4.5		1.7	5.2	2.4	2.6	1.2	3.3	8.3	3.0	1.2	2.2					7725
WA	WARNBRO			5.2		7.7	2.7		4.5	2.4	12.0	2.9	2.1	5.2	7.7	8.0	12.6	1.9	16.6	6.0	2.0						9040
VIC	HORSHAM	1.3	2.6	4.1	4.7	7.1	0.8	5.0	1.3	4.0	6.7	2.8	4.6	5.1	11.8	4.5	10.5	10.1	5.2	2.5	1.0		1.0	2.5		1.0	8651
NSW	RYDALMERE		6.0	1.0	7.5	6.0	1.1	1.8	6.1	3.3	7.9	5.8	7.6	4.9	2.4	6.9	2.7	10.6	11.2	1.8				1.5			8903
WA	JINDALEE		2.4	4.3	1.5	7.4	2.8	5.3	0.1	5.2	6.1	7.8	8.3	4.9		6.9	10.1	1.0	17.1	1.7	0.7					6.3	7570
VIC	MOE			2.1		3.6		1.0	2.8	1.2	7.8	5.9	1.8	4.9	1.7	10.7	6.3	3.0	14.9	12.1	6.5	2.7	7.0	2.1	0.9	0.3	8800
QLD	TOOWOOMBA		2.0	2.2		6.6	1.7	4.0	0.9	2.4	16.7	5.5	2.2	4.4	2.2	2.1	2.5	18.7	12.4	8.6	2.7	1.0	0.2				8828

Here is another listing of large urban localities sorted on 12 Mb/s. It is fairly obvious that not a high proportion of Premises are actually connected at 24 Mb/s (or near that) but at substantially slower speeds - but the expectation is 24 Mb/s.

Unbundling to Encourage Competition

The problem behind all this ADSL technology is that as Customers connect with a "Competitive Carrier" for want of very expensive stupidity and totally unrealistic expectations that have not been thought past the "make quick money" mentality of Competitive Business.

The fact that the CAN pairs have been "Unbundled" in some mindless Competitive Business brain-snap that "Unbundling" would actually promote Broadband connectivity at great expense to very economic engineering!

As demonstrated above, ADSL technologies are sensitive to cable length - so connecting an "un-bundled" pair to a competitive DSLAM in a Local Exchange DSLAM2+ where the line is longer than 1100 m is not going to provide 24 Mb/s. Connecting to a line longer than about 2500 m is not going to provide greater than 12 Mb/s so why sell ADSL2+ connectivity in these situations?

These Competitive Business mindset situations only server to cause extreme Customer anxiety and frustration and fills the Telecomm Industry Ombudsman (TIO) with thousands of unsolvable complaints that could be totally avoided if done by an Infrastructure Business mindset without the "Blind-Man's Bluff" scenario as it is with the Competitive Business stupidity.

To compound the stupidity of promoting competition by introducing and advancing ADSL telecommunications technologies in what is really an Infrastructure Business environment, Customers have been competitively connected on a very much very expensive worst economic case possible piece-meal approach which loses all the value and economy of scale in mass production do it once do it right engineering.

This competitive strategy of competing ADSL equipment suppliers, and selectively connecting ADSL to customer lines has cost the Government big-time in totally unnecessary TIO expenses caused by encouraged competition.

Compounding this Competitive Business mindset stupidity, a high proportion of large urban Premises are on pair cables that are far too long to provide 24 Mb/s, or 12 Mb/s and struggle to provide 4 Mb/s even though the DSLAM equipment and premises modem are both ADSL2+ compliant.

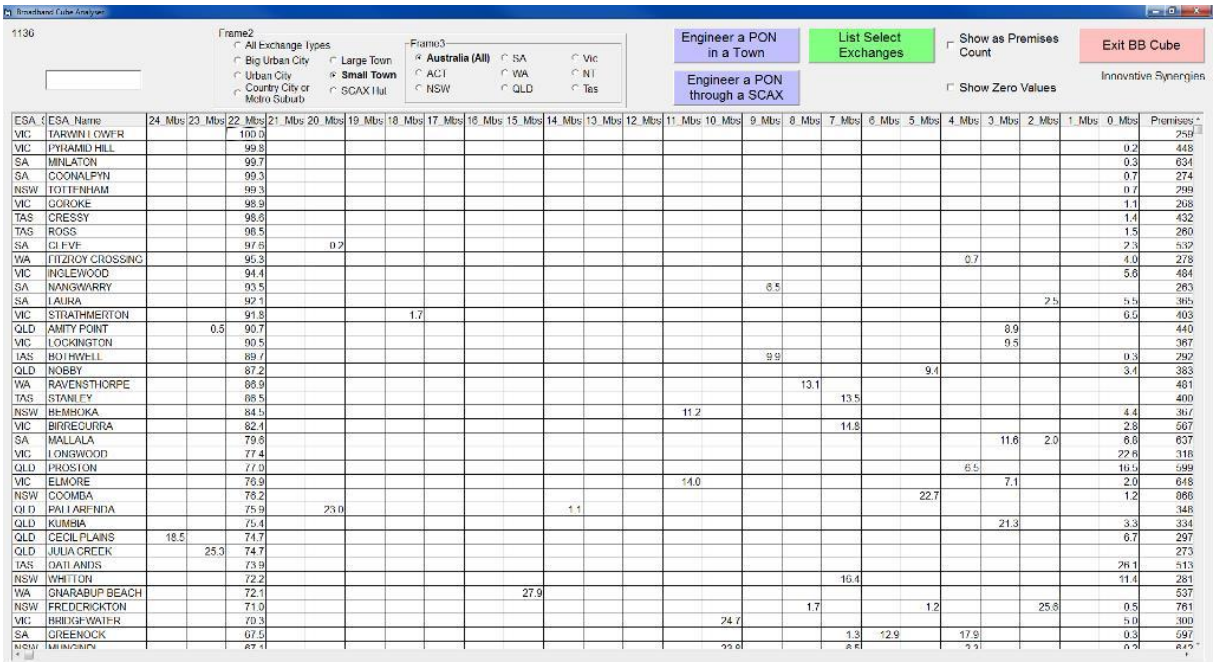
Aligning ADSL Technology with Cable Lengths

With some logical Engineering commonsense, the existing DSLAM equipment could be block-aligned to sequentially connect with every pair copper line in a specific cable at every Local Switch site.

With this rational thinking, all CAN main cables would be aligned with specific DSLAM technology equipment (at the Local Exchange site) that would optimally match the vast majority of premises for that main cable (and intermediate cables' sum length) for a certain single type of ADSL technology.

The screen dump picture below included in the Appendix in this Submission under " Non Metropolitan Situations - Village" clearly shows that ADSL2+(M) would be perfect for Villages, Small Towns, Large Towns and CBD situations

Because of commercial interests that seriously lack Engineering understanding of how ADSL technologies could have been optimised, this is a really lost opportunity that has cost (and is still costing) Australia very dearly, because the External costs of not implementing ADSL technologies in Regional areas has crippled rural and farming industry and cost Australia dearly in Social Services costs.



ESA_C	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
VIC	TARWIN LOWER			100.0																						259
VIC	PYRAMID HILL			99.8																					0.2	448
SA	MINLATON			99.7																					0.3	634
SA	COONALPYN			99.3																					0.7	274
NSW	TOTTENHAM			99.3																					0.7	299
VIC	GOROKE			98.9																					1.1	268
TAS	CRESSY			98.6																					1.4	432
TAS	ROSS			98.5																					1.5	260
SA	CLEVE			97.6		0.2																			2.3	532
WA	FITZROY CROSSING			95.3																		0.7			4.0	278
VIC	INGLEWOOD			94.4																					5.6	484
SA	NANGWARRY			93.5													6.5									283
SA	LAURA			92.1																				2.5	5.5	365
VIC	STRATHMERTON			91.8				1.7																	6.5	403
QLD	AMITY POINT		0.5	90.7																			8.9			440
VIC	LOCKINGTON			90.5																			9.5			367
TAS	BOTHWELL			89.7													9.9								0.3	292
QLD	NOBBY			87.2																	9.4				3.4	383
WA	RAVENSTHORPE			86.9														13.1								481
TAS	STANLEY			86.5															13.5							400
NSW	BEMBOKA			84.5											11.2										4.4	367
VIC	BIRREGURRA			82.4															14.8						2.8	567
SA	MALLALA			79.8																			11.6	2.0	6.6	637
VIC	LONGWOOD			77.4																					22.6	318
QLD	PROSTON			77.0																		6.5			16.5	599
VIC	ELMORE			76.9											14.0								7.1		2.0	648
NSW	COOMBA			76.2																	22.7				1.2	866
QLD	PALLARENDA			75.9		23.0						1.1														348
QLD	KUMBIA			75.4																			21.3		3.3	334
QLD	CECIL PLAINS	18.5		74.7																					6.7	297
QLD	JULIA CREEK		25.3	74.7																						273
TAS	OATLANDS			73.9																					26.1	513
NSW	WHITTON			72.2															16.4						11.4	281
WA	GNARABUP BEACH			72.1							27.9															537
NSW	FREDERICKTON			71.0														1.7			1.2			25.8	0.5	761
VIC	BRIDGEWATER			70.3												24.7									5.0	300
SA	GREENOCK			67.5															1.3	12.9		17.9			0.3	597
NSW	MUNGINDI			67.1												22.8			6.5			3.2			0.2	842

In many of these cases, Satellite technology is being rush released to provide connectivity at about $5,770 per premises, when mini-DSLAM equipment and associated Routers can be installed and working at about 1% (i.e. about $57 per line) that of Satellite and provide perfect low latency Internet connectivity.

The Appendix shows that a miniscule proportion of the 2,545 inland Villages (about 228,600 Premises) and a very small proportion of 1,136 Small Towns (about 532,600 Premises) have ADSL2+(M) facilities. The reason for this is that privatised telecomms businesses actually work against Australia's GDP when it comes to inland connectivity.

Fitting into Cable Internet

Cable Internet[12] is available in most of the Australian metropolitan (State Capital cities and their suburbs) areas. This technology has Fibre/Coax "nodes" that are remote from the Local Exchange located Fibre Headends.

Because the coaxial cable infrastructure is (almost) regularly amplified along its distance Hybrid Fibre Coax (HFC) based Cable Internet in Australia Cable Internet can be connected to about 90% of most street facing Premises.

The problem is that because the previous infrastructure for Cable Internet (i.e. Pay TV) was rolled out in a Competitive Business mindset and not with an Infrastructure business mindset.

Not only was this totally unnecessary competition incredibly expensive (and therefore extremely inefficient). My example of the incredibly expensive waste (see the answer in 1b) caused by this totally unnecessary competition. Financial figures are provided in the answer to Question 1 "**Three False Points**".

Because of increased competition on this Cable TV rollout, the work standards were pitiful and there is a litany of problems of premises passed but unable to be connected without considerably more expensive rework - all no thanks to increased competition.

The NBN is now picking up the pieces of this competitive disaster and paying very dearly for yet another stupidity of promoting competition in what is really an Infrastructure Business environment.

In 2004/2005 I believe that Telstra panicked that it would be Physically Separated and as a rearguard action totally re-structured its rather cramped Cable Internet Broadband Routers from city centralised locations to being in every metropolitan Local Exchange site - to show that it had full capability to provide Broadband if it was put to the test.

In 2005 / 2006 I was the supervising Engineer for the Sydney part of the National Project to rebuild Telstra's Cable Internet infrastructure as a total cost of about $2.5 Bn. Detail is in the Appendix under "**Inquiry into the Australian Telecommunications Regulatory Regime**".

This rebuild when fully fleshed out was basically prepared to provide up to about 4,000,000 metropolitan premises with DOCSIS 3.0 Cable internet (nominally 35 Mb/s downstream and low latency). This project was deliberately not fully fleshed out so it could reliably support only up to about 1,000,000 premises - which matches closely with the Discussion Paper's short term Cable Internet figures (over the past 5 years).

[12] http://www.moore.org.au/comms/04/20030223%20Cable%20Television%20and%20Internet.pdf

Substituting Cable Internet for ADSL

Cable Internet could be substituted instead of ADSL2+ (at nominally 24 Mb/s) to connect all metropolitan Premises beyond 1000 m from Local Exchange sites. Concurrently, the Cable Internet Broadband Routers could be throttled back to 24 Mb/s to match the ADSL2+ to provide a virtually identical and highly consistent Internet connectivity in all the metropolitan areas.

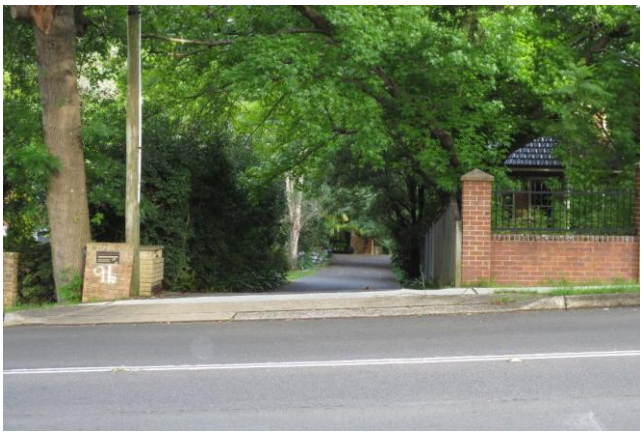
The first sticking problem is that the Broadband Cable internet Routers would not be identical to those in place so a completer rebuild (and fully fleshed out) would cost about $50,000 per Broadband Router, times 6, times 400 locations = about $0.12 Bn, so that is a rather small cost in infrastructure terms and easy / quick to roll out.

> ***It is interesting to see Competitive Business mindset people when they see the "rivers of gold" for financing infrastructure projects! Their eyes bug out and they come up with every dishonest reason possible for their involvement! Usually the first dishonest reason is "efficiency" Well, excellent efficiency at diverting the project funds to themselves and not to the project!***

As alluded to before, because of competition in rolling out the Pay TV infrastructure, a low proportion of metropolitan streets (about 20% at that time now probably more like 15% of streets were not cabled for Pay TV and these would have the be now cabled, together with Amplifiers and passive splitters so the premises can connect.

As also alluded to before, because of competition in rolling out Pay TV infrastructure, very few off-street premises (i.e. in short alleys and/or in Battle Axe Blocks - behind street-fronting premises) can connect with the Coax cable because the amplifiers are missing (they were never installed) - so these premises were "Passed" (but very deceitfully) - not able to be "Connected" without considerable extra cost.

The NBN is now picking up the tab (counted in some $Bn) for the massive inefficiencies caused by this stupidly expensive Competitive Business mindset infrastructure rollout.



Here is a typical Battle Axe setting in where Telstra has repetitively found an array of reasons to not connect HFC infrastructure to these "battle axe" Premises, primarily because it involves the inclusion of a line amplifier to raise the attenuated signal level to connect an outpost of a few Premises.

ADSL is heavily used by Small Business. As far as I am aware Telstra will not connect Cable Internet into Small Businesses - because this conflicts with their Fibre Service Delivery products. Nuf said...

Consider there are about 4,700,000 urban Premises in the Metropolitan areas of Australia. Consider that about 8% (i.e. about 376,000 Premises) are within 1,100 m

of the Local Exchange Switches and therefore can be connected to ADSL2+M DSLAMs in these Local Exchange sites. This leaves about 4,400,000 Premises to be connected with Cable Internet.

Some years ago I came up with an earlier alternative[13] which was to consider providing Broadband stabilised between 17 Mb/s and 24 Mb/s, because this strategy extends the use of ADSL2+ DSLAMs to about 1.9 km (or about 20% of the large urban ESAs) with ADSL technology with a downstream speed of at least 17 Mb/s, and then top-up the 80% with HFC Cable Internet.

Consider there are about 4,700,000 urban Premises in the Metropolitan areas of Australia. Consider that about 20% (i.e. about 940,000 Premises) are within 1,900 m of the Local Exchange Switches and therefore can be connected to ADSL2+M DSLAMs in these Local Exchange sites. This leaves about 3,760,000 Premises to be connected with Cable Internet.

Rethinking with Optical Fibre

In 1960, the highly efficient PMGs Department introduced Crossbar mechanical Switching to totally replace manual switching and Step-by-Step (SxS) mechanical switching that were fast reaching their use-by dates. By 1975, this national labour intensive rebuild was virtually complete with a considerable amount of research and development was done in Australia to advance this technology way past its Swedish inventors and manufacturer.

Telecom Australia then introduced Digital Switching in 1980 and by about 1993 this was fully rolled out. In about 1992, Telecom Australia introduced the second generation of digital switching equipment and concurrently started to remove the Crossbar mechanical switches from the switched network, and before 2005 all the Crossbar mechanical switching was removed - leaving many large Local Exchange sites with plenty of free floor space.

Concurrent with the replacement of mechanical switching with digital and IP switching was the replacement of analogue quad copper and coaxial and radio point-to-point transmission systems with digital transmission systems starting at about 1980, and projected to be complete by about 2005.

But,
in mid-April 1984 everything changed with the rapid introduction of Single Mode Optical Fibre (SMOF) technology that suddenly changed everything!

Introduced competition had absolutely nothing to do with increased efficiency in Telecom Australia / Telstra.

[13] http://www.moore.org.au/comms/20130509%20Inexpensive%20Metropolitan%20Broadband%20Infrastructure.pdf

Single Mode Optical Fibre (SMOF):

- Is very inexpensive to manufacture (even in Australia)
- Is not Lightning induction prone - making it very low maintenance
- Is much thinner than pair, quad, coax cables
- Has a massive bandwidth (far wider than everything else)
- Has a very low Insertion Loss per length (far lower than everything else)
- Is inexpensive to splice (fuse together)

By 1993 virtually all of the Australian Inter-Exchange Network (IEN) was rewired with SMOF cable and associated transmission systems.

In 1990 / 1991 there was a concerted move to replace the then ageing pair copper Telstra CAN with SMOF technology but with "privatisation" in the wings this technology advancement was soundly refuted - only to be upstaged by a very rushed and fiercely competitive introduction of Hybrid Fibre Coax (HFC) technology to primarily facilitate Pay TV services, with substantial content from Foxtel as a third party venture.

Rebuilding with an Optical CAN

The technology of Optical CAN structures has evolved since the mid-1980s and is now a mature technology[14].

The standard urban structure is analogous to a coconut tree (with a long thin trunk and a small set of branches at the top) with a single strand of fibre connecting from the Optical Line Termination (OLT) Equipment in the Local Exchange site, spanning to typically within about 200 m of a cluster of Premises where a Passive Optical Splitter connects typically 32 premises from the Passive node.

Global Engineering (refer to the Appendix in this Submission "**The Basics of Global Engineering**") combined with Computer Aided Design (CAD) combined with Geographical Information Systems (GIS) have dramatically changed the way that network engineering is done to the point that market engineering for telecommunications equipment Tenders can be done in other countries overnight. Refer to the Appendix in this Submission "**Global Marketing of Global Engineering**" as a real example.

Virtually all telecommunications-related Global Marketing uses Northern Hemisphere templates as these work for virtually all urban areas, and in the Northern Hemisphere that is virtually 100% of the demographics (because Homesteads are Village-based in the Northern Hemisphere).

The urban marketing templates for selling Fibre to the Premises (FTTP) turnkey systems, or a range of equipment are mostly based on a maximum distance from OLT (Local Exchange site) to most distant Premises is 10 km. In a major city environment this means that about only a third of the Local Exchange sites would be required if the OLT equipment and associated equipment (neglecting other technologies like the Mobile phone network) can be stuffed into the other Local Exchange sites.

[14] http://www.pitt.edu/~dtipper/2011/PON_Tutorial.pdf

Sharing FTTP with Existing CAN Technologies

From an urban transfer strategic perspective:

- ADSL2+ M has a distance range of about 1100 m before the 24 Mb/s downstream data speeds are compromised by excessive attenuation.
- DOCSIS 3.0 Cable Internet on HFC infrastructure has a range of about 85% of all premises (without building special extensions to pick up missing streets and battle axe blocks that were deliberately missed out because of the (negative) "efficiencies of competition".
- GPON FTTP is only just starting to be rolled out - but it has the advantage of distance (10 km of distance), so running fibre drops top battle axe premises, home unit blocks and streets with no HFC infrastructure should be the ports of first call.

If this practice was followed, then the most distant Urban Premises with the worst ADSL facilities would be the first to be fixed with the GPON FTTP telecomms infrastructure that should have been rolled out from about 1995 (only about 20 years too late all thanks the "efficiencies" of Competition)!

Again this is stifled because Telstra - which has deliberately not rolled out FTTP - to maximise shareholder value - has ownership of the pits and pipes (under footpath conduits) and drop conduits into the Premises, and the Local Exchange sites, and the main Switching sites etc.

Again - to very simply resolve this impasse - Physically Separate Telstra at the Retail Reselling and Infrastructure levels and merge al the NBN infrastructure into one sub-Government Commission.

Telstra will scream for about three minutes (as will the ASX) but immediately after that little scream Telstra will realise that it can now fully focus on Retail Reselling and leave the infrastructure to real Engineers and not Lawyers and Marketing types. Meanwhile the Wholesale price will dramatically drop and the profits for Telstra's shareholders will be even greater than it is now.

Oh, and the End User prices will also drop, and Customer Service will again become an Australian call by somebody that knows the area, not an international call that is difficult to comprehend.

Question 5

5. Are there separate but related markets for high speed fixed-line broadband services and superfast broadband services? What evidence exists to support this?

Market Hype and Engineering Reality

It has been "interesting" in the last few years, hearing the marketing hype and (totally irrelevant and totally unnecessary NBN) advertising about the apparent need for much faster Internet connectivity, while being knowledgeable about what speeds are being advertised, and what is engineering reality.

In practice, the current downstream requirement for Internet connectivity is really about 12 Mb/s as a minimum, but this is half the maximum ADSL2+ downstream speed of 24 Mb/s, and the (time) difference between these two is relatively small, particularly if you are using it for most of the commercially available social Website pages.

Why? because the time taken to download a social Webpage of a few Mbytes is a few seconds at 12 Mb/s and the latency (connection delay) is also a second (or two), so it really does not matter. Increase the downstream speed to 24 Mb/s and the total download and latency time is still a couple of seconds.

So why the marketing hype for increased speed?

The problem goes back to the extremely poor engineering of ADSL technology in Australia, brought about by the privatisation of Telecom Australia - to make what was extremely efficient in engineering terms, to be extremely efficient in sending the engineering revenue off-shore in "shareholder value".

This is a very subtle restructure of "trickle-down" economics, where the revenue trickled down to build and maintain excellent (telecomms) infrastructure - to now (as "opportunity costs") have that same revenue trickle down as shareholder dividends - causing (in this case Telstra) infrastructure to be the casualty and be run into the ground, resulting in a series of Government level Inquiries that deliberately avoid the real questions of financial "redirection".

Early Internet Connectivity

The original hype for increased marketing of Internet connectivity speed came because as the Internet was being created and developed, the standard connection was a Dial-Up modem through the telephony network that has a bandwidth of 3.4 kHz (0.034 MHz) and a maximum data speed (using V.34 technology on short phone lines) of 56 kb/s (0.056 Mb/s).

As pictures were added to Websites, the size of Web pages quantum jumped from about 50 kBytes (0.05 MBytes) to about 2 Mbytes, or about 40 times larger, so the download time increased by 40 times, from a few seconds to a few minutes (and usually timed out).

At about 1995, the technology scramble for "(fast and inexpensive) digital line services", was on in earnest.

The Northern Hemisphere had moved in on the Integrated Services Digital Network (ISDN) technology, and had come up with multiple 64 kb/s channels (up to 32) per line to provide business customer connectivity over two pairs of two-pair copper.

Telecom Australia / Telstra had been working in the background for many years and had developed a very straightforward and very inexpensive "MegaLink" / ISDN technology based on 2 Mb/s blocks using all the 32 channels as a direct connection. This was a resounding success in the Commercial world because it directly interfaced with digital PABXs and with computer interfaces to business systems.

In the late 1990s the real breakthrough came with a Large Scale Integrated (LSI) silicon chip that used the spectrum well above the telephony Voiceband to transmit and receive data streams over the telephone pair copper cable.

It was very obvious that the downstream data speed was by far the most important criteria, and overnight the understanding that Asynchronous (different data clocking speeds in each direction) was the way to go - hence ADSL.

Almost concurrently, another almost parallel breakthrough with another LSI chip enabled data to be transmitted and received over the Pay TV's Hybrid Fibre Coax (HFC) infrastructure - but this technology was considerably more expensive than the already expensive ADSL technology.

More Hype - Less Engineering

As described in the Appendix of my Submission ADSL technology went through a series of quantum advances in (mainly downstream) speeds and the marketing / advertising people jumped on these ADSL technology advances like new "used cars" for sale.

The marketing was all about the maximum downstream speeds but very seriously lacked detail about how poorly a modem would really be delivering downstream data (as this was as usual, totally lost in the fine print of the contracts).

> *In 1988 I was working in six of seven National Working Groups (in Telecom Australia) to bring the wide-ranging Customer Access Network (CAN) specifications into one standard and then nationally steer the processes to align all CAN services to be within the agreed engineering specification.*
>
> *This was a massive project involving about 10,000,000 fixed line services and it took a couple of years to complete. Then - all Telephony, Fax and Modem related connections could be rationally managed and measured for consistency.*
>
> *One of the main problems was poor workmanship in Joints and Pillars / Sputniks / Main Frames, resulting in joints not (water) sealed and exposed to early corrosion etc.. These issues could not get properly resolved because the Director / Executive focus was on "Shareholder Value" so the workmanship remained poor and in due course Contractors (working on rushed time rates) replaced a large force of far better trained and experience Lines / Field staff.*

ADSL technology requires a minimum of attenuation between the Local Exchange Digital Services Line Access Multiplexer (DSLAM) and the customer Premises ASDL modem.

With Telephony engineering, the "line in the sand" for attenuation was drawn at a maximum attenuation of 6.5 dB at 820 Hz (using 600 ohm terminations) and a large proportion of the CAN was re-engineered in several States to be within this specification.

With ADSL technology, it is my understanding that Telstra (and all other competiting infrastructure delivery retailers i.e. "access seekers") **have not done any re-engineering of the pair copper CAN to bring it into specification so that ADSL works optimally.**

Engineering for Urban ADSL2+

With consideration that ADSL2+ (24 Mb./s) is the expected standard, then it follows that 20 Mb/s would be the minimum downstream acceptable speed, and from that the maximum length pair copper (urban, 0.40 mm pair-copper) line would be 1.7 km (not 4.1 km)

With this mindset, 0.40 mm pair copper is too thin in diameter for lines exceeding 1.7 km and instead the second option would be 0.64 mm pair copper, and for this to provide an ADSL2+ service with a downstream speed exceeding 20 Mb/s, the maximum line length would have

to be less than 3.1 km (total). At 4.1 km the ADSL2+ downstream speed would be about 16.1 Mb/s.

No ADSL2+(M) where it Would Work Perfectly

Thinking a little laterally, all Villages (2545 of them, 228,514 lines), almost all Small Towns (1136 of them, 591,768 lines) and most Large Towns (415 of them, 660,639 lines) have pair-copper CAN lines over 1200 m long; so virtually all the Premises in these localities should have 24 Mb/s ADSL. But how can we tell?

The My.Broadband website included a rather comprehensive national listing of the ADSL and some other technologies by DAs (District Areas), which are all subsets of Exchange Switching Areas (ESAs), which implicitly associates Local Exchange sites, which in turn directly associates Villages, Towns, Cities and Suburbs, and includes their States / Territories.

It does not take a University Degree (or indeed a Trades Certificate) to skip through these records and recognise that the wide spread in resultant downstream ADSL technology data rate figures is almost everywhere.

The My.Broadband Website has a very comprehensive listing of ADSL connections and it clearly shows how Competition does not work!

The spread in ADSL downstream figures is purely because of the chaos caused by totally irresponsible competitive[15] "access seekers" joining any length telephone CAN cable to any technology DSLAM equipment - without any structured engineering order that would have optimised the ADSL downstream performances (data speeds) for the end users.

ADSL Hype and Superfast Hype

The market hype is pushing for 100 Mb/s when currently the average urban ADSL technology is delivering 12 Mb/s even though the advertising was saying 24 Mb/s.

In practice the difference for most end users with 12 Mb/s and 24 Mb/s downstream is virtually insignificant for most applications. Because about 50% of large city urban lines are about 2900 m in length, this means that nominally 50% of the total large city urban lines are longer than 2900 m so the average speed for these end users is much slower than 12 Mb/s.

It is quite common to hear end users complaining about ADSL downstream speeds slower than 4 Mb/s and the My.Broadband Excel spreadsheet has thousands of examples in its 95,000 row listing of DA locations where ADSL services can be (and are) connected through.

The low end of the "Superfast" market hype starts at 25 Mb/s, while the high end of the "Fast" market hype ends at 24 Mb/s.

This is a very subtle discontinuity that deliberately isolates Fast from SuperFast and leaves the data speed spectrum between 24 Mb/s and 25 Mb/s as "nowhere"!

In practice, the difference in downstream data speeds is miniscule, so it makes sense to rename the SuperFast low end at 24 Mb/s even though the competitive marketing and advertising people will be horrified as this impinges on pre-existing ADSL2+M technology.

My Upstream is Somebody else's Downstream

About 10% of ADSL technology users play interactive games with other people on the Internet (i.e. with through and bi-directional Internet connectivity) with as fast a connection as they can get.

[15] http://www.moore.org.au/busn/02infrcomp.ppsx

In the future many of these people, their friend and business associates will be interactively communicating with full high definition Video with multiple screens between many locations (not just business, but also socially).

So how does this work? Well, the cameras in one location will be feeding to a computer editing facility that will stream video (and sound) upstream into the Internet "fabric" (for want of a meaningless sales term). The other people in these video conversations will also be uploading stream video and sound in the same manner and downloading multiple streams concurrently.

So, ideally the upstream bandwidth will be in the order of 2 Mb/s to 6 Mb/s and the downstream bandwidth will be in the order of 6 Mb/s to 24 Mb/s (receiving multiple screens).

As it turns out, ADSL2+ (M) has a maximum upstream bandwidth of about 3.3 Mb/s and ADSL2 has a maximum upstream bandwidth of about 1.4 Mb/s so no prizes there, and the answers are fairly clear in that the future trend will be to have a significantly larger upstream bandwidth so that means ADSL1 and ADSL2 technologies are due for removal and should be replaced by ADSL2+ or VDSL technologies, or FTTP.

VDSL technology has its place in Comms Rooms of pre-existing Home Unit / Apartment Blocks and nowhere else; and that leaves FTTP as the obvious replacement for ADSL technologies in the future.

++++++++++++++++++

Question 6

6a. Are wireless broadband services (offered over mobile broadband, fixed wireless or satellite) substitutes for high speed fixed-line broadband services and if so, to what extent?

Really Uneconomic (Metropolitan) Radio Systems

Since the mid 1980s, Mobile telephone technology was originally rolled out by Telecom Australia in the metropolitan areas (i.e. the State Capital cities and their suburbs) and not long after Optus was spun out of Telecom Australia and parts of the then OTC, there was competition to provide a series of developing Mobile Phone platforms (Towers, Radio Base Stations, SMOF Cables to back-connect to District Switches, Database systems to manage phone number and accounts, and number portability between competing wholesale infrastructure etc.) and extended to support an ever changing set of technology advances.

As all this Mobile Phone associated technology was being rushed out with each technology advancement (Analogue, GSM1, GSM2, GSM3. GSM4, GSM5) there was no just one infrastructure to be installed and commissioned but several (Telstra, Optus, Vodafone, Hutchison etc.), and this did not come cheaply.

In other words - this technology was being rolled out in an extremely uneconomic fashion - because of competition.

Instead of rolling out a network that actually had nil black Spots in the metropolitan areas, there were several parallel Radio Towers / Antennae / Base Stations in these parallel networks that all had Black Spots in many common areas. If the one network was rolled out, then this equipment would have more than covered the metropolitan Black Spots and left plenty over for beyond the metropolitan areas - well into the country areas.

Really Uneconomic (Non- Metropolitan) Radio Systems

Several Regional Telecomms Review and Select Senate Inquiries later - nothing happened and the same mistakes are being perpetrated in the Non-Metropolitan areas with wholesale / retail vertically integrated Telecoms businesses rolling out competing infrastructure at an immense cost that Australia cannot sustain - and still the ACCC asks the really dumb question: How can we increase competition??????

We now had the Radio Black Spots Programme where the Federal Government is forking out several $100 M to have infrastructure installed in rural areas where the main carrier has been delinquent and has effectively handed this funding over to Shareholders.

Really Economic (Inland) Radio Systems

In the mid 1970's the then Telecom Australia Commission developed and rolled out the Digital Radio Concentrator System (DRCS)[16] and followed this with the High Capacity Radio Concentrator (HCRC) system.

Both these point-to-point radio systems were world-wide unique long-haul Customer Access Network technology that had a range of up to about 660 km and up to about 22 Homesteads (end users), with reliable radio hops over about 80 km and more.

Recently the CSIRO came up with their Ngara[17] intelligent point-to-point CAN radio system but the McKinsey's Cost Business Analysis flatly refused to included this technology in its analysis (most probably because it was not "commercialised" to a multi-national business that they were bound to model network structures on - based on Northern Hemisphere templates that do not match inland Australia).

With an Infrastructure Business mindset, it makes extremely economic sense to "re-vitalise" the DRCS / HCRC technologies[18] very tall masts and antennae with modern electronics based on the Ngara system - but keep it simple (and very inexpensive)!

Basically the radio hops can exceed 80 km, the point-to-point connections are reliable and low latency and because the radio channel bandwidth is about 5 MHz (bi-directional), then the shared data rate will exceed 300 Mb/s (bi-directional)!

In other words - using the existing mast and antennae infrastructure and inexpensive upgrading of the electronics (called innovation instead of competition) should provide in excess of 100 Mb/s bi-directional (and very low latency) to many hundred very remote Homesteads at a small fraction the cost of Satellite connectivity which is over-utilised and high latency as well as extremely expensive because satellites have a life of about 5 years before they run out of fuel - and go AWOL (away without leave - never to return) and have to be replaced again at enormous expense.

The Advent of GSM4, GSM5 and (Public) Wi-Fi

As the generations of "digital" mobile technology has advanced over the past 30 years, so too has the quantum size of the required spectrum bandwidth, because each generation of Mobile Phone technology uses a broader radio spectrum to handle everything over a data channel that uses the Internet Protocol (IP) suite to transfer data (IP) and voice (VoIP).

[16] http://www.irca.net.au/sites/default/files/public/documents/186-1072-7-PB.pdf
[17] http://www.sief.org.au/Documents/RP/NgaraFinalGeneralReport.pdf
[18] http://www.moore.org.au/comms/08/201606revitalisedDRCS.ppsx

The problem struck home when it was realised that because there are competing "service providers" (wholesale competing infrastructures) that the radio spectrum for mobile phones was too small for multiple Australian radio networks

Think again, if there was only one telecomms infrastructure provider, then the spectrum demand problem would be totally non-existent. So - this is a simple case of economic "diminishing returns" and the obvious strategy would be to either limit the competing infrastructures to be geographically bound (and this was considered several years ago), or to take spectrum from another service facility - and this was euphemistically called the Digital Dividend - as lost by the UHF TV bands.

The topic about economic waste and by auctioning off the spectrum is covered in my answer for Q1

Wideband Cellular Radio offers an economic goldmine (for "Privatised" operators at the end users expense) because the maintenance can be minimised and the cell can cover a complete Village, Small town or Large Town. In other words, by moving all the telecommunications infrastructure onto fixed Wireless the cost of Mobile data is far higher than for line data and the end user is locked into an arrangement where they are gouged - refer to the my Appendix "Gouging with GSM4 / GSM5 (and Wi-Fi)" in my Submission.

6b. What evidence exists to support this?
The Facebook BIRRR[19] page (**Better Internet for Rural, Regional and Remote Australia**) is more than ample evidence that a very high proportion of inland / regional and remote Farmers and Graziers sick to the back of their teeth with far less than adequate Broadband connectivity, and have been for well over a decade.

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Question 7

7. Is it appropriate to consider the relevant markets on a national basis or should they be defined on a more narrow, e.g. ESA, geographic basis? If so, what should that be and why?

The Best of Both Worlds

With my strategy of bringing all the competing telecomms infrastructure under their competitive hoods into one highly efficient economy of scale infrastructure business with a common focus and a minimum of legal interference (renting space etc.) all wholesale products will come under the one wholesaler and be available in large volume (wholesale) packets to a range of competing telecomms retail resellers.

All ADSL and associated competitive Internet access services will then nationally available as wholesale services to the retail resellers who can in their business merit - bundle a range of telecommunications (and entertainment / educational / insurance / holiday etc) products and services at their discretion.

Charging for the wholesale services would follow the same strategies as used for other essential and discretionary products and services.

[19] https://www.facebook.com/groups/BIRRR/

Rural and Remote wholesale services would be brought into line with urban service delivery and prices, and the wholesale costs would be identical with the urban wholesale costs to retailers.

It is understood that the costs for Rural and Remote wholesale connectivity may be far greater than the actual service costs, but the Australian Inter-Exchange Network (IEN) will be going through a massive structural change where a large number of inland highways will be constructed to provide extensive alternate path connectivity between major urban centres.

In a national sense this inland grid of high capacity interconnectivity is imperative for building the future nation so high capacity connections can be made virtually anywhere to anywhere.

Inexpensive Non-Urban FTTP

In a district sense the SMOF cables that make this loose national high capacity grid will contain several fibres in to that are shared in the cables for Non-Urban FTTP so that thousands of Homesteads will be very inexpensively connected up to 60 km from Local Exchange OLTs (Optical Line Terminations) - and be back connected into the IEN highways.

This network structure was never a remote consideration in the McKinsey's Report because it used Northern Hemisphere urban modelling (from multi-national (Global Engineering) businesses) and the Terms of Reference deliberately locked any local research and / or development / innovations off the table.

An overview of how Non-Urban FTTP[20] and PON in SCAX huts can be very inexpensively implemented in inland Australia[21] is included in the referenced footnotes.

Question 8

8. What do you consider to be the state of competition in the high speed fixed-line broadband markets?

If Retail Resellers are advertising on prime time TV then the state of competition is far too high.

A wholesale infrastructure business such as the NBN Co. should have a very low profile and not be advertising (or promoting) in any form whatsoever, not even have a Website presence. This is money that should have all priorities on installing and commissioning the infrastructure. This is further covered in Q9a. below.

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[20] http://www.moore.org.au/comms/20130412%20Inexpensive%20Non-Urban%20FTTP.pdf
[21] http://www.moore.org.au/comms/08/20140406PONBroadbandSCAX.pdf

Question 9

9a. Is there effective competition at the wholesale level of the market, and if so why?

The Flaw of Effective Wholesale Competition

There is a fundamental flaw in economics theory[22] in having Wholesale infrastructure competition, that in no way possible makes the end user better off.

(Telecommunications) Wholesale Infrastructure gets its economic efficiency business margin by not being in competition with any other potential service provider and focussing on providing a maximised service delivery of suitable products and services in a timely manner that is well thought out (planned) years in advance.

Please read through this referenced[23] 12-page PowerPoint Slide Show called "Competition V Infrastructure"

It should be now very clearly understood both how and why that the only effective competition in the Wholesale infrastructure is ZERO.

It should be now also very clearly understood both how and why that Telstra, Optus, etc must be Physically Separated along the lines of Retail Reselling and Wholesale Infrastructure, and all the combined Wholesale infrastructure put into one sub-Government body (with the NBN Co.) to maximise the economic efficiency of this infrastructure Business.

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9b. Please provide subscriber numbers and any market share information to illustrate this, including any information about competitive supply of the wholesale ADSL service.

The My.Broadband website with its Excel 95,000 line spreadsheet shows the entire Telecomms pair copper telephony network and its direct association with ADSL technology.

Over 1600 Villages Missing Out on ADSL

It did not take me much more than a first glance analysis of this data to recognise that the country areas have been literally isolated from having ADSL technology installed (probably from about the time that the NBN was announced).

Here is a really easy way to get a jump start on inexpensively rolling out inexpensive ADSL2+ Broadband well beyond the main cities, significantly increase Telstra's Broadband market share, take the load off the dismal / expensive NBN Satellite apparent solution, and quickly provide considerable Broadband connectivity to over 1600 Villages, about 222 Small Towns and their surrounding Farm areas, accounting for about 727,000 Australians who currently have no ADSL2+ Broadband connectivity.

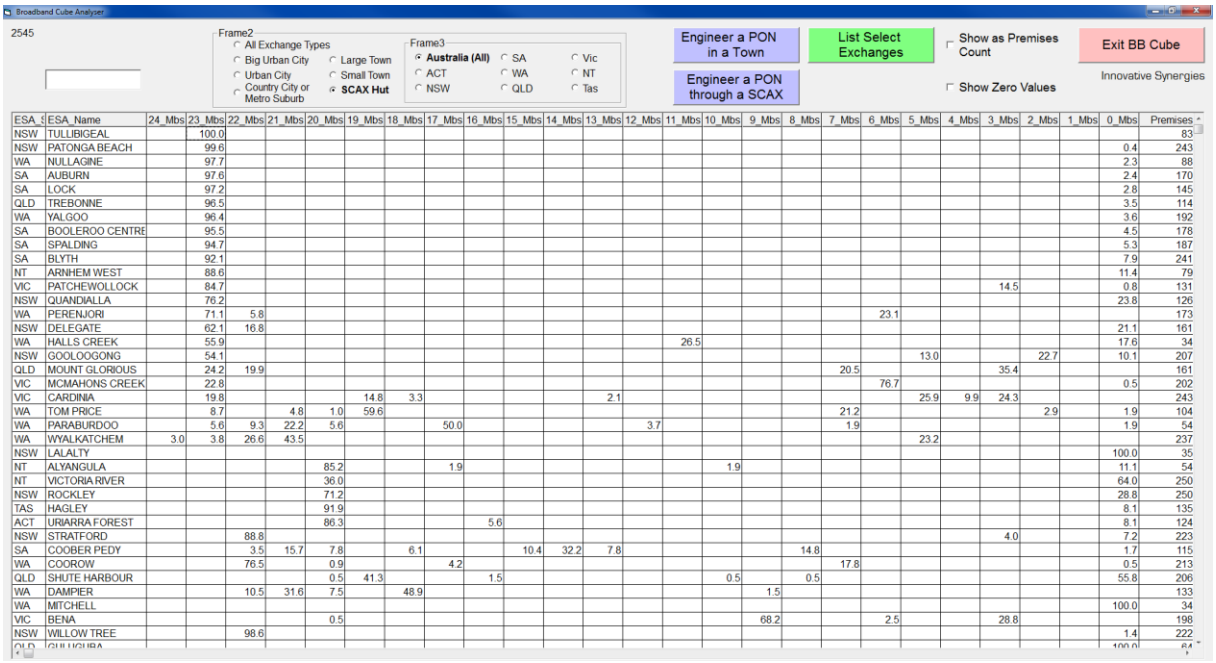
The first issue to resolve is that Australia has a very high percentage of ADSL2+ broadband connectivity (particularly in the capital cities and suburbs), and that the

[22] http://www.moore.org.au/busn/02/TheoryoftheSecondBest.pdf
[23] http://www.moore.org.au/busn/02/infrcomp.ppsx

maximum downstream speed is 24 Mb/s - so - we should not be hyping for much faster speeds in the Consumer / Small Business market.

To me, it makes very good Engineering sense to consider that currently and until about 2020, that 24 Mb/s is a "maximum speed" and that all other Broadband CAN technologies that are capable of faster downstream speeds should be "throttled" to provide Consumer / Small Business conformity of 24 Mb/s.

My relatively simple forensic analysis of the MyBroadband Data Cube[24] ADSL data showed me that about 1600 country Villages with Small Country Automatic Exchanges (SCAX huts) with up to 250 lines to premises, (average about 90 lines per village SCAX hut), have absolutely nil ADSL facilities in them. This accounts for about 1600 * 90 * 2.83 = 407,520 country Australians not getting inexpensive ADSL2+ Broadband Internet at their premises.



ESA_S	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
NSW	TULLIBIGEAL		100.0																							83
NSW	PATONGA BEACH		99.6																						0.4	243
WA	NULLAGINE		97.7																						2.3	88
SA	AUBURN		97.6																						2.4	170
SA	LOCK		97.2																						2.8	145
QLD	TREBONNE		96.5																						3.5	114
WA	YALGOO		96.4																						3.6	192
SA	BOOLEROO CENTRE		95.5																						4.5	178
SA	SPALDING		94.7																						5.3	187
SA	BLYTH		92.1																						7.9	241
NT	ARNHEM WEST		88.6																						11.4	79
VIC	PATCHEWOLLOCK		84.7																			14.5			0.8	131
NSW	QUANDIALLA		76.2																						23.8	126
WA	PERENJORI		71.1	5.8																23.1						173
NSW	DELEGATE		62.1	16.8																					21.1	161
WA	HALLS CREEK		55.9												26.5										17.6	34
NSW	GOOLOOGONG		54.1																		13.0			22.7	10.1	207
QLD	MOUNT GLORIOUS		24.2	19.9															20.5				35.4			161
VIC	MCMAHONS CREEK		22.8																	76.7					0.5	202
VIC	CARDINIA		19.8				14.8	3.3					2.1								25.9	9.9	24.3			243
WA	TOM PRICE		8.7		4.8	1.0	59.6												21.2					2.9	1.9	104
WA	PARABURDOO		5.6	9.3	22.2	5.6			50.0					3.7					1.9						1.9	54
WA	WYALKATCHEM	3.0	3.8	26.6	43.5																23.2					237
NSW	LALALTY																								100.0	35
NT	ALYANGULA					85.2			1.9							1.9									11.1	54
NT	VICTORIA RIVER					36.0																			64.0	250
NSW	ROCKLEY					71.2																			28.8	250
TAS	HAGLEY					91.9																			8.1	135
ACT	URIARRA FOREST					86.3				5.6															8.1	124
NSW	STRATFORD			88.8																			4.0		7.2	223
SA	COOBER PEDY			3.5	15.7	7.8		6.1			10.4	32.2	7.8					14.8							1.7	115
WA	COOROW			76.5		0.9			4.2										17.8						0.5	213
QLD	SHUTE HARBOUR					0.5	41.3			1.5						0.5		0.5							55.8	206
WA	DAMPIER			10.5	31.6	7.5		48.9									1.5									133
WA	MITCHELL																								100.0	34
VIC	BENA					0.5											68.2			2.5			28.8			198
NSW	WILLOW TREE			98.6																					1.4	222

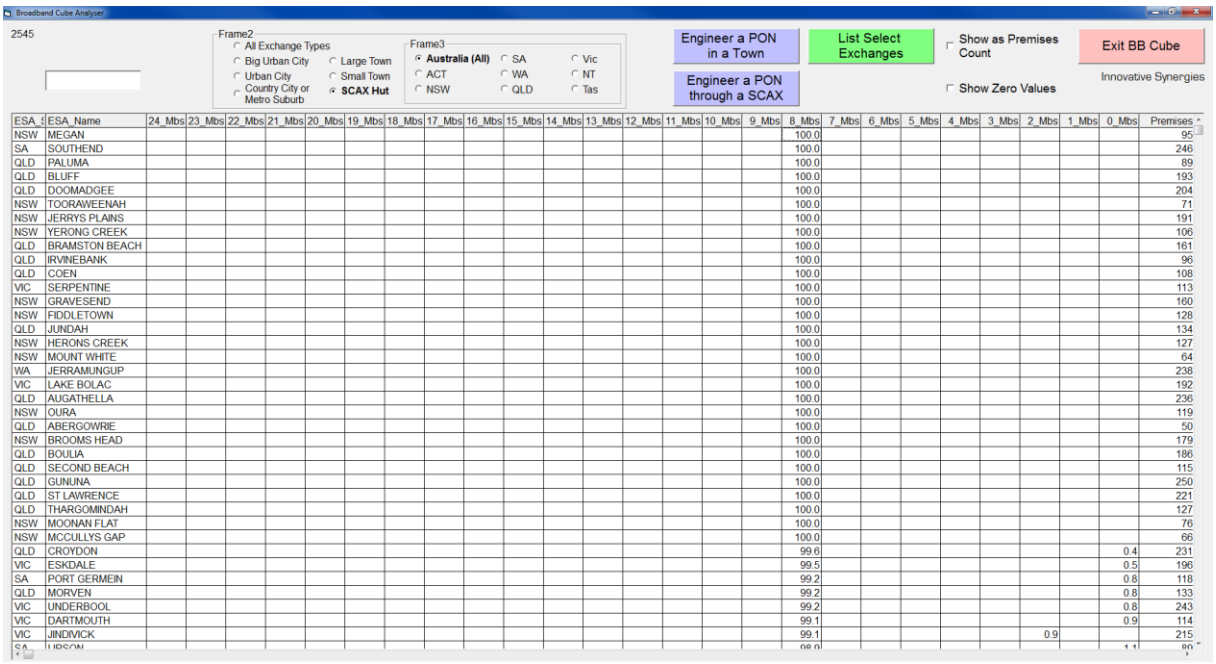
A very high proportion of these Village premises are very close (<750 m) to the SCAX hut sites. If these SCAX huts had inexpensive DSLAM2+ equipment installed in them, then this simple strategy would be a very quick and inexpensive fix to provide 24 Mb/s Internet to most (about +80%) of all these premises.

The screenshot above, of my simple analysis if the Broadband DataCube (for ADSL) shows a very high percentage of Villages that actually have DSLAM2+ equipment connect at virtually 24 Mb/s downstream speeds.

Villages with Incorrect DSLAM Technology

Villages in the screen shot below are obviously fitted with very old hand-me-down DSLAM1 equipment removed from the metropolitan areas and having a maximum downstream speed of only 8 Mb/s where if they had reasonable DSLAM2+ equipment they would be downloading at nominally 24 Mb/s.

[24] https://www.mybroadband.communications.gov.au/resources.aspx



ESA_t	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
NSW	MEGAN																	100.0								95
SA	SOUTHEND																	100.0								246
QLD	PALUMA																	100.0								89
QLD	BLUFF																	100.0								193
QLD	DOOMADGEE																	100.0								204
NSW	TOORAWEENAH																	100.0								71
NSW	JERRYS PLAINS																	100.0								191
NSW	YERONG CREEK																	100.0								106
QLD	BRAMSTON BEACH																	100.0								161
QLD	IRVINEBANK																	100.0								96
QLD	COEN																	100.0								108
VIC	SERPENTINE																	100.0								113
NSW	GRAVESEND																	100.0								160
NSW	FIDDLETOWN																	100.0								128
QLD	JUNDAH																	100.0								134
NSW	HERONS CREEK																	100.0								127
NSW	MOUNT WHITE																	100.0								64
WA	JERRAMUNGUP																	100.0								238
VIC	LAKE BOLAC																	100.0								192
QLD	AUGATHELLA																	100.0								236
NSW	OURA																	100.0								119
QLD	ABERGOWRIE																	100.0								50
NSW	BROOMS HEAD																	100.0								179
QLD	BOULIA																	100.0								186
QLD	SECOND BEACH																	100.0								115
QLD	GUNUNA																	100.0								250
QLD	ST LAWRENCE																	100.0								221
QLD	THARGOMINDAH																	100.0								127
NSW	MOONAN FLAT																	100.0								76
NSW	MCCULLYS GAP																	100.0								66
QLD	CROYDON																	99.6							0.4	231
VIC	ESKDALE																	99.5							0.5	196
SA	PORT GERMEIN																	99.2							0.8	118
QLD	MORVEN																	99.2							0.8	133
VIC	UNDERBOOL																	99.2							0.8	243
VIC	DARTMOUTH																	99.1							0.9	114
VIC	JINDIVICK																	99.1					0.9			215
SA	HIPSON																	98.9							1.1	89

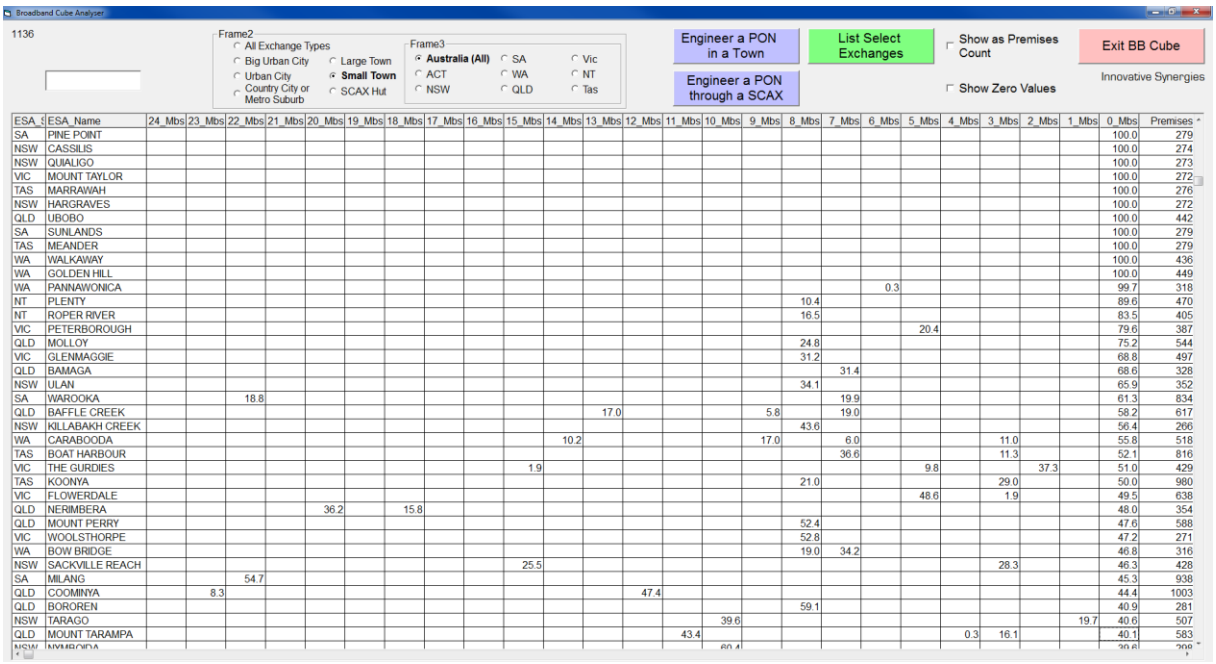
To get a price on this little project, a 128 port DSLAM2+ costs about $6,000 https://www.google.com.au/#q=MA5616+ports+adsl+DSLAM+ and double that price to include labour and contract management plus ancillary materials and this is about $12,000 per SCAX hut. Count in say 1,600 SCAX huts and this is a grand total of $19.2 M all done and dusted. Cost per premises is about $133, paid for, well inside 24 months and the rest is profit.

This is a tiny project for Telstra, (or NBN) and it really takes the weight off the NBN Satellite congestion disaster; that turned out exactly as I forecast some years ago.

If all the "Village" SCAX huts (up to 250 lines) were fitted with small DSLAM equipment then this would cost about 2,545 * $12,000 = $30.54 M, ($133 per premises). This would take a tremendous weight off the Federal Government and NBN problems, and provide Telstra with a ready market of another 229,050 ADSL2+ customers. Again this is tiny money for Telstra for big profits and it would go a long way to support those in the inland who vote for the National / Liberal coalition.

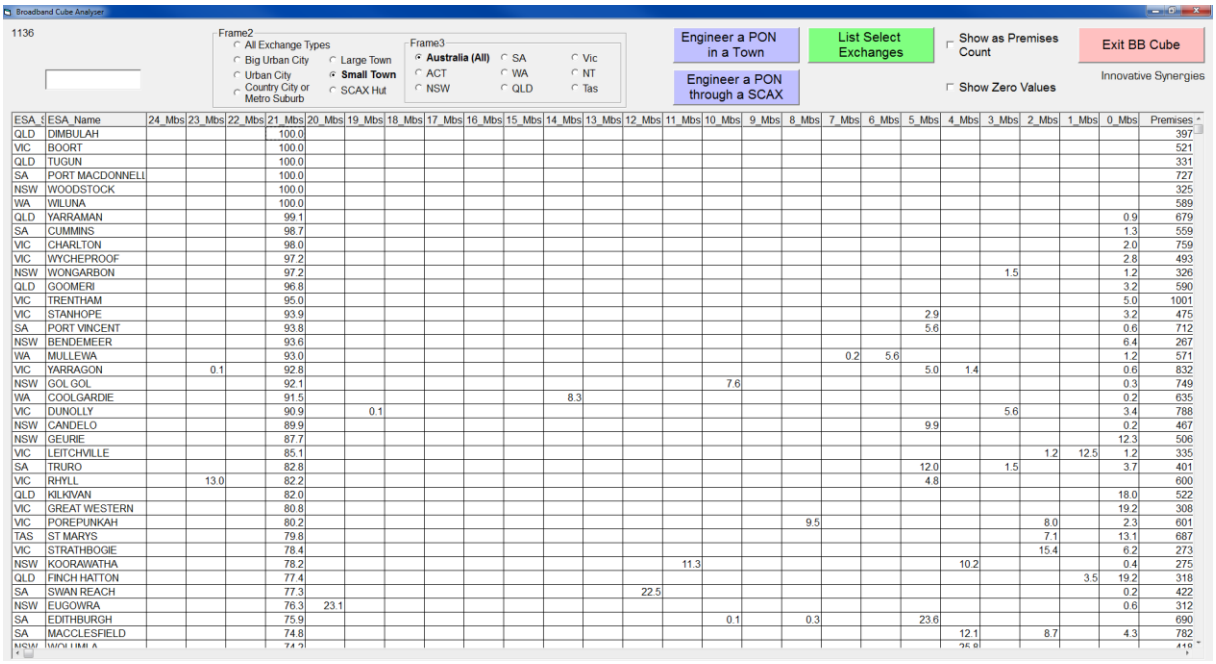
Small Towns with Slow DSLAMs

Look a little further and the Small Town scenario (251 to 1,000 lines SCAX huts), average 520 lines per Small Town, about 1,136 Small Towns, total lines 591,768, immediate people affected about 2.83 * 591,768 = 1,674,703 people, and more than half these people vote). Again in a Small Town scenario most premises are <1000 m from the SCAX hut so all premises should be able to connect at 24 Mb/s.



ESA_S	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
SA	PINE POINT																								100.0	279
NSW	CASSILIS																								100.0	274
NSW	QUIALIGO																								100.0	273
VIC	MOUNT TAYLOR																								100.0	272
TAS	MARRAWAH																								100.0	276
NSW	HARGRAVES																								100.0	272
QLD	UBOBO																								100.0	442
SA	SUNLANDS																								100.0	279
TAS	MEANDER																								100.0	279
WA	WALKAWAY																								100.0	436
WA	GOLDEN HILL																								100.0	449
WA	PANNAWONICA																			0.3					99.7	318
NT	PLENTY																	10.4							89.6	470
NT	ROPER RIVER																	16.5							83.5	405
VIC	PETERBOROUGH																				20.4				79.6	387
QLD	MOLLOY																	24.8							75.2	544
VIC	GLENMAGGIE																	31.2							68.8	497
QLD	BAMAGA																		31.4						68.6	328
NSW	ULAN																	34.1							65.9	352
SA	WAROOKA			18.8															19.9						61.3	834
QLD	BAFFLE CREEK												17.0				5.8		19.0						58.2	617
NSW	KILLABAKH CREEK																	43.6							56.4	266
WA	CARABOODA											10.2					17.0		6.0				11.0		55.8	518
TAS	BOAT HARBOUR																		36.6				11.3		52.1	816
VIC	THE GURDIES										1.9										9.8			37.3	51.0	429
TAS	KOONYA																	21.0					29.0		50.0	980
VIC	FLOWERDALE																				48.6		1.9		49.5	638
QLD	NERIMBERA					36.2		15.8																	48.0	354
QLD	MOUNT PERRY																	52.4							47.6	588
VIC	WOOLSTHORPE																	52.8							47.2	271
WA	BOW BRIDGE																	19.0	34.2						46.8	316
NSW	SACKVILLE REACH										25.5												28.3		46.3	428
SA	MILANG			54.7																					45.3	938
QLD	COOMINYA		8.3											47.4											44.4	1003
QLD	BORDEN																	59.1							40.9	281
NSW	TARAGO															39.6								19.7	40.6	507
QLD	MOUNT TARAMPA														43.4							0.3	16.1		40.1	583

This screenshot above is typical of Small Towns as ADSL speeds by percentage of premises lines and this is the 4th screen from the top, so all the above have no DSLAM2+ facilities AFAIK.



ESA_S	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
QLD	DIMBULAH				100.0																					397
VIC	BOORT				100.0																					521
QLD	TUGUN				100.0																					331
SA	PORT MACDONNELL				100.0																					727
NSW	WOODSTOCK				100.0																					325
WA	WILUNA				100.0																					589
QLD	YARRAMAN				99.1																				0.9	679
SA	CUMMINS				98.7																				1.3	559
VIC	CHARLTON				98.0																				2.0	759
VIC	WYCHEPROOF				97.2																				2.8	493
NSW	WONGARBON				97.2																		1.5		1.2	326
QLD	GOOMERI				96.8																				3.2	590
VIC	TRENTHAM				95.0																				5.0	1001
VIC	STANHOPE				93.9																2.9				3.2	475
SA	PORT VINCENT				93.8																5.6				0.6	712
NSW	BENDEMEER				93.6																				6.4	267
WA	MULLEWA				93.0														0.2	5.6					1.2	571
VIC	YARRAGON		0.1		92.8																5.0	1.4			0.6	832
NSW	GOL GOL				92.1											7.6									0.3	749
WA	COOLGARDIE				91.5							8.3													0.2	635
VIC	DUNOLLY				90.9		0.1																5.6		3.4	788
NSW	CANDELO				89.9																9.9				0.2	467
NSW	GEURIE				87.7																				12.3	506
VIC	LEITCHVILLE				85.1																			1.2	12.5	335
SA	TRURO				82.8																12.0		1.5		3.7	401
VIC	RHYLL		13.0		82.2																4.8					600
QLD	KILKIVAN				82.0																				18.0	522
VIC	GREAT WESTERN				80.8																				19.2	308
VIC	POREPUNKAH				80.2													9.5						8.0	2.3	601
TAS	ST MARYS				79.8																			7.1	13.1	687
VIC	STRATHBOGIE				78.4																			15.4	6.2	273
NSW	KOORAWATHA				78.2										11.3							10.2			0.4	275
QLD	FINCH HATTON				77.4																			3.5	19.2	318
SA	SWAN REACH				77.3									22.5											0.2	422
NSW	EUGOWRA				76.3	23.1																			0.6	312
SA	EDITHBURGH				75.9											0.1		0.3			23.6					690
SA	MACCLESFIELD				74.8																	12.1		8.7	4.3	782

The screenshot is typical of Small Towns with DSLAM2+ facilities by percentage in download data rates of the premises count.

On average each Small Town SCAX would require $24,000 in project costs including DSLAM2+, ancillaries, labour and project management; and the total outlay would be about 1,136 * $24,000 = $27.26 M, again small bickies, massive (political) ROI.

According to the My Broadband DataCube data, my quick analysis of this shows that about 222 Small Towns about (521 * 222 * 2.83 =) 327,323 people have nil ADSL2+ facilities and that fix should cost about $5.4 M, which again is a very small expenditure for such a massively big political return.

With this infrastructure, a high percentage of Rural Homesteads will be within 10 km of the SCAX huts, but the ADSL will be rather slow (1.3 Mb/s to 4.5 Mb/s) - but something is far better than nothing – and right now they have nothing.

Further analysis of the MyBroadband DataCube showed me that about 35 farms are on average connected to each SCAX hut. I have an inexpensive strategy[25] that I believe can bring these ADSL2+ speeds to Homesteads to be over 11 Mb/s for up to 10.5 km away from the SCAX huts.

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I grew up in a country town for several years and been highly associated with farming / grazing; and being a well-seasoned telecommunications engineer with a very strong technical knowhow.

Recently I briefly studied the Homestead workplace scenario with regards to Broadband connectivity, and I am now firmly of the conviction that a radically different Broadband connectivity strategy is imperative for those on the land, as compared to those in Urban (small / medium business) situations.

My inexpensive Homestead Broadband connectivity strategy is confidential at this stage, and it has massive side benefits for the Government and for the telecomms infrastructure in Australia for the now and future. If you wish to discuss this topic then contact me.

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Question 10

10a. Is there effective competition at the retail level of the market?

10b. Please provide market share information to illustrate this, including for customers on-net and off-net subscriber numbers.

10c. Are access seekers more successful in the retail market when supplying services on-net?

My understanding of this basic (CCA) legislation is based around **discretionary products and services**, that is: **not essential products and services**.

In economic terms, Competition is inherently extremely inefficient, because the products and services are discretionary (i.e. these are luxury items that are not necessary), and the End User costs are considerably higher than the wholesale costs to cover for expensive advertising / marketing / distribution / sale / maintenance practices and procedures.

The **facilitation** of Transport is an ESSENTIAL SERVICE and telecommunications infrastructure is a Transport facility, so it therefore directly stands to reason that that telecommunications infrastructure is part of the essential services infrastructure that must therefore be managed from a sub-Government Commission and definitely not from a number of private vertically integrated entities in competition with each other.

[25] http://www.moore.org.au/comms/03/20150821ADSLPhysicallyBondedPairs.pdf

> *In 1997 after over 30 years in the Australian Telecommunications industry I took up a role in Sydney as Bid Manager (Alternate Operators) with Nortel Telecomms (a major Global telecommunications equipment provider starting in Quebec, Canada, 1895).*
>
> *It was immediately obvious to me that Equipment / Service Tenders to large businesses like Telstra, Vodafone and Optus could command upwards of 30% discount and be at the front of production lines, and have preferential delivery, and Engineering support; where the Alternate Operators (much smaller) got virtually nil, and at the back of the queue.*
>
> *At this time it also became obvious to me that Infrastructure Businesses are diametrically opposite in almost every mindset facet than Competitive Businesses. (The ACCC is an Infrastructure Business.)*
>
> *For a really efficient economy, both business models require each other to be operating separately and without interference from each other and from external forces - and work with each other - one providing reliable and inexpensive infrastructure and the other marketing, advertising, promoting and profiting from competitive retail reselling.*

In the USA, Essential Services are euphemistically called "Utilities" to deliberately avoid coming in under scrutiny and allowing essential products and services to be controlled by very large privatised businesses with maximised profits that are definitely not in the interests of LTIE.

The Davidson Inquiry 1980, and its subsequent sham report in 1982 deliberately falsified factual information to justify the breaking up and privatisation of the then Telecom Australia in line with the pseudo political (economic) force put in Australia and several other countries by the USA controlled WTO / IMF after the USA had deliberately bankrupted Chile in 1972 for nationalising their very expensive to End Users USA-owned (majority Bell) telecomms controlled infrastructure that was definitely not in the interests of the LTIE.

With the understanding that **RETAIL** (**not INFRASTRUCTURE**) telecommunications (products and) services is the focus of the ACCC, this radically simplifies the role of the ACCC to align with the intended legislation.

It therefore stands to reason that the ACCC should be very strongly focussed on nationalising the totally merged telecomms infrastructure while facilitating competition between the various telecomms competitive retail outlets - to provide by far the most efficient outcome for the Australian economy.

In other words for the LTIE, the ACCC should be championing the Physical Separation of Telstra / Optus etc. as a very high priority so that these Retail Reselling facilities can naturally promote competition without the need for ACCC intervention.

The ACCC should therefore be very strongly promoting the total merging of all Australian located telecomms infrastructures[26] into one sub-Government Commission as this imperative action will provide a far more efficient (lower priced) wholesale products and services without the requirement for the specific NBN (and a large

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

number of Select Senate Inquiries and Regional Telecomms Inquiries that had associated Reports that seriously lacked any meaningful Engineering content on how to fix the problems - even though substantial Engineering detail was provided in these inquiries).

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Question 11

11. Are there any geographic areas where competition at the wholesale or retail levels is considered to be effective, and if so where are these areas and why is competition considered effective?

Geographic Areas in the Country

According to the My.Broadband ADSL data, the Excel Spreadsheet shows that of the nominal 5028 Local Exchange (Small Country Automatic Exchange (SCAX) hut) sites, there are about 2545 Villages (up to 250 pair copper lines) averaging about 90 lines per SCAX hut, so this is about 229,050 premises in the inland that are not in towns and cities in the inland.

Of these 2545 SCAX huts about 434 of these SCAX huts have DSLAM equipment installed providing ADSL (of sorts) to about 67,700 premises.

So about 161,350 premises (ABS 2.6 people per premises = 419,510 people) in these 2,111 Villages have nil ADSL connectivity.

According to the My.Broadband ADSL data, the Excel Spreadsheet shows that of the nominal 434 SSCAX huts that have DSLAM equipment in them, only a few (about 30) have ADSL2+ technology and the rest have much older second-hand DSLAM equipment.

The stupidity here is that most of these Village situations have the vast majority of premises within a 500 m radius, so the pair copper distance is typically well short of 1,100 m where the downstream speed (if the DSLAM equipment was ADSL2+) would be nominally 24 Mb/s.

So - no thanks to the stupidity and greed of "privatisation" / "competition" instead of very economically installing ADSL2+M DSLAM equipment in all inland SCAX huts and Telstra potentially connecting over 214,000 premises with ADSL2+ for a nominal project cost of about $15 M, the NBN (Federal Government) is lumped with providing Satellite for over $810 M and Satellite is a very short term (<5 years) fix - before it has to be replaced.

Far more detail is included in the reference[27] and[28] below.

The Fundamental Flaw of Wholesale Infrastructure Competition

There is a fundamental flaw in economics theory[29] in having Wholesale competition of Essential Infrastructure, as this in no way possible makes the LTEU better off.

(Telecommunications) Wholesale Infrastructure gets its economic efficiency business margin by not being in competition with any other potential service provider and focussing on providing a maximised service delivery of suitable products and services in a timely manner that is well thought out (planned) years in advance.

[27] http://www.moore.org.au/comms/03/201601inlandADSLinSCAX.ppsx
[28] http://www.moore.org.au/comms/03/201601inlandADSLbb.ppsx
[29] http://www.moore.org.au/busn/02/TheoryoftheSecondBest.pdf

Please read through this referenced[30] 12-page PowerPoint Slide Show called "Competition V Infrastructure"

It should be now very clearly understood both how and why that the only effective competition in the Wholesale infrastructure is ZERO.

It should be now also very clearly understood both how and why that Telstra, Optus, etc must be Physically Separated along the lines of Retail Reselling and Wholesale Infrastructure, and all the combined Wholesale infrastructure put into one sub-Government body (with the NBN Co.) to maximise the economic efficiency of this infrastructure Business.

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Question 12

12. Are there any particular barriers to entry impacting competition in the wholesale or retail markets for high speed fixed-line broadband services?

The Fundamental Flaw of Wholesale Competition

Fundamentally there is a major flaw in economics theory[31] in promoting Wholesale infrastructure competition, as this competing Infrastructure mindset makes the end user far worse off than if the infrastructure is managed by and Infrastructure Business mindset.

(Telecommunications) Wholesale Infrastructure gets its economic efficiency business margin by not being in competition with any other potential service provider and focussing on providing a maximised service delivery of suitable products and services in a timely manner that is well thought out (planned) years in advance.

Please read through this referenced[32] 12-page PowerPoint Slide Show called "Competition V Infrastructure"

It should be now very clearly understood both how and why that the only effective competition in the Wholesale infrastructure is ZERO.

It should be now also very clearly understood both how and why that Telstra, Optus, etc must be Physically Separated along the lines of Retail Reselling and Wholesale Infrastructure, and all the combined Wholesale infrastructure put into one sub-Government body (with the NBN Co.) to maximise the economic efficiency of this infrastructure Business.

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Question 13

13. Are there any implications for competition of the price differentials between on-net and off-net price ADSL services?

[30] http://www.moore.org.au/busn/02/infrcomp.ppsx
[31] http://www.moore.org.au/busn/02/TheoryoftheSecondBest.pdf
[32] http://www.moore.org.au/busn/02/infrcomp.ppsx

This competitive infrastructure situation is in no way promoting the Long Term Interests of End Users (LTIE), simply because competitive infrastructures is extremely inefficient and very costly - ultimately to the detriment of the end user, because the end user has to pay for the costs of competition in their connection bill.

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Question 14

14a. Do you consider that declaration of the wholesale ADSL service will promote competition?

14b. How is the wholesale ADSL service being used for this purpose?

The Fundamental Flaw of Wholesale Competition

There is a fundamental flaw in economics theory[33] in having Wholesale infrastructure competition, that in no way possible makes the end user better off.

(Telecommunications) Wholesale Infrastructure gets its economic efficiency business margin by not being in competition with any other potential service provider and focussing on providing a maximised service delivery of suitable products and services in a timely manner that is well thought out (planned) years in advance.

Please read through this referenced[34] 12-page PowerPoint Slide Show called "Competition V Infrastructure"

It should be now very clearly understood both how and why that the only effective competition in the Wholesale infrastructure is ZERO.

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Question 15

15a. Do you think competition concerns remain in the relevant market for the wholesale ADSL service since the 2012 declaration, or would remerge if the wholesale ADSL service was not declared?

15b. What is, or would be, the nature of these concerns and how significant are they?

Competitive ADSL without Needing POI Connectivity

When the telecomms infrastructure business is a Commission without private competitors it will be the economy of scale wholesale provider to a narrow or wide range of retail resellers. The economy of scale will mean that the correct DSLAM equipment will be allocated to the Local Exchange sites that best suit that equipment and the requirement for POIs will be void.

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

From there the wholesale prices will be substantially lower than they now are (because the wholesaler does not have to pay for advertising and marketing), and all pair copper lines will be fitted with ADSL technology that best suits them - not the expensive and untimely chaos of competition putting on whatever to make a quick buck.

From that point, using the MAC address of modems will be the key to Internet connectivity, and all that is required is the MAC address into a (national) database to permit connectivity and allocate that wholesale service to a retail reseller.

Should the modem owner (retail customer) move to another address they simply take their modem with them (if it is the same ADSL technology), and the modem will immediately re-connect and through-connection to the Internet is permitted.

If it is a different technology ADSL, then the new modem MAC address is associated and the through connection is associated to the Retail Reseller / Customer.

It is this simple, and no POI is necessary.

Question 16

16a. Are commercial wholesale ADSL service terms and conditions set with reference to those in the FAD, or independently?

16b. Do the terms and conditions negotiated inhibit competition in any way, including through restricting the nature of service offerings?

16c. Are you aware of any discrimination occurring between prices offered to different access seekers?

FAD = Final Access Determination (meaningles)

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Question 17

17a. Are there any instances whereby delays in the negotiation of revised wholesale DSL charges following Telstra's retail price changes have affected the ability of access seekers to compete?

Although this is not my area of expertise or involvement, it is very clear that the question is highlighting what I have heard is a standard practice to cripple retail reselling competition by sequentially changing the financial situation and causing internal haemorrhaging of dependent retail reselling businesses.

The real question is "**Please provide examples that show why Infrastructure Business and Competitive Business cannot ever be under the one Company / Board / Director / Executive Management structure.**"

17b. If so, please specify the duration and impact of the delays.

ADSL with Point-to-Point Radio Connectivity

Recently I heard from an extremely reliable source about a situation that he (and his then business) was, I believe, deliberately targeted to be force-closed.

On the back of one of the Liberal hare-brained "initiatives", he set up a country / rural telecomms business that provided very inexpensive "point-to-point Radio - ADSL" to Homesteads, up to at least 20 km from towns.

Basically, he chose a high point in a town (water tower, building, grain silo etc., and connected several point-to-point radios systems from this hub, each pointing to specific Homesteads, where the other end of the point-to-point radio system was located (on a high point there near or at the Homestead).

In the town he connected several pair copper lines to the hub location and connected several ADSL modems with their Cat5 (100 Mb/s bi-directional) to the p-p radio transceivers (100 Mb/s bi-directional). With this structure his business could connect several Homesteads with ADSLx at maximum "short line" speed with Homesteads at least 20 km from the towns.

This connectivity was very popular, and it really grated with Telstra because of several marketing issues (not to mention the situation that the Universal Services Obligation gift of $190 M pa from the Federal Government was in dire threat of being removed because country people were making the rural / regional telecomms business to look profitable).

Metering is Crippling Process

The catch came from Telstra concerning a (subtle but very significant) change in the metering software processes. This may have been coincidental with software progress, but I was very reliably informed that the Telstra person that met to discuss this problem with my source stated a phrase like: "I am very sorry but you will have to terminate your business".

For 99.9% of all telecom-related competitive infrastructure / retail reselling businesses having a subtle but significant change in Telstra software / process would involve a total re-write of the competing / sibling software so that it can still interface and be reliable.

My understanding from other Engineering work in software that such a cost is typically in the order of $200,000 if you have to start from scratch and rewrite everything. An extra cost like this plus being off air and no income for some / several months would normally drive a small business off the map - particularly in this highly competitive telecomms infrastructure / retail reselling business; particularly in an inland situation.

The saving grace was that my highly reliable source had extensive telecomms Engineering experience, and had been intricately involved several years before with the process in metering and was heavily involved in the writing of the metering / charging software for Telecom Australia / Telstra.

It took him less than a couple of days to identify the subtle and deliberate changes in the metering process and associated software coding, and make the rather small but subtle changes to reflect these deliberate changes in his sibling software to re-align. From there his metering and charging software worked perfectly smoothly with the subtly altered Telstra metering / charging software and his small business continued to flourish.

My understanding is that he sold this flourishing business some years later and moved on towards retirement as a Consultant Engineer.

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Question 18

18a. How do the wholesale terms and conditions negotiated with Telstra compare to those from other providers of the wholesale ADSL service?

Infrastructure Business for ADSL Wholesale

If both **Infrastructure Businesses** providing the somewhat parallel services became aware that their product delivery was competitive (i.e. a parallel product / service range), then both Infrastructure Businesses would draw together and negotiate on an economy of sale outcome with a lower overall wholesale price and a maximised and common service base.

Firstly the product and service range would be openly discussed, then how it can be most economically provided, and most efficiently use the associated infrastructure to support this range of services.

One or the other Infrastructure Businesses would freely hand over their infrastructure and associated staff (and/or indeed totally merge both Infrastructure Businesses to have an "economy of scale" greater efficiency that would further reduce the wholesale product / service range to the Retail Resellers.

Telstra cannot do what is described above as Telstra is a Competitive Business, so its primary focus is to beat other competing businesses, whether they are competitive Infrastructure oriented (as per wholesale) or retail oriented (as per retail reselling).

18b. Please detail the differences.

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Question 19

19a. Do you consider that it is imperative to have a pre-existing subscriber base prior to the complete rollout of the NBN?

19b. If so, will an existing market share provide a material comparative advantage?

19c. If so, how? Are customers switching to different NBN providers and are there any barriers to customers wanting to switch to a different service provider?

Privatised Infrastructure Costing Australians

The technology of ADSL was rolled out with a Competitive Business mindset - so instead of long-term planning for the correct equipment in the locations that would work at the best of their ability and rolled out nationally, the ADSL technology was rushed out without care of any CAN specifications and we now have the mess with about 500,000 inland premises not connected to ADSL where they could very inexpensively connect and run at 24 Mb/s and we have satellite being thrown at them and nobody wants Satellite - they want FTTP.

With the understanding that because the ACCC has fostered COMPETITION in the Australian public telecommunications infrastructure; one of the major economic downsides was a very rushed and very uncoordinated series of DSLAM rollouts for various ADSL technologies.

Apart from this ADSL equipment costing far more that it would have if this were purchased in a well-organised sequence of a single large corporate purchase; the multiple and "competitive" rollouts were rush multi-duplicated by competing telecommunications wholesale partial infrastructure businesses "access seekers" (in ACCC legal gobbledegook) that would then look to maximise their trading position by advertising and selling this wholesale infrastructure as retail re-sold services.

To make a rather bad economic situation much worse, the ACCC as continued to foster increased competition as the mindless panacea to fix the lack of roll out - that was initially caused by PRIVATISING the Australian Telecomms infrastructure through the sham Davidson Inquiry so as to justify a Telecomms Sector on the ASX, so that superannuation bodies could apparently invest their money in Australian Telecomms Infrastructure (most of which is now in foreign hands - no thanks to totally incorrect PRIVATISATION strategy).

This massive theft of Australian infrastructure can be very quickly fixed but it required the **Productivity Commission** to wake up and recognised the mass inefficiencies caused by the Telecomms wholesale infrastructure selloff, and the **ACCC** to recognise it has made an immense mistake by promoting competition as the panacea for massively reduced productivity - and reverses the promotion of increased competition - which is much like realising your car is now in petrol (in the tank) then really speeding for say 150 km to the nearest petrol station to get there before the petrol in the car's tank runs out!

Open Competition is the correct place for Retail Resellers;

Complete Co-operation is the correct place for Telecomms infrastructure as a single sub-Government Commission.

This tiered-structure is the correct economic competition - for maximised Australian productivity.

We need to sit down and discuss this

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Question 20

20. Is the wholesale ADSL service being used as a vehicle to achieve a pre-existing subscriber base prior to the complete rollout of the NBN?

Subscriber Base a Perfect Fit for Infrastructure Business

Assuming the NBN (Commission) was the Infrastructure Business that by its nature would therefore be the Wholesale manager of the entire Telecomms infrastructure in Australia, then it would logically follow that the entire wholesale ADSL number base would be entirely managed by the NBN, no iffs, no butts and no legal interference.

From there it is therefore very straightforward that each ADSL number is allocated to a Consumer (via a Retail Reseller) and the Retail Reseller would regularly receive the wholesale usage data from the NBN and restructure this usage data to create billing data for their specific Consumers, and bill these Retail Consumers according to their Retail Plan arrangements.

In turn, the Retail Resellers would receive a wholesale bill from the NBN (Commission), which they would pay and that payment would nominally be reinvested into rolling out more telecomms infrastructure and buying back Bonds that were sold to fund the NBN.

This simple process would take the NBN (and Australia) out of foreign and local debit in this area and maximise the profit for the Retail Reselling Competitive Businesses because the Wholesale price would be substantially lower than it is now.

The ACCC would then focus on what it should be focussing on - regulating the misdemeanours and deliberate illegal activities of Competitive Businesses, because Wholesale Infrastructure Businesses do not require regulation.

What Infrastructure Businesses do require from the ACCC (and other Government bodies) is protection from those with Competitive Business mindsets (i.e. greed) deliberately changing the Federal laws to privatise what is not theirs - so they can make it "more efficient" be asset shifting and asset stripping - usually for increased personal wealth!

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Question 21

21a. Are there any other potential risks to competition that may arise in the transition to the NBN if the wholesale ADSL service is not regulated?

21b. If so, what are they?

How to Optimise Retail Competition

If the wholesale ADSL infrastructure was owned and managed by one national Infrastructure Business (Commission), then there would be absolutely nil potential or real risk to retail reselling competition and further, there would be absolutely nil requirement for the wholesale ADSL service to be regulated (and nil involvement by the ACCC) at any level.

The reason why this question 21 was included is because the framework of having a Competitive Business mindset in charge of the vast majority of ADSL wholesale infrastructures / services is very fertile ground to grow a range of unethical competitive arrangements that require regulation as alluded to in this and previous questions.

It therefore follows to reason that the industry structure of having Telstra / Optus etc. as competitive vertically integrated infrastructure providers and also retail resellers in fundamentally flawed, resulting in a raft of customer complained at many levels and areas, and the resultant requirement for the ACCC to produce a Discussion paper.

Unfortunately the ACCC Discussion paper is seriously omitting to raise or even discuss the obvious issue in that the simplistic "Competition is Good - more Competition is Better" mantra / uneconomic framework has only one place where it is functional with a minimum of external regulation and that is by Physically Separating Telstra, Optus etc along the Infrastructure (Wholesale) and Retail Reselling lines.

So, in return, when is the ACCC finally going to act on behalf of Australia and Physically Separate Telstra / Optus etc.?

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Question 22

22. What impact would declaration have on the objective of achieving any-to-any connectivity?

Two Decades Behind Reality

As pointed out in the answer to Question 1, under the heading **Three False Phrases**

"**achieving any-to-any connectivity**" is really a catch-phrase from the early 1980s when it became apparent that telecommunications that had been basically telephony from about 1870 until about 1977 then it became apparent that voice-band modems could readily transfer data, so Bulletin Boards and inter-computer data transport became practical using a range of packeted data "chunks" that could be checked and repeated if the checking proved unsuccessful.

The advent of Fax machines brought a new level of data transfer in the form of printed sheets being transferred from the mid 1970s using a relatively simple form of packet data that negotiated a fastest (safe and reliable) data speed between the two end devices before setting down and communicating the main message .

At about this same time the electronic Telegraph (Telex) went through metamorphosis where an intermediate computer was included to hold and store then forward as and when the distant end was available, so a (Customer Access Network) phone line and its associated equipment started to become multi-purpose.

Almost concurrently, (analogue) mobile phones started to become practical and these could communicate with other (analogue) mobile phones or to (analogue, and ISDN / PABX) fixed line phones.

The next phase of mobile phones were "digital" - well, digital transmission and reception techniques used in an analogue radio base structure (GSM) and this technology took several iterations before the distortion was low enough to be clear for audio communications. But, in the background the Common Channel Signalling Number 7 (CCS7) was extended to the mobile phones so that Texting could be transferred on the same "mobile" radio connection and passed through the telecomms switching control channel to the distant end mobile phone or other device.

In the late 1980s the advent of the Internet Protocol (IP) revolutionised data transfer because this data transfer protocol sat over (on top of) the physical (data) level.

This second level of data transport (IP) made any terminal equipment capable of transceiving with the IP effectively could communicate with any other terminal equipment also capable of transceiving with the IP. (Hence the "any-to-any connectivity" mantra) providing the underlying physical data protocol can link-up.

From the IP rapidly growing use in the late 1980s from its embryo stages, the concept of fixed line voice only telephony passed its use-by date, and ADSL technology to utilise the vacant spectrum space above the telephony Voiceband has become the expected standard telecommunications facility to assist in providing a wide range of digitally-based telecommunications terminal equipment to talk with each other.

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Question 23

23a. Are there still opportunities for efficient investment in competing DSL networks – in terms of either expansion of the existing DSL footprint or increased investment in areas that have already attracted ULLS/LSS based competition?

Why Infrastructure Competition is Really Inefficient

Duplicated infrastructure by competing businesses is inherently and extremely inefficient investment strategy, because the wrong equipment will be (and has been) installed in the wrong places for maximised shareholder profit - at direct expense to the Australian economy, because this far less than optimum management of this infrastructure cause by the Competitive Business mindset directly impinges on other unassociated (competitive) businesses and the community from being optimally connected to the DSL technology that best suits their locality.

23b. Is this likely to change over time?

The status quo will continue to cost Australia very dearly until the ACCC takes decisive action to totally restructure the Telecomms sector so that (commercially) it is purely a Telecomms Retail Reseller on the ASX and all the Australian telecomms infrastructure is merged into one sub-Government Commission where competition is eliminated and timely roll outs of the right infrastructure can be done in a timely and very economically (minimum cost, maximum coverage, maximum service, lowest wholesale cost, maximum retail reselling profit).

23c. How would declaration of the wholesale ADSL service impact this?

In the commercial world of Competitive Business which is squarely focussed on maximised internal profit using internal accounting practices (the profit and loss of that Competitive Business as a result of a business decision), the mindset of these businesses expressly avoid any external accounting (the profit and loss of the community / Government and Competitive Businesses) as a result of a change in their business decisions.

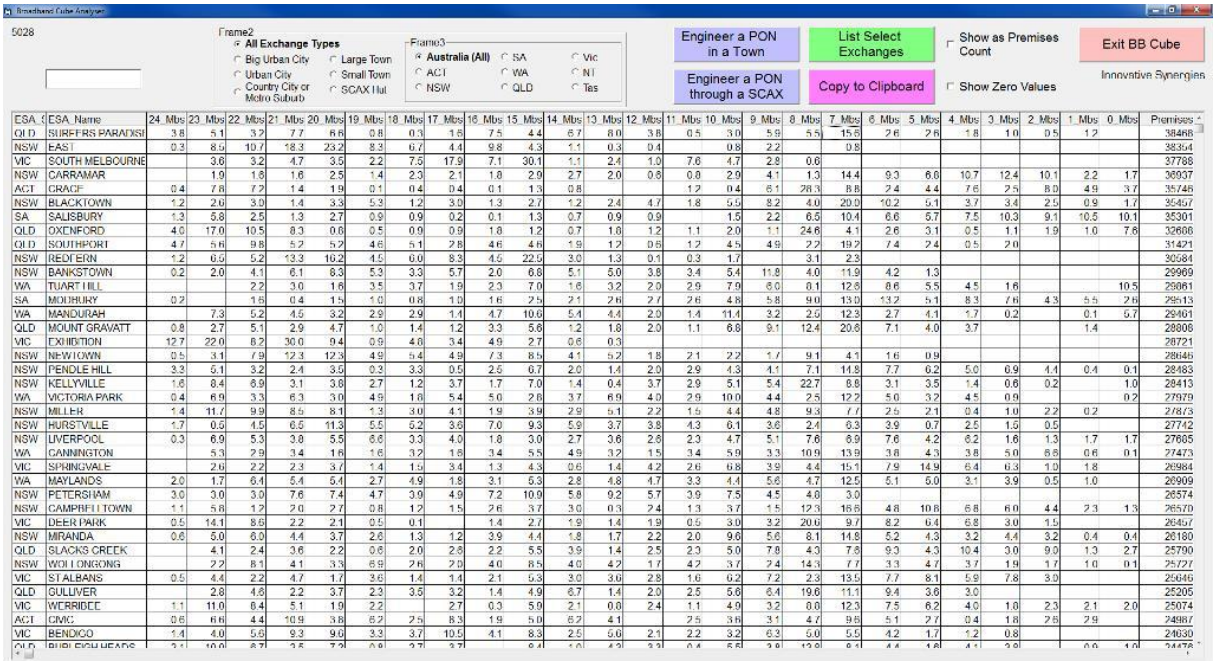
With this maximised internal ROI mindset, the only localities to roll out ADSL is in the major cities (and suburbs), then minor cities, than major towns, then minor towns, then villages / Localities in that order.

It is rather obvious from the My.Broadband Excel database that the ADSL infrastructure rollout followed these lines because the Excel spreadsheet shows very low proportion of minor Towns and virtually nil Villages have any ADSL infrastructure.

Looking at this from a corporate (competitive) vision, it is easy (inexpensive) to roll out ADSL facilities DSLAMs in the largest Local Exchange sites because these have by far the biggest customer numbers per Local Exchange site.

Wrong Technology DSLAMS in Cities

This screenshot below shows Australia's large Local Exchanges, sorted by Customer count. The first 10 Local Exchanges add up to about 352,000 lines, and all of these are in the big cities. (NB: *Crace in really North Canberra servicing the suburbs of Mitchell, Watson, Kaleen, Giralang, Watson, Hackett, Downer.*) Of these10 very big Local Exchange only 2.4% of Customer lines do not have ADSLx infrastructure.

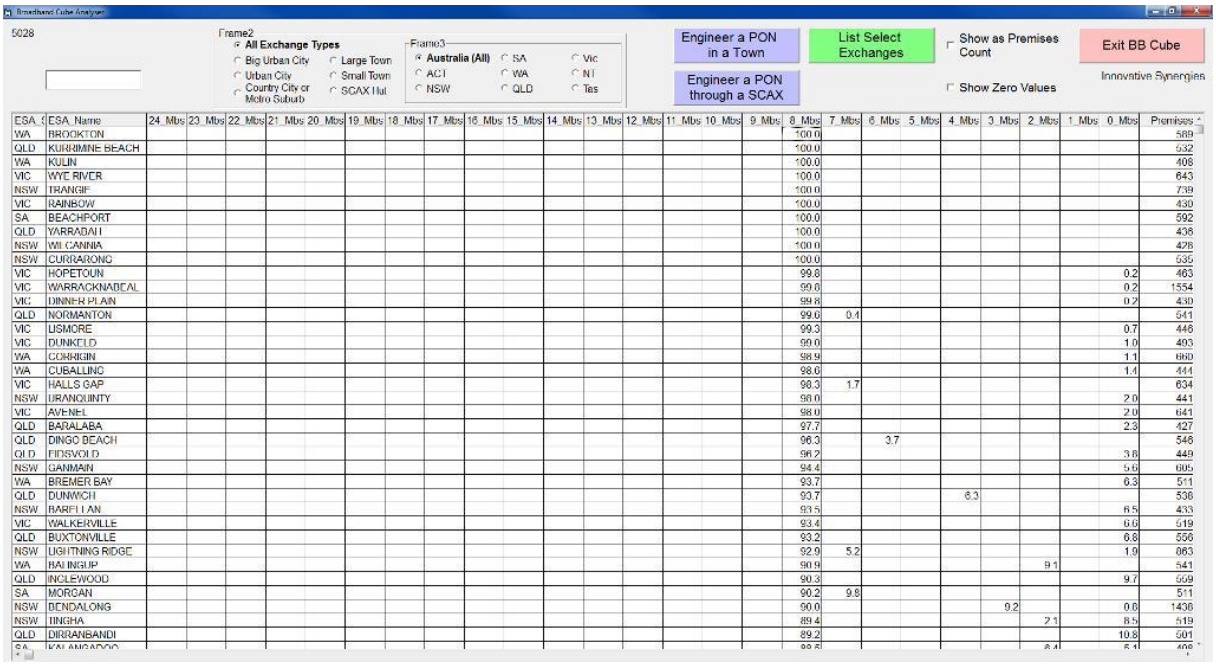


ESA_C	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
QLD	SURFERS PARADISE	3.8	5.1	3.2	7.7	6.6	0.8	0.3	1.6	7.5	4.4	6.7	8.0	3.8	0.5	3.0	5.9	5.5	15.5	2.6	2.6	1.8	1.0	0.5	1.2		38468
NSW	EAST	0.3	8.5	10.7	18.3	23.2	8.3	6.7	4.4	9.8	4.3	1.1	0.3	0.4		0.8	2.2		0.8								38354
VIC	SOUTH MELBOURNE		3.6	3.2	4.7	3.5	2.2	7.5	17.9	7.1	30.1	1.1	2.4	1.0	7.6	4.7	2.8	0.6									37788
NSW	CARRAMAR		1.9	1.8	1.6	2.5	1.4	2.3	2.1	1.8	2.9	2.7	2.0	0.6	0.8	2.9	4.1	1.3	14.4	9.3	6.8	10.7	12.4	10.1	2.2	1.7	36937
ACT	GRACE	0.4	7.8	7.2	1.4	1.9	0.1	0.4	0.4	0.1	1.3	0.8			1.2	0.4	6.1	28.3	8.8	2.4	4.4	7.6	2.5	8.0	4.9	3.7	35746
NSW	BLACKTOWN	1.2	2.6	3.0	1.4	3.3	5.3	1.2	3.0	1.3	2.7	1.2	2.4	4.7	1.8	5.5	8.2	4.0	20.0	10.2	5.1	3.7	3.4	2.5	0.9	1.7	35457
SA	SALISBURY	1.3	5.8	2.5	1.3	2.7	0.9	0.9	0.2	0.1	1.3	0.7	0.9	0.9		1.5	2.2	6.5	10.4	6.6	5.7	7.5	10.3	9.1	10.5	10.1	35301
QLD	OXENFORD	4.0	17.0	10.5	8.3	0.6	0.5	0.9	0.9	1.8	1.2	0.7	1.8	1.2	1.1	2.0	1.1	24.6	4.1	2.6	3.1	0.5	1.1	1.9	1.0	7.6	32666
QLD	SOUTHPORT	4.7	5.6	9.8	5.2	5.2	4.6	5.1	2.8	4.6	4.6	1.9	1.2	0.6	1.2	4.5	4.9	2.2	19.2	7.4	2.4	0.5	2.0				31421
NSW	REDFERN	1.2	6.5	5.2	13.3	16.2	4.5	6.0	8.3	4.5	22.5	3.0	1.3	0.1	0.3	1.7		3.1	2.3								30584
NSW	BANKSTOWN	0.2	2.0	4.1	6.1	8.3	5.3	3.3	5.7	2.0	6.8	5.1	5.0	3.8	3.4	5.4	11.8	4.0	11.9	4.2	1.3						29969
WA	TUART HILL			2.2	3.0	1.6	3.5	3.7	1.9	2.3	7.0	1.6	3.2	2.0	2.9	7.9	6.0	0.1	12.6	8.6	5.5	4.5	1.6			10.5	29861
SA	MODBURY	0.2		1.6	0.4	1.5	1.0	0.8	1.0	1.6	2.5	2.1	2.6	2.7	2.6	4.8	5.8	9.0	13.0	13.2	5.1	8.3	7.6	4.3	5.5	2.6	29513
WA	MANDURAH		7.3	5.2	4.5	3.2	2.9	2.9	1.4	4.7	10.6	5.4	4.4	2.0	1.4	11.4	3.2	2.0	12.3	2.7	4.1	1.7	0.2		0.1	5.7	29401
QLD	MOUNT GRAVATT	0.8	2.7	5.1	2.9	4.7	1.0	1.4	1.2	3.3	5.6	1.2	1.8	2.0	1.1	6.8	9.1	12.4	20.6	7.1	4.0	3.7			1.4		28808
VIC	EXHIBITION	12.7	22.0	8.2	30.0	9.4	0.9	4.6	3.4	4.9	2.7	0.6	0.3														28721
NSW	NEWTOWN	0.5	3.1	7.9	12.3	12.3	4.9	5.4	4.9	7.3	8.5	4.1	5.2	1.8	2.1	2.2	1.7	9.1	4.1	1.6	0.9						28646
NSW	PENDLE HILL	3.3	5.1	3.2	2.4	3.5	0.3	3.3	0.5	2.5	6.7	2.0	1.4	2.0	2.9	4.3	4.1	7.1	14.8	7.7	6.2	5.0	0.9	4.1	0.4	0.1	28483
NSW	KELLYVILLE	1.6	8.4	6.9	3.1	3.6	2.7	1.2	3.7	1.7	7.0	1.4	0.4	3.7	2.9	5.1	5.4	22.7	8.8	3.1	3.5	1.4	0.6	0.2		1.0	28413
WA	VICTORIA PARK	0.4	6.9	3.3	6.3	3.0	4.9	1.6	5.4	5.0	2.6	3.7	6.9	4.0	2.9	10.0	4.4	2.5	12.2	5.0	3.2	4.5	0.9			0.2	27979
NSW	MILLER	1.4	11.7	9.9	8.5	8.1	1.3	3.0	4.1	1.9	3.9	2.9	5.1	2.2	1.5	4.4	4.8	9.3	7.7	2.5	2.1	0.4	1.0	2.2	0.2		27873
NSW	HURSTVILLE	1.7	0.5	4.5	6.5	11.3	5.5	5.2	3.6	7.0	9.3	5.9	3.7	3.8	4.3	6.1	3.6	2.4	6.3	3.9	0.7	2.5	1.5	0.5			27742
NSW	LIVERPOOL	0.3	6.9	5.3	3.8	5.5	6.6	3.3	4.0	1.8	3.0	2.7	3.6	2.6	2.3	4.7	5.1	7.6	6.9	7.6	4.2	6.2	1.6	1.3	1.7	1.7	27665
WA	GANNINGTON		5.3	2.9	3.4	1.6	1.6	3.2	1.6	3.4	5.5	4.9	3.2	1.5	3.4	5.9	3.3	10.9	13.9	3.6	4.3	3.8	5.0	6.6	0.6	0.1	27473
VIC	SPRINGVALE		2.6	2.2	2.3	3.7	1.4	1.5	3.4	1.3	4.3	0.6	1.4	4.2	2.6	6.8	3.9	4.4	15.1	7.9	14.9	6.4	6.3	1.0	1.8		26984
WA	MAYLANDS	2.0	1.7	6.4	5.4	5.4	2.7	4.9	1.8	3.1	5.3	2.8	4.8	4.7	3.3	4.4	5.6	4.7	12.5	5.1	5.0	3.1	3.9	0.5	1.0		26909
NSW	PETERSHAM	3.0	3.0	3.0	7.6	7.4	4.7	3.9	4.9	7.2	10.9	5.8	9.2	5.7	3.9	7.5	4.5	4.0	3.0								26574
NSW	CAMPBELLTOWN	1.1	5.8	1.2	2.0	2.7	0.8	1.2	1.5	2.6	3.7	3.0	0.3	2.4	1.3	3.7	1.5	12.3	16.6	4.8	10.8	6.8	6.0	4.4	2.3	1.3	26570
VIC	DEER PARK	0.5	14.1	8.6	2.2	2.1	0.5	0.1		1.4	2.7	1.9	1.4	1.9	0.5	3.0	3.2	20.0	9.7	8.2	6.4	6.8	3.0	1.5			26457
NSW	MIRANDA	0.6	5.0	6.0	4.4	3.7	2.6	1.3	1.2	3.9	4.4	1.8	1.7	2.2	2.0	9.6	5.6	8.1	14.8	5.2	4.3	3.2	4.4	3.2	0.4	0.4	26180
QLD	SLACKS CREEK		4.1	2.4	3.6	2.2	0.6	2.0	2.6	2.2	5.5	3.9	1.4	2.5	2.3	5.0	7.8	4.3	7.8	9.3	4.3	10.4	3.0	9.0	1.3	2.7	25790
NSW	WOLLONGONG		2.2	8.1	4.1	3.3	6.9	2.6	2.0	4.0	8.5	4.0	4.2	1.7	4.2	3.7	2.4	14.3	7.7	3.3	4.7	3.7	1.9	1.7	1.0	0.1	25727
VIC	ST ALBANS	0.5	4.4	2.2	4.7	1.7	3.6	1.4	1.4	2.1	5.3	3.0	3.6	2.8	1.6	6.2	7.2	2.3	13.5	7.7	8.1	5.9	7.8	3.0			25646
QLD	GULLIVER		2.8	4.6	2.2	3.7	2.3	3.5	3.2	1.4	4.9	6.7	1.4	2.0	2.5	5.6	6.4	19.6	11.1	9.4	3.6	3.0					25205
VIC	WERRIBEE	1.1	11.0	6.4	5.1	1.9	2.2		2.7	0.3	5.9	2.1	0.8	2.4	1.1	4.9	3.2	0.8	12.3	7.5	6.2	4.0	1.0	2.3	2.1	2.0	25074
ACT	CIVIC	0.6	6.6	4.4	10.9	3.8	6.2	2.5	8.3	1.9	5.0	6.2	4.1		2.5	3.6	3.1	4.7	9.6	5.1	2.7	0.4	1.8	2.6	2.9		24987
VIC	BENDIGO	1.4	4.0	5.6	9.3	9.6	3.3	3.7	10.5	4.1	8.3	2.5	5.6	2.1	2.2	3.2	6.3	5.0	5.5	4.2	1.7	1.2	0.8				24630
QLD	BURLEIGH HEADS	2.1	10.0	6.7	2.5	7.2	0.9	2.7	2.7		9.4	1.0	4.2	2.3	0.4	6.5	2.8	12.9	9.1	4.4	1.6	4.1	2.9		0.0	1.0	24478

In Competitive Business terms, the only Local Exchange sites to install new DSLAM equipment is in the areas that will (potentially) provide the highest ROI (for the shareholders), which would be those areas with the largest amount of small and medium business in these ESAs.

Wrong Technology DSLAMs in Small Towns

In Infrastructure Business terms the ideal Local Exchange sites to install new DSLAM equipment is the would be the areas in Australia that do not have ADSL facilities and would seriously benefit from having Broadband connectivity - and that would mean the small Local Exchanges (Small Country Automatic Exchanges - "SCAX" huts for short) would be one of the first localities (and this would go a long way to resolving a wad of Select Senate Inquires, Regional Reviews etc. where the county areas are screaming for Broadband connectivity but not getting economically connected.



ESA_C	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
WA	BROOKTON																	100.0								589
QLD	KURRIMINE BEACH																	100.0								532
WA	KULIN																	100.0								408
VIC	WYE RIVER																	100.0								643
NSW	TRANGIE																	100.0								739
VIC	RAINBOW																	100.0								430
SA	BEACHPORT																	100.0								592
QLD	YARRADAH																	100.0								436
NSW	WILCANNIA																	100.0								428
NSW	CURRARONG																	100.0								535
VIC	HOPETOUN																	99.8							0.2	463
VIC	WARRACKNABEAL																	99.8							0.2	1554
VIC	DINNER PLAIN																	99.8							0.2	430
QLD	NORMANTON																	99.6	0.4							541
VIC	LISMORE																	99.3							0.7	446
VIC	DUNKELD																	99.0							1.0	493
WA	CORRIGIN																	98.9							1.1	660
WA	CUBALLING																	98.6							1.4	444
VIC	HALLS GAP																	98.3	1.7							634
NSW	URANQUINTY																	98.0							2.0	441
VIC	AVENEL																	98.0							2.0	641
QLD	BARALABA																	97.7							2.3	427
QLD	DINGO BEACH																	96.3		3.7						546
QLD	FIDSVOLD																	96.2							3.8	449
NSW	GANMAIN																	94.4							5.6	605
WA	BREMER BAY																	93.7							6.3	511
QLD	DUNWICH																	93.7				6.3				536
NSW	BARELLAN																	93.5							6.5	433
VIC	WALKERVILLE																	93.4							6.6	519
QLD	BUXTONVILLE																	93.2							6.8	556
NSW	LIGHTNING RIDGE																	92.9	5.2						1.9	863
WA	BALINGUP																	90.9						9.1		541
QLD	INGLEWOOD																	90.3							9.7	559
SA	MORGAN																	90.2	9.8							511
NSW	BENDALONG																	90.0					9.2		0.8	1436
NSW	TINGHA																	89.4						2.1	8.5	519
QLD	DIRRANBANDI																	89.2							10.8	501
SA	KALANGADOO																	88.5						6.4	5.1	408

With Competitive Business terms the logical procession is to over-supply the highest ROI (Metropolitan City) areas with the best equipment so that they can produce even more profits for the shareholders.

The above picture paints a very obvious story of where the early DSLAM equipment was later re-installed from what was almost certainly the big city high ROI locations.

So, basically it looks very obvious that these much lower ROI locations were the recipients of the old DSLAM1 equipment from the high ROI locations.

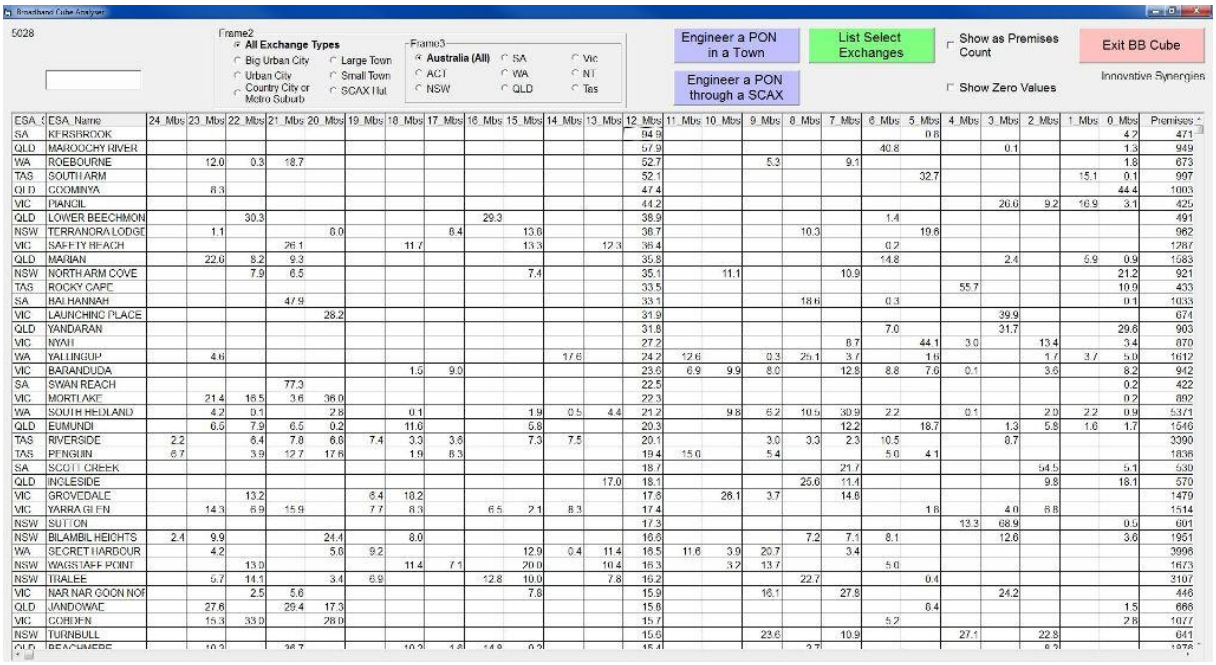
In Competitive Business terms this is highly efficient because the equipment was used again - but - as shown before these locations are all Small Towns (250 - 1040 lines) and the maximum length for all but about 16 (Homestead) lines are less than 1200 m long around each Small Town.

Because of this very simple Engineering situation of pair copper lines being less than 1200 m, with an Infrastructure Business mindset, all these Local Exchange sites would have had 100% ADSL2 or ADSL2+ DSLAMs installed capable of 24 Mb/s - because virtually all these Premises would be able to connect at 24 Mb/s and not 8 Mb/s, which can be used in far more appropriate locations (in metropolitan cities).

A little analysis of the My.Broadband Excel data shows that there are 125 Small towns that have nil ADSL facilities accounting for about 102,400 premises, and using

the Australian Bureau of Statists[35] there are about 2.6 people per premises, so this puts about 226,240 people in Small Towns without and ADSL connectivity, where they could be very inexpensively connected with 24 Mb/s Broadband.

Very clearly, allowing Competitive Business mindset (Telstra / Optus etc.) in charge of managing telecomms infrastructure in Australia is akin to having Dracula minding the Blood Bank - it is clearly not in Australia's economic interest and it is costing Australia very dearly. For a start - nil of these premises would require Satellite Broadband connections.



ESA_C	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
SA	KERSBROOK													94.9							0.8					4.2	471
QLD	MAROOCHY RIVER													57.9						40.8			0.1			1.3	949
WA	ROEBOURNE		12.0	0.3	18.7									52.7			5.3		9.1							1.8	673
TAS	SOUTH ARM													52.1							32.7				15.1	0.1	997
QLD	COOMINYA		8.3											47.4												44.4	1003
VIC	PIANCIL													44.2									26.0	9.2	16.9	3.1	425
QLD	LOWER BEECHMON			30.3						29.3				38.9						1.4							491
NSW	TERRANORA LODGE		1.1			6.0			6.4		13.6			38.7				10.3			19.6						962
VIC	SAFETY BEACH				26.1			11.7			13.3		12.3	36.4						0.2							1287
QLD	MARIAN		22.6	8.2	9.3									35.8						14.8			2.4		5.9	0.9	1083
NSW	NORTH ARM COVE			7.9	6.5						7.4			35.1		11.1			10.9							21.2	921
TAS	ROCKY CAPE													33.5								55.7				10.9	433
SA	HALHANNAH				47.9									33.1				18.6		0.3						0.1	1033
VIC	LAUNCHING PLACE					28.2								31.9									39.9				674
QLD	YANDARAN													31.8						7.0			31.7			29.6	903
VIC	NYAH													27.2					6.7		44.1	3.0		13.4		3.4	870
WA	YALLINGUP		4.6									17.6		24.2	12.6		0.3	25.1	3.7		1.6			1.7	3.7	5.0	1612
VIC	BARANDUDA							1.0	9.0					23.6	6.9	9.9	8.0		12.8	8.8	7.6	0.1		3.6		8.2	942
SA	SWAN REACH				77.3									22.5												0.2	422
VIC	MORTLAKE		21.4	18.5	3.6	36.0								22.3												0.2	892
WA	SOUTH HEDLAND		4.2	0.1		2.8		0.1			1.9	0.5	4.4	21.2		9.8	6.2	10.5	30.9	2.2		0.1		2.0	2.2	0.9	5371
QLD	EUMUNDI		6.6	7.9	6.5	0.2		11.0			5.8			20.3					12.2		18.7		1.3	5.8	1.6	1.7	1546
TAS	RIVERSIDE	2.2		6.4	7.8	6.6	7.4	3.3	3.6		7.3	7.5		20.1			3.0	3.3	2.3	10.5			6.7				3390
TAS	PENGUIN	6.7		3.9	12.7	17.6		1.9	8.3					19.4	15.0		5.4			5.0	4.1						1838
SA	SCOTT CREEK													18.7					21.7					54.5		5.1	530
QLD	INGLESIDE												17.0	18.1				25.6	11.4					9.8		18.1	570
VIC	GROVEDALE			13.2			6.4	10.2						17.8		26.1	3.7		14.6								1479
VIC	YARRA GLEN		14.3	6.9	15.9		7.7	8.3		6.5	2.1	8.3		17.4							1.6		4.0	6.8			1514
NSW	SUTTON													17.3								13.3	68.9			0.0	601
NSW	BILAMBIL HEIGHTS	2.4	9.9			24.4		8.0						16.6				7.2	7.1	8.1			12.6			3.6	1951
WA	SECRET HARBOUR		4.2			5.6	9.2				12.9	0.4	11.4	16.5	11.6	3.9	20.7		3.4								3998
NSW	WAGSTAFF POINT			13.0				11.4	7.1		20.0		10.4	16.3		3.2	13.7			5.0							1673
NSW	TRALEE		5.7	14.1		3.4	6.9			12.8	10.0		7.8	16.2				22.7			0.4						3107
VIC	NAR NAR GOON NOF			2.5	5.6						7.8			15.9			16.1		27.8				24.2				446
QLD	JANDOWAE		27.6		29.4	17.3								15.6							6.4					1.5	668
VIC	COHUNA		15.3	33.0		28.0								15.7						5.2						2.8	1077
NSW	TURNBULL													15.6			23.6		10.9			27.1		22.8			641
QLD	BEACHMERE		10.3		26.7			10.2	1.8	14.8	9.2			15.4				2.7						6.2			1878

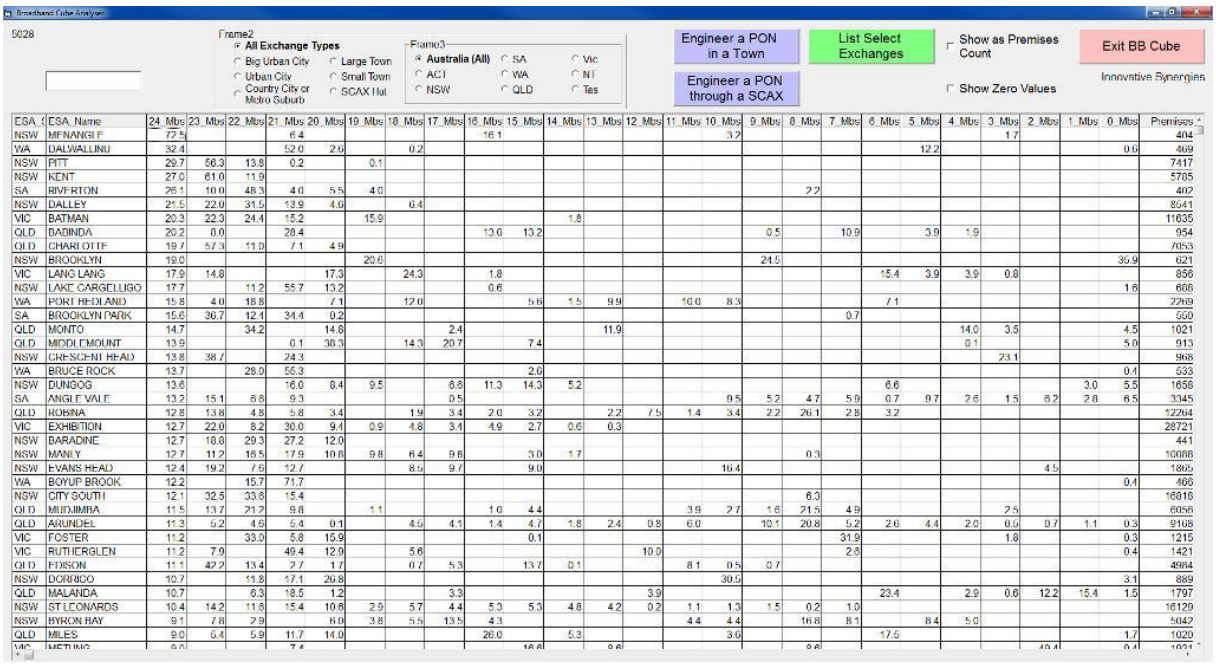
Looking at the inappropriate locating of DSLAMs in another light the ADSL2 DSLAMs have a maximum downstream data rate of 12 Mb/s, and when the analysed Data Cube data is sorted on 12 Mb/s, this clearly shows there are no metropolitan cities / suburbs in the top listings as all this equipment has been dumped into country areas.

Note on the right column the number of premises per Local Exchange. Most are under 1500 premises with South Hedland (WA) being the outstanding location with 5371 premises. Even then it has 30.9% at 7 Mb/s and a very few in the 20+ Mb/s range. It is a very strong indication that all these locations have a very high concentration of ADSL2 (12 Mb/s max) ADSL equipment that is most probably hand-me-downs (used and discarded) from metropolitan Local Exchanges.

The screenshot below shows this story from another side. Here are the 24 Mb/s equipped exchange sites running at the highest percentages, and look at the exchange names as it reads out like a who's who of the big ROI localities.

No real prizes here because most of these ESAs a rather small (1000 m max) or happen to be in the country as Towns and goes to prove the point that Towns and villages should be the first (not last) recipients of ADSL2+ DSLAM equipment.

[35] http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4130.0~2013-14~Main%20Features~Housing%20Occupancy%20and%20Utilisation~4



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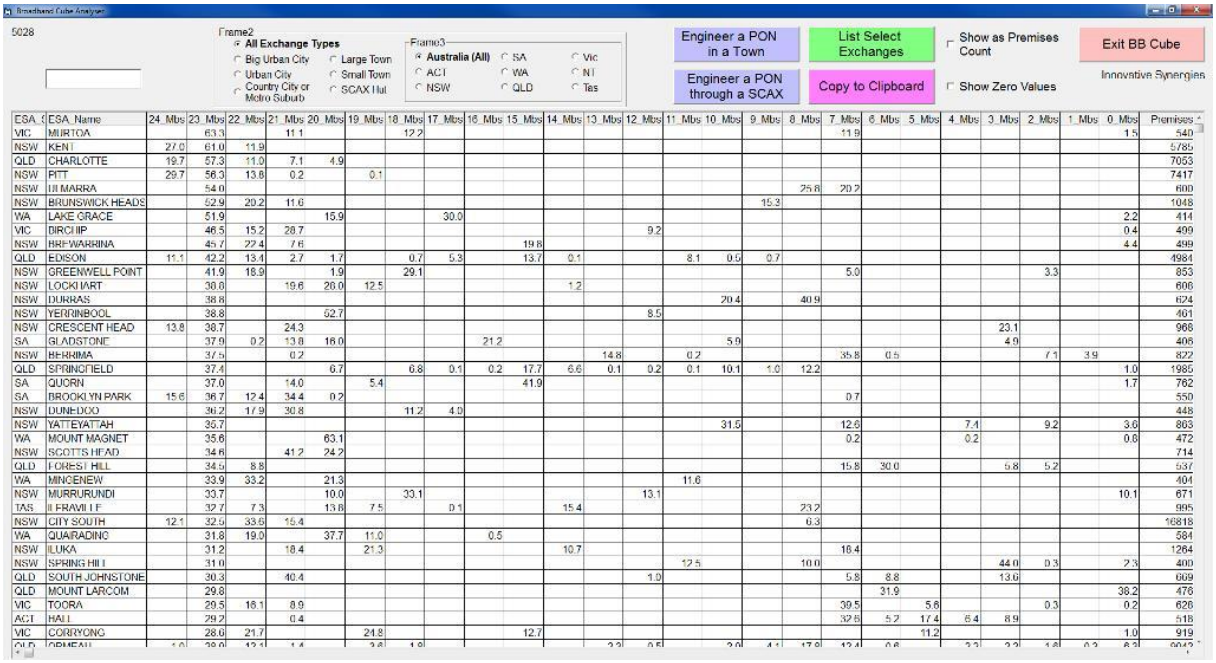
NSW	MENANGLE	72.5			6.4					16.1						3.2							1.7			404
WA	DALWALLINU	32.4			52.0	2.6		0.2													12.2					0.6	469
NSW	PITT	29.7	56.3	13.8	0.2		0.1																				7417
NSW	KENT	27.0	61.0	11.9																							5785
SA	RIVERTON	26.1	10.0	48.3	4.0	5.5	4.0											2.2									492
NSW	DALLEY	21.5	22.0	31.5	13.9	4.0		6.4																			8641
VIC	BATMAN	20.3	22.3	24.4	15.2		15.9					1.8															11635
QLD	BADINDA	20.2	8.0		28.4					13.0	13.2						0.5		10.9		3.9	1.9					954
QLD	CHARLOTTE	19.7	57.3	11.0	7.1	4.9																					7053
NSW	BROOKLYN	19.0					20.6										24.5									35.9	621
VIC	LANG LANG	17.9	14.8			17.3		24.3		1.8										15.4	3.9	3.9	0.8				856
NSW	LAKE CARGELLIGO	17.7		11.2	55.7	13.2				0.6																1.6	698
WA	PORT HEDLAND	15.8	4.0	18.8		7.1		12.0			5.6	1.5	9.9		10.0	8.3				7.1							2269
SA	BROOKLYN PARK	15.6	36.7	12.1	34.4	0.2													0.7								660
QLD	MONTO	14.7		34.2		14.6			2.4				11.9									14.0	3.5			4.5	1021
QLD	MIDDLEMOUNT	13.9			0.1	36.3		14.3	20.7		7.4											0.1				5.0	913
NSW	CRESCENT HEAD	13.8	38.7		24.3																		23.1				968
WA	BRUCE ROCK	13.7		28.0	56.3						2.6															0.4	633
NSW	DUNGOG	13.6			16.0	8.4	9.5		6.8	11.3	14.3	5.2								6.6					3.0	5.5	1656
SA	ANGLE VALE	13.2	15.1	6.6	9.3				0.5							9.5	5.2	4.7	5.9	0.7	9.7	2.6	1.5	6.2	2.8	6.5	3345
QLD	ROBINA	12.8	13.8	4.8	5.8	3.4		1.9	3.4	2.0	3.2		2.2	7.5	1.4	3.4	2.2	26.1	2.8	3.2							12264
VIC	EXHIBITION	12.7	22.0	8.2	30.0	9.4	0.9	4.8	3.4	4.9	2.7	0.6	0.3														28721
NSW	BARADINE	12.7	18.8	29.3	27.2	12.0																					441
NSW	MANLY	12.7	11.2	18.5	17.9	10.8	9.8	6.4	9.8		3.0	1.7						0.3									10088
NSW	EVANS HEAD	12.4	19.2	7.6	12.7			8.5	9.7		9.0					16.4								4.5			1865
WA	BOYUP BROOK	12.2		15.7	71.7																					0.4	466
NSW	CITY SOUTH	12.1	32.5	33.8	15.4													6.0									16818
QLD	MUDJIMBA	11.5	13.7	21.2	9.8		1.1			1.0	4.4				3.9	2.7	1.6	21.5	4.9				2.5				6056
QLD	ARUNDEL	11.3	5.2	4.6	5.4	0.1		4.9	4.1	1.4	4.7	1.8	2.4	0.8	6.0		10.1	20.8	5.2	2.6	4.4	2.0	0.9	0.7	1.1	0.3	9168
VIC	FOSTER	11.2		33.0	5.8	15.9					0.1								31.9				1.8			0.3	1215
VIC	RUTHERGLEN	11.2	7.9		49.4	12.9		5.6						10.0					2.8							0.4	1421
QLD	EDISON	11.1	42.2	13.4	2.7	1.7		0.7	5.3		13.7	0.1			8.1	0.5	0.7										4984
NSW	DORRIGO	10.7		11.8	17.1	26.8										30.5										3.1	889
QLD	MALANDA	10.7		6.3	18.5	1.2			3.3					3.9						23.4		2.9	0.6	12.2	15.4	1.5	1797
NSW	ST LEONARDS	10.4	14.2	11.8	15.4	10.6	2.9	5.7	4.4	5.3	5.3	4.8	4.2	0.2	1.1	1.3	1.5	0.2	1.0								16129
NSW	BYRON BAY	9.1	7.8	2.9		6.0	3.8	5.5	13.5	4.3					4.4	4.4		16.8	8.1		8.4	5.0					5042
QLD	MILES	9.0	5.4	5.9	11.7	14.0				26.0		5.3				3.6				17.6						1.7	1020
VIC	METUNG	9.0			7.4						16.6		9.6					9.6							40.4	0.4	1021

Slowing the pace down slightly and looking at sorting on 23 Mb/s gives the following:



ESA_S	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
VIC	MURTOA		63.3		11.1			12.2											11.9							1.5	540
NSW	KENT	27.0	61.0	11.9																							5785
QLD	CHARLOTTE	19.7	57.3	11.0	7.1	4.9																					7053
NSW	PITT	29.7	56.3	13.8	0.2		0.1																				7417
NSW	ULLADULLA		54.0															25.8	20.2								600
NSW	BRUNSWICK HEADS		52.9	20.2	11.6												15.3										1048
WA	LAKE GRACE		51.9			15.9			30.0																	2.2	414
VIC	DIRCIIP		46.5	15.2	28.7									9.2												0.4	499
NSW	BREWARRINA		45.7	22.4	7.6						19.8															4.4	499
QLD	EDISON	11.1	42.2	13.4	2.7	1.7		0.7	5.3		13.7	0.1			8.1	0.5	0.7										4984
NSW	GREENWELL POINT		41.9	18.9		1.9		29.1											5.0					3.3			853
NSW	LOCKHART		38.8		19.6	26.0	12.5					1.2															606
NSW	DURRAS		38.8													20.4		40.9									624
NSW	YERRINBOOL		38.8			52.7								8.5													401
NSW	CRESCENT HEAD	13.8	38.7		24.3																		23.1				968
SA	GLADSTONE		37.9	0.2	13.8	16.0				21.2						5.9							4.9				408
NSW	BERRIMA		37.5		0.2								14.8		0.2				35.8	0.5				7.1	3.9		822
QLD	SPRINGFIELD		37.4			6.7		6.8	0.1	0.2	17.7	6.6	0.1	0.2	0.1	10.1	1.0	12.2								1.0	1985
SA	QUORN		37.0		14.0		5.4				41.9															1.7	762
SA	BROOKLYN PARK	15.6	36.7	12.4	34.4	0.2													0.7								550
NSW	DUNEDOO		36.2	17.9	30.8			11.2	4.0																		448
NSW	YATTEYATTAH		35.7													31.5			12.6			7.4		9.2		3.6	803
WA	MOUNT MAGNET		35.6			63.1													0.2			0.2				0.6	472
NSW	SCOTTS HEAD		34.6		41.2	24.2																					714
QLD	FOREST HILL		34.5	8.8															15.8	30.0			5.8	5.2			537
WA	MINGENEW		33.9	33.2		21.3									11.6												404
NSW	MURRURUNDI		33.7			10.0		33.1						13.1												10.1	671
TAS	ILFRACOMBE		32.7	7.3		13.6	7.5		0.1			15.4						23.2									995
NSW	CITY SOUTH	12.1	32.5	33.6	15.4													0.3									16818
WA	QUAIRADING		31.8	19.0		37.7	11.0			0.5																	584
NSW	ILUKA		31.2		18.4		21.3					10.7							18.4								1264
NSW	SPRING HILL		31.0												12.5			10.0				44.0	0.3		2.3	400
QLD	SOUTH JOHNSTONE		30.3		40.4									1.0					5.8	8.8			13.0				609
QLD	MOUNT LARCOM		29.8																	31.9						36.2	476
VIC	TOORA		29.5	16.1	8.9														39.5		5.6			0.3		0.2	626
ACT	HALL		29.2		0.4														32.6	5.2	17.4	6.4	8.9				518
VIC	CORRYONG		28.6	21.7			24.8				12.7										11.2					1.0	919
QLD	ORMEAU	1.0	28.0	12.1	1.4		2.6	1.8					2.2	0.5		2.0	4.1	17.8	12.4	0.6		2.2	2.2	1.6	0.2	6.2	6042

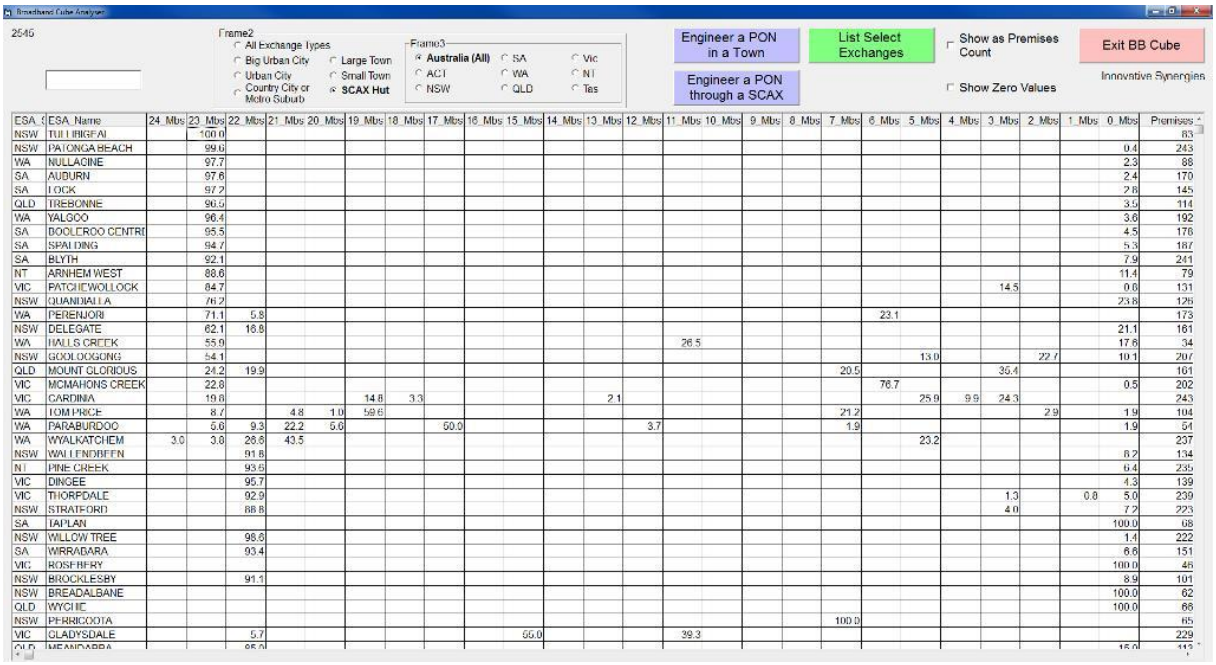
Yes there are a few (metropolitan) capital city CBD Local Exchanges in this but mainly Large and Small Towns - where these DSLAM2+ equipment should be.

But - as I had stated before, there is about 125 Small towns without any ADSL infrastructure - and if they have ADSL infrastructure, then the majority of these Small Towns and Large Towns have the wrong type of ADSL DSLAMS because these were installed with a Competitive business mindset and certainly not with an Infrastructure Business mindset.

Virtually Nil Villages with ADSL Facilities

Taking this mindset thinking to another level of residences (Villages), consider what happens now! For a start the urban oriented Competitive Business mindset is at

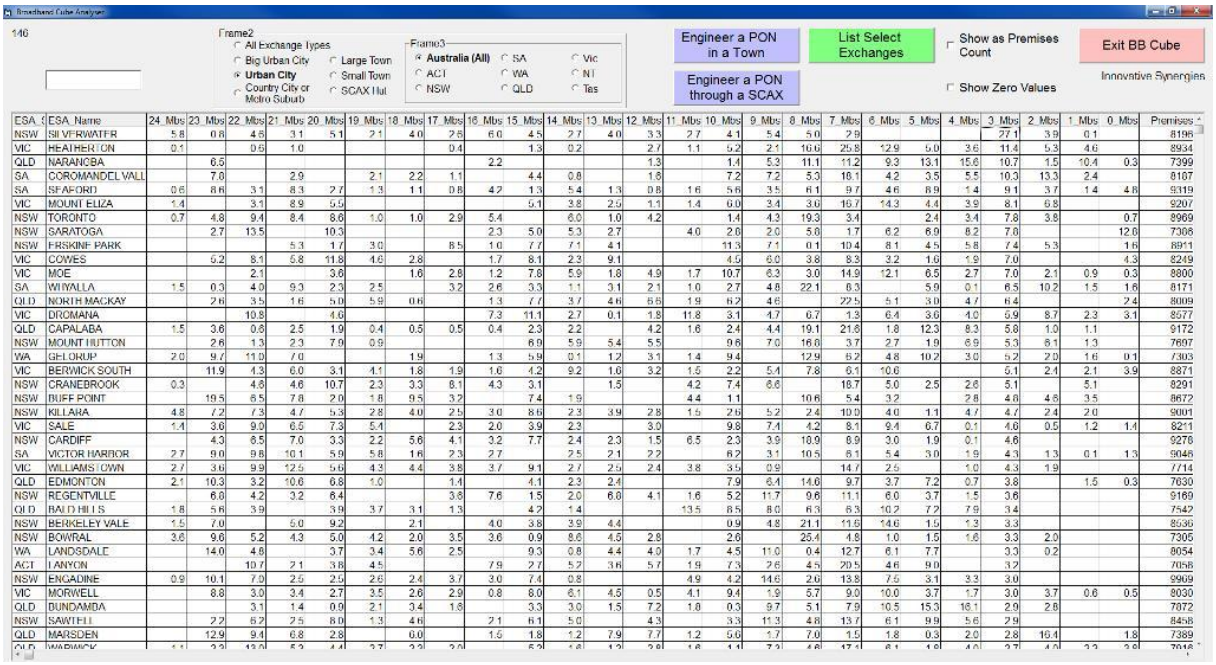
loggerheads in providing any telecomms equipment in the inland (because it may be heavily used and cancel out the USO feed-line if the country areas make a profit.



ESA_C	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
NSW	TULLIBIGEAL		100.0																								83
NSW	PATONGA BEACH		99.6																							0.4	243
WA	NULLAGINE		97.7																							2.3	88
SA	AUBURN		97.6																							2.4	170
SA	LOCK		97.2																							2.8	145
QLD	TREBONNE		96.5																							3.5	114
WA	YALGOO		96.4																							3.6	192
SA	BOOLEROO CENTRE		95.5																							4.5	176
SA	SPALDING		94.7																							5.3	187
SA	BLYTH		92.1																							7.9	241
NT	ARNHEM WEST		88.6																							11.4	79
VIC	PATCHEWOLLOCK		84.7																				14.5			0.0	131
NSW	QUANDIALLA		76.2																							23.8	126
WA	PERENJORI		71.1	5.8																23.1							173
NSW	DELEGATE		62.1	16.8																						21.1	161
WA	HALLS CREEK		55.9												26.5											17.6	34
NSW	GOOLOOGONG		54.1																	13.0				22.7		10.1	207
QLD	MOUNT GLORIOUS		24.2	19.9															20.5				35.4				161
VIC	MCMAHONS CREEK		22.8																	76.7						0.5	202
VIC	CARDINIA		19.6				14.8	3.3					2.1								25.9	9.9	24.3				243
WA	TOM PRICE		8.7		4.8	1.0	59.6												21.2					2.9		1.9	104
WA	PARABURDOO		5.6	9.3	22.2	5.6			50.0					3.7					1.9							1.9	54
WA	WYALKATCHEM	3.0	3.8	26.6	43.5																23.2						237
NSW	WALLENDBEEN			91.8																						8.2	134
NT	PINE CREEK			93.6																						6.4	235
VIC	DINGEE			95.7																						4.3	139
VIC	THORPDALE			92.9																			1.3		0.8	5.0	239
NSW	STRATFORD			88.8																			4.0			7.2	223
SA	TAPLAN																									100.0	68
NSW	WILLOW TREE			98.6																						1.4	222
SA	WIRRABARA			93.4																						6.6	151
VIC	ROSEBERY																									100.0	46
NSW	BROCKLESBY			91.1																						8.9	101
NSW	BREADALBANE																									100.0	62
QLD	WYCHIE																									100.0	66
NSW	PERRICOOTA																		100.0								65
VIC	GLADYSDALE			5.7							66.0				39.3												229
QLD	MEANDARRA			85.0																						15.0	113

Now it gets very interesting because most Villages are less than 750 m in radius so they should all be at 24 Mb/s but generally they are not - and out of the 2545 SCAX huts in Villages only about 2112 Villages need DSLAMs in them (or about 214,337 premises - or about 557,300 people in the inland are without ADSL)!

So why are about 557,300 people in Villages without Broadband - well that is because of **COMPETETION that is the CAUSE**. This reference[36] is how to address and very inexpensively re-engineer this infrastructure[37] for inland Australia.



ESA_C	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
NSW	SILVERWATER	5.8	0.8	4.6	3.1	5.1	2.1	4.0	2.8	6.0	4.5	2.7	4.0	3.3	2.7	4.1	5.4	5.0	2.9				27.1	3.9	0.1		8195
VIC	HEATHERTON	0.1		0.6	1.0				0.4		1.3	0.2		2.7	1.1	5.2	2.1	10.6	25.8	12.9	5.0	3.6	11.4	5.3	4.6		8934
QLD	NARANGBA		6.5							2.2				1.3		1.4	5.3	11.1	11.2	9.3	13.1	15.6	10.7	1.5	10.4	0.3	7399
SA	COROMANDEL VALL		7.8		2.9		2.1	2.2	1.1		4.4	0.8		1.8		7.2	7.2	5.3	18.1	4.2	3.5	5.5	10.3	13.3	2.4		8187
SA	SEAFORD	0.6	6.6	3.1	8.3	2.7	1.3	1.1	0.8	4.2	1.3	5.4	1.3	0.8	1.6	5.6	3.5	6.1	9.7	4.6	6.9	1.4	9.1	3.7	1.4	4.8	9319
VIC	MOUNT ELIZA	1.4		3.1	8.9	5.5			5.1	3.8	2.5	1.1	1.4	6.0	3.4	3.0	16.7	14.3	4.4	3.9	8.1	6.8					9207
NSW	TORONTO	0.7	4.8	9.4	8.4	8.6	1.0	1.0	2.9	5.4		6.0	1.0	4.2		1.4	4.3	19.3	3.4		2.4	3.4	7.8	3.8		0.7	8969
NSW	SARATOGA		2.7	13.5		10.3				2.3	5.0	5.3	2.7		4.0	2.6	2.0	5.6	1.7	6.2	6.9	8.2	7.0			12.0	7308
NSW	ERSKINE PARK				5.3	1.7	3.0		8.5	1.0	7.7	7.1	4.1			11.3	7.1	0.1	10.4	8.1	4.5	5.8	7.4	5.3		1.6	8811
VIC	COWES		6.2	8.1	6.8	11.8	4.6	2.8		1.7	8.1	2.3	9.1			4.9	6.0	3.8	8.3	3.2	1.8	1.9	7.0			4.3	8249
VIC	MOE			2.1		3.6		1.6	2.8	1.2	7.8	5.9	1.8	4.9	1.7	10.7	6.3	3.0	14.9	12.1	6.5	2.7	7.0	2.1	0.9	0.3	8800
SA	WHYALLA	1.5	0.3	4.0	9.3	2.5	2.5		3.2	2.6	3.3	1.1	3.1	2.1	1.0	2.7	4.8	22.1	6.3		5.9	0.1	6.5	10.2	1.5	1.6	8171
QLD	NORTH MACKAY			2.6	3.5	1.6	5.0	5.9	0.6		1.3	1.7	3.7	4.6	8.6	1.9	6.2	4.6		22.5	5.1	3.0	4.7	6.4		2.4	8009
VIC	DROMANA			10.8		4.6				7.3	11.1	2.7	0.1	1.8	11.8	3.1	4.7	6.7	1.3	6.4	3.6	4.0	6.9	8.7	2.3	3.1	8677
QLD	CAPALABA	1.5	3.6	0.6	2.5	1.9	0.4	0.5	0.5	0.4	2.3	2.2		4.2	1.6	2.4	4.4	19.1	21.6	1.8	12.3	8.3	5.8	1.0	1.1		9172
NSW	MOUNT HUTTON			2.6	1.3	2.3	7.9	0.9			6.0	5.9	5.4	5.5		9.6	7.0	16.6	3.7	2.7	1.9	6.9	5.3	6.1	1.3		7697
WA	GELORUP	2.0	9.7	11.9	7.0			1.9		1.3	5.9	0.1	1.2	3.1	1.4	9.4		12.9	6.2	4.8	10.2	3.0	5.2	2.0	1.6	0.1	7303
VIC	BERWICK SOUTH		11.9	4.3	6.0	3.1	4.1	1.8	1.9	1.6	4.2	9.2	1.6	3.2	1.5	2.2	5.4	7.8	6.1	10.6			5.1	2.4	2.1	3.9	8871
NSW	CRANEBROOK	0.3		4.6	4.6	10.7	2.3	3.3	8.1	4.3	3.1		1.5		4.2	7.4	6.6		18.7	5.0	2.5	2.6	5.1		5.1		8291
NSW	BUFF POINT		19.5	6.5	7.8	2.0	1.8	9.5	3.2		7.4	1.9			4.4	1.1		10.6	5.4	3.2		2.8	4.6	4.6	3.5		8672
NSW	KILLARA	4.8	7.2	7.3	4.7	5.3	2.8	4.0	2.5	3.0	8.6	2.3	3.9	2.8	1.5	2.6	5.2	2.4	10.0	4.0	1.1	4.7	4.7	2.4	2.0		9001
VIC	SALE	1.4	3.6	9.0	6.5	7.3	5.1		2.3	2.0	3.9	2.3		3.0		9.8	7.1	4.2	8.1	9.4	6.7	0.1	4.6	0.5	1.2	1.4	8211
NSW	CARDIFF		4.3	6.5	7.0	3.3	2.2	5.6	4.1	3.2	7.7	2.4	2.3	1.5	6.5	2.3	3.9	10.9	8.9	3.0	1.9	0.1	4.6				9276
SA	VICTOR HARBOR	2.7	9.0	9.8	10.1	5.9	5.8	1.6	2.3	2.7		2.5	2.1	2.2		6.2	3.1	10.5	6.1	5.4	3.0	1.9	4.3	1.3	0.1	1.3	9048
VIC	WILLIAMSTOWN	2.7	3.6	9.9	12.5	5.6	4.3	4.4	3.8	3.7	9.1	2.7	2.5	2.4	3.8	3.5	0.9		14.7	2.5		1.0	4.3	1.9			7714
QLD	EDMONTON	2.1	10.3	3.2	10.6	6.8	1.0		1.4		4.1	2.3	2.4			7.9	6.4	14.0	9.7	3.7	7.2	0.7	3.8		1.5	0.3	7630
NSW	REGENTVILLE		6.8	4.2	3.2	6.4			3.8	7.6	1.5	2.0	6.8	4.1	1.6	5.2	11.7	9.6	11.1	6.0	3.7	1.5	3.6				9169
QLD	BALD HILLS	1.8	5.6	3.9		3.9	3.7	3.1	1.3		4.2	1.4			13.5	8.5	8.0	6.3	6.3	10.2	7.2	7.9	3.4				7542
NSW	BERKELEY VALE	1.5	7.0		5.0	9.2		2.1		4.0	3.8	3.9	4.4			0.9	4.8	21.1	11.6	14.6	1.5	1.3	3.3				8636
NSW	BOWRAL	3.6	9.6	5.2	4.3	5.0	4.2	2.0	3.5	3.6	0.9	8.6	4.5	2.8		2.6		25.4	4.8	1.0	1.5	1.6	3.3	2.0			7305
WA	LANDSDALE		14.0	4.6		3.7	3.4	5.6	2.5		9.3	0.8	4.4	4.0	1.7	4.5	11.0	0.4	12.7	6.1	7.7		3.3	0.2			8054
ACT	TANYON			10.7	2.1	3.8	4.5			7.9	2.7	5.2	3.6	5.7	1.9	7.3	2.6	4.5	20.5	4.6	9.0		3.2				7058
NSW	ENGADINE	0.9	10.1	7.0	2.5	2.5	2.6	2.4	3.7	3.0	7.4	0.8			4.9	4.2	14.6	2.0	13.8	7.5	3.1	3.3	3.0				9909
VIC	MORWELL		8.8	3.0	3.4	2.7	3.5	2.6	2.9	0.8	8.0	6.1	4.5	0.5	4.1	9.4	1.9	5.7	9.0	10.0	3.7	1.7	3.0	3.7	0.6	0.5	8030
QLD	BUNDAMBA			3.1	1.4	0.0	2.1	3.4	1.6		3.3	3.0	1.5	7.2	1.8	0.3	9.7	5.1	7.9	10.5	15.3	16.1	2.9	2.8			7872
NSW	SAWTELL		2.2	6.2	2.5	8.0	1.3	4.6		2.1	6.1	5.0		4.3		3.3	11.3	4.8	13.7	6.1	9.9	5.6	2.9				8458
QLD	MARSDEN		12.9	9.4	6.8	2.8		0.0		1.5	1.8	1.2	7.9	7.7	1.2	5.6	1.7	7.0	1.5	1.8	0.3	2.0	2.8	16.4		1.8	7389
QLD	WARWICK	1.1	2.3	13.0	5.2	4.4	3.7	2.3	2.0		5.2	1.8	1.2	2.8	1.8	1.1	7.2	4.8	17.1	6.1	1.8	4.0	2.7	4.0	2.2	2.8	7018

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

The screen shot above shows urban cities (7000 to 1000 lines) that have a maximum Customer Access pair-copper line length of 4100 m (and average 2900 m). No ADSL should be less than 3.9 Mb/s, and this has been sorted on 3 Mb/s. The expected result is nominally 0% if the lines are well maintained.

The percentage of premises that are connecting with less than 4 Mb/s is very telling because the ADSL (downstream) data speed is defined by the "physical line length", which defines the "electrical line length". If the pair-copper cable insulation (or joints) contain water / vapour, then the water dramatically increases the electrical capacitance (and leakage) - both of which dramatically increase the "electrical line length" causing the ADSL downstream data rate to be significantly reduced (slowed down) and be well under minimum specification.

In other words the pair-copper line maintenance is being let run into the ground (no pun intended) to minimise expenses and maximise value because other forms of Broadband connectivity can produce far greater profit margins for shareholders.

Consider that the average length of the pair-copper access lines connected to these Local Exchange sites is 2900 m, and at 2900 m the maximum downstream ADSL data rate is about 10 Mb/s, so only about 50% of the DSLAM equipment need be ADSL2+ (24 Mb/s) technology - and deliberately connected to the lines shorter than 2900 m (only). The rest should be older technology, because these will not connect at faster than 10 Mb/s, and from 3500 m onwards these DSLAMs should be ADSL1.

So, not only does infrastructure competition result in the wrong infrastructure be located in the wrong places (multiple times), but no infrastructure is installed where it is really needed and would work exceedingly well.

In 1956, in the middle of the US / USSR Cold War two Economists (Lipsey / Livingstone) came up with the Theory of the Second Best, which basically states that:

"Any form of Co-operation is far more Economical / Efficient than any level of Competition".

My reference[38] makes it easy to comprehend. Reading up on this theory[39] on the Internet is rather hopeless because the people that describe it have a fixation about competition and use entirely the wrong mindset (not an infrastructure mindset) and the wrong (competitive - internally accounting only) maths, and they just don't get it.

Put simply - all competitive infrastructure providers (Telstra / Optus / TPG etc) need to be totally stripped of the telecomms DSL infrastructure (***including the NBN if it continues to think it can be privatised***) and **all this infrastructure needs to be in the hands of a sub-Government Commission** to manage the **right infrastructure in the right places, without unnecessary duplication, in a timely manner, and really minimise the requirement for regulation**.

++++++++++++++

[38] http://www.moore.org.au/busn/02/infrcomp.ppsx
[39] http://www.moore.org.au/busn/02/TheoryoftheSecondBest.pdf

Question 24

24. What impact does the NBN rollout have on investment in, or use of, wholesale ADSL services as well as incentives to invest in ULLS and DSL infrastructure?

When is a Cartel a Cartel?

If the ACCC were to look closely at when Telstra ceased rolling out ADSL technology, I believe there would be a close coincidental date to when the NBN started to roll out Broadband infrastructure.

If these dates are close, then it looks very suspicious that Telstra and the NBN could be in a cartel arrangement so as not to "encroach on each others' territories".

The long term end users would be far better off (with a less expensive, better engineered and far more timely provision of Broadband access network connectivity if all this infrastructure was in one Wholesale provide that had no other shareholders than the Federal Government of Australia.

Question 25

25a. Could declaration of the wholesale ADSL service encourage efficient investment in infrastructure that will be used to interconnect on the NBN or provide value-added retail services?

How and Why Competition is Inherently Very Uneconomic

By its own very nature; efficient investment in infrastructure is totally impossible at any level in a Competitive Business environment. The answer that I provided in Q24 demonstrates several historically recent and technologically parallel (and proven) examples about critically failed competitive ADSL infrastructure, and these examples can be greatly expanded.

Even then you (ACCC) have numerous Select Senate Inquiries that came about because competition in infrastructure is an extremely expensive folly that is anything but economic. To date nothing economic has happened other than the "encouragement" (enforced increase) of competition when there must be a severe decrease in competition to become economically efficient for Australia.

If the notion of competitive wholesale ADSL facilities (services) were available and economic, then there would be no need to intervene and "encourage" competition, so this very question questions the economic validity of having "encouraged" competition where it is not economic, which then really asks the big question: "why the desperate need to encourage investment in infrastructure"?

It is very clear to me that the ACCC has an extremely blinkered vision that is "COMPETITION" in total oblivion that competition has its place in retail reselling and really nowhere else. Competition certainly has no place with INFRASTRUCTURE.

The NBN has very selectively used the VDSL 25 Mb/s barrier (as opposed to the 24 Mb/s ADSL technology) as a discrimination gap between "Fast Broadband" and "Super Fast Broadband". In practice the data rate differential is about 4% which is virtually not noticeable in virtually all telecommunications using Websites etc..

25b. If so, please outline how.
25c. Could declaration encourage efficient use of NBN infrastructure?

I can't see how....

Question 26

26. Are there any issues in relation to the technical feasibility of supplying the wholesale ADSL service that the ACCC should be aware of?

Unrealistic Cable Transmission Expectations

The technology of ADSL uses the same pair copper technology that was engineered for telephony.

From about 1948 to about 1970 the (apparently rather inefficient) PMG - being part of the Department of Communications and Transport at that time; quietly went about its work, removing and replacing many 10,000 km (probably well over 200,000 km) of overhead (areal poles and wire) and trenched in pair copper cables for all the Customer Access Network and all the Inter-Exchange Network. Much of this was done by physical labour - with very little machinery, and very efficiently.

Concurrent with this work, the then Telecom Research Laboratory (TRL) as part of the PMG, did a tremendous amount of research and development to assist the private sector in manufacturing excellent telephony cables in Australia, for Australia.

TRL came up with a significant number of manufacturing techniques that made the diameter (and therefore resistivity per unit length) of drawn copper extremely consistent; techniques to stabilise the thickness of the paper insulation; techniques to manage the pair copper twist ratios (to minimise crosstalk) and several other manufacturing initiatives that significantly minimised manufacturing spread / variation and consequently make leading world class cables for voice band telephony.

Even though voice-band Telephony has a maximum frequency of only 3.4 kHz, these (Category 3) cables were systematically tested to over 32 kHz to ensure their Quality far exceeded the telephony specifications.

Category 4 (quad structured) cables are used for Carrier up to about 0.6 MHz, and Category 5 cable are used for short data connectivity (up to about 100 MHz). In an engineering sense, nobody in their right mind would use telephony (Cat3) cables for carrier / ADSL type services, particularly if these cables had not been measured for transmission abnormalities and capacity balanced to ensure minimum crosstalk - as was standard practice with Cat4 cables.

The vast majority of these very old telephony engineered lead-sheathed cables are still in place in location from the Local Exchange to the main pillar / sputnik (or under footpath main joint), and these cables are very easily identified because they were lead-sheathed to (still) be impervious to water.

Earth Resistance Issues

At that time it was taken for granted that the Exchange resistance to earth was extremely low, because most of these cable's lead sheaths were highly conductive,

were in a moist ground / conduit environment and formed a loose mat of grid extending for several tens of km - particularly over many metropolitan areas.

From the mid-1960s, lead-sheathed pair-copper paper-insulated cables stopped being manufactured and the new line of pair-copper polyester-sheathed cables became the new cable products. Because of the pre-existing extensive labyrinth of lead sheathed cables in these metropolitan (and some other urban areas) started to be infiltrated with polyester sheathed cables, the Local Exchange's earth resistances started to rise, resulting in a range of lightning induced problems, excessive (mains) earth currents, and induced noise that was previously suppressed.

The standard transmission medium from between all the metropolitan exchange switches, as a part of the metropolitan Inter-Exchange Network (IEN) was 0.64 mm loaded "Junction" cables. "Junction" - because the joined mechanical switches in different Exchange sites.

From about 1987 to about 1993 virtually all this lead-sheathed loaded cable was removed (along with the low resistance to earth lead sheath) and was replaced with polyurethane sheathed Single Mode Optical Fibre (SMOF) cable.

In one way, when the metropolitan Inter-Exchange Network (IEN) rapidly changed from loaded pair-copper cable to Single Mode Optical Fibre (SMOF) cable the low resistance metropolitan earth mat was haemorrhaged, but left the Local Exchange Switching Areas (ESAs) as low earth resistance centres - but not necessarily low-resistance linked with other nearby Local Exchange sites.

When Cables Get Wet

When a cable gets (internally) wet - bad things happen. Per unit volume, water stores about 80 times more charge than dry air - or dry paper, or bubbled polyurethane, so even water vapour. Because the charge in a wet cable is considerable greater than in a dry cable, the wet cable looks much longer electrically than it is physically (without the water / vapour).

With telephony, a wet cable has a far higher attenuation per unit length - so the received signal is faint and particularly muffled. Similar story with ADSL - but much worse, because the water / vapour really muffles the downstream speed, because the downstream direction uses the top area of the ADSL spectrum, where the received signal s really heavily muffled well under the noise.

The big problem with these cables is that apart from being in the order of 60 years old, the pair copper wires are paper insulated and the paper gradually breaks down with age; especially if it get moist.

To avoid and minimise this moisture problem, these cables were (before the notion of competitive "privatisation") nitrogen pressurised then later "dry air" pressurised (because it was cheaper) and as Telecom Australia moved to being Telstra, more competitive "corners were cut" and no pressure was used so paper insulation in these cables quickly deteriorated as moisture could now enter these and other pair copper without backward pressure to keep water out.

In hindsight, the Junction Cables were gas pressurised until they were removed and replaced by SMOF cables, but the CAN cables had their gas pressure removed very shortly after the farcical Davidson Inquiry (1980) to see how to privatise the then

Telecom Australia by any means possible, including minimising maintenance practices.

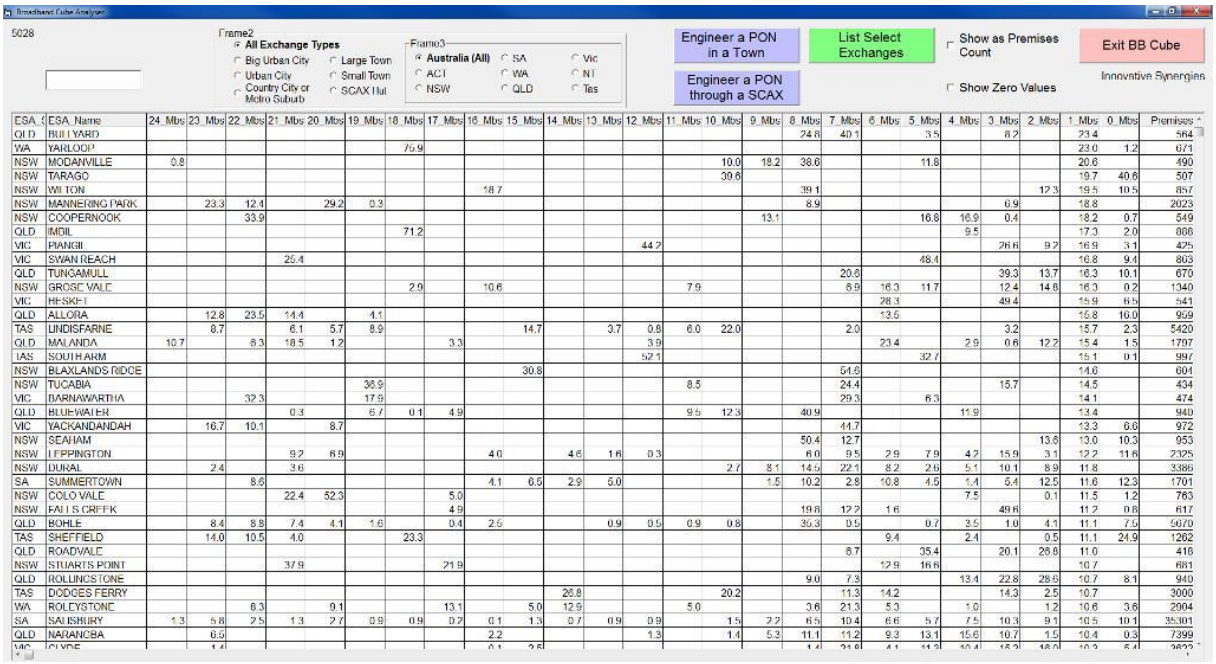
The Junction cables were gas pressurised to keep them working properly to 3.4 kHz, as this was "accountable" in the Exec / Managers Key Performance Indicators (KPIs).

The CAN cables were not pressurised after it was realised that there was no KPI to keep account - primarily because the CAN loop resistance limit was the key specification (and KPI just for "loop signalling" to detect the handset being picked up, but not a KPI if you couldn't talk over it) - almost totally void of frequency response and attenuation limits!

It is rather interesting and obvious how the Competition Business mindset was/is on a direct head-on collision with "Customer Service", with the result being "minimised Customer Service".

Considering that ADSL works in the frequency range that is way above that used for telephony (Cat 3; and above that for Cat 4), then the line (physical and electrical) length is critically important to be as minimised as much possible.

If an Infrastructure Business mindset was involved in managing this CAN infrastructure than it would be a certainty that all cables that could be dry gas pressurised would be gas pressurised to keep the minimum ADSL speed over 3.9 Mb/s in every case.



ESA_C	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
QLD	BULLYARD																	24.8	40.1		3.5		8.2		23.4		564
WA	YARLOOP							79.9																	23.0	1.2	671
NSW	MODANVILLE	0.8														10.0	18.2	38.6			11.8				20.6		490
NSW	TARAGO															39.6									19.7	40.6	507
NSW	WILTON									18.7								39.1						12.3	19.5	10.5	857
NSW	MANNERING PARK		23.3	12.4		29.2	0.3											8.9					0.9		18.8		2023
NSW	COOPERNOOK			33.9													13.1				16.8	16.9	0.4		18.2	0.7	549
QLD	IMBIL							71.2														9.5			17.3	2.0	866
VIC	PIANGIL													44.2									26.6	9.2	16.9	3.1	425
VIC	SWAN REACH				26.4																48.4				16.8	9.4	803
QLD	TUNGAMULL																		20.6				39.3	13.7	16.3	10.1	670
NSW	GROSE VALE							2.9		10.6					7.9				8.9	16.3	11.7		12.4	14.8	16.3	0.2	1340
VIC	HESKET																			28.3			49.4		15.9	6.5	541
QLD	ALLORA		12.8	23.5	14.4		4.1													13.6					15.8	16.0	959
TAS	LINDISFARNE		8.7		6.1	5.7	8.9				14.7		3.7	0.8	6.0	22.0			2.0				3.2		15.7	2.3	5420
QLD	MALANDA	10.7		6.3	18.5	1.2			3.3					3.9						23.4		2.9	0.6	12.2	15.4	1.5	1797
TAS	SOUTH ARM													52.1							32.7				15.1	0.1	997
NSW	BLAXLANDS RIDGE									30.8									54.6						14.6		604
NSW	TUCABIA						36.9								8.5				24.4				15.7		14.5		434
VIC	BARNAWARTHA			32.3			17.9												29.3		6.3				14.1		474
QLD	BLUEWATER				0.3		6.7	0.1	4.9						9.5	12.3		40.9				11.9			13.4		940
VIC	YACKANDANDAH		16.7	10.1		8.7													44.7						13.3	6.6	972
NSW	SEAHAM																	50.4	12.7					13.8	13.0	10.3	953
NSW	EPPINGTON				9.2	6.9				4.0		4.6	1.6	0.3				6.0	9.5	2.9	7.9	4.2	15.9	3.1	12.2	11.6	2325
NSW	DURAL		2.4		3.6											2.7	8.1	14.9	22.1	8.2	2.6	5.1	10.1	8.9	11.8		3386
SA	SUMMERTOWN			8.6						4.1	6.5	2.9	5.0				1.5	10.2	2.8	10.8	4.5	1.4	5.4	12.5	11.6	12.3	1701
NSW	COLO VALE				22.4	52.3			5.0													7.5		0.1	11.5	1.2	763
NSW	FALLS CREEK								4.9									19.8	12.2	1.6			49.6		11.2	0.8	617
QLD	BOHLE		8.4	8.8	7.4	4.1	1.6		0.4	2.5			0.9	0.5	0.9	0.8		35.3	0.5		0.7	3.5	1.0	4.1	11.1	7.5	5670
TAS	SHEFFIELD		14.0	10.5	4.0			23.3												9.4		2.4		0.5	11.1	24.9	1262
QLD	ROADVALE																		8.7		35.4		20.1	28.8	11.0		416
NSW	STUARTS POINT				37.9				21.9											12.9	16.6				10.7		681
QLD	ROLLINGSTONE																	9.0	7.3			13.4	22.8	28.6	10.7	8.1	940
TAS	DODGES FERRY											26.8				20.2			11.3	14.2			14.3	2.5	10.7		3000
WA	ROLEYSTONE			6.3		9.1			13.1		5.0	12.9			5.0			3.6	21.3	5.3		1.0		1.2	10.6	3.6	2904
SA	SALISBURY	1.3	5.8	2.5	1.3	2.7	0.9	0.9	0.2	0.1	1.3	0.7	0.9	0.9		1.5	2.2	6.5	10.4	6.6	5.7	7.5	10.3	9.1	10.5	10.1	35301
QLD	NARANGBA		6.5							2.2				1.3		1.4	5.3	11.1	11.2	9.3	13.1	15.6	10.7	1.5	10.4	0.3	7399
VIC	CLYDE		1.4							0.1	2.6							1.4	21.9	4.1	11.3	10.4	15.2	18.0	10.2	5.4	2622

To get the picture, a very high proportion of the ADSL customers on these Local Exchanges are limited to about 1 Mb/s, yet others are running at 24 Mb/s in the same (generally Small Town) Local Exchanges.

My extensive telecomms industry experience tells me that the pair-copper cables in these localities (and probably in well over 4000 of the 5028 Local Exchange sites i.e. 80%) have wet cables in the CAN that in most cases could be repaired to working far better for ADSL if these cables were dry gas pressurised.

Proper maintenance of the pair copper CAN is not in the interests of Telstra because other Broadband products e.g. 4G / 5G can and do provide a far higher internal ROI for their shareholders - at the expense of Australia.

Engineered for Telephony, not for ADSL

By 1986, Competitive Business mindset had resulted in the pitiful state of the Australian telecommunications Voiceband telephony, which had came to a head, and seven Working Groups were established to tackle the problems head-on. I played a very prominent position in six of the seven working groups, that ran for about two years to resolve the then issues.

Standard practice for Competitive Business mindsets is to let the infrastructure run down until there is an outcry and then set up a specialist team to fix the biggest problems and advertise what the team did - not the fact that the infrastructure was let run into the ground for years.

Standard practice for Infrastructure Business mindsets is to continually improve the maintenance practices and proactively keep the infrastructure in excellent repair; while long-term planning for replacement / updating in a timely fashion.

One of the initial major problems of the Voiceband telephony network was that of highly inconsistent specifications for the pair-copper Customer Access Network (CAN) as each State had their own specifications but none looked at the Voice attenuation and Voiceband spectrum - it was all assumed.

By 1988 the entire Australian physical pair-copper CAN was rationalised for Voiceband telephony and nominally within specification (for Voiceband telephony).

ADSL really did not become a reality until about 1999, and really did not become mature until about 2009 with ADSL2+(M) technology from about 2006.

Innovation with ADSL Pair Cable Technology

One of the unheralded failings about competitive ADSL rollouts by "Access Seekers" is / was the direct installation of DSLAM technology in Local exchange with very little regard of the length of the pair copper - but ADSL2+ was all too readily advertised as 24 Mb/s Broadband, indicating it was practicable and possible, and really upsetting customers that expected much higher than 2.4 Mb/s, or even 4 Mb/s.

Australia peaked with over 10 M phone lines and many premises had Fax and Dial up modems on separate lines to their fixed line Phone connections. With the drop in Dial-Up modem technology to be replaced by ADSL technologies, and with the take-up of Mobile phone technologies, the number of active phone lines (pair copper lines) has steadily dropped and I believe the number of active pair-copper lines connecting premises is more like 9 M.

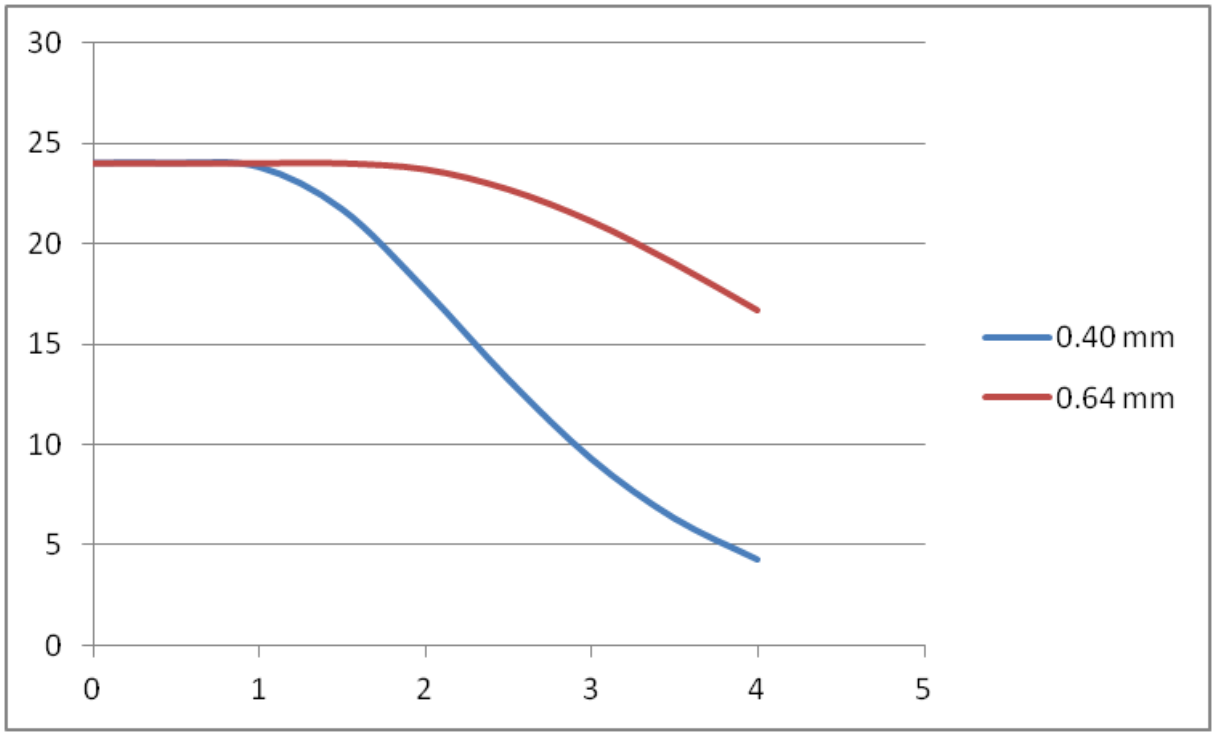
The attenuation in pair copper lines is highly related to length and the standard urban 0.4 mm pair copper line has been discussed in the Appendix of this submission.

If two pairs of pair-copper were to be physically bonded at each end, (i.e. at the Local Exchange MDF and at the Premises) then the physical cross sectional area is doubled and the loop resistance is halved, meaning that (at low frequencies) the attenuation per unit length is also virtually halved.

At frequencies well above Voiceband telephony, i.e. where ADSL operates, the signal travels in the "skin" of the wire, and using two wires instead of one wire doubles the skin (and halves the resistance).

The big "but" is that the distance attenuation figures are worked out for single strand pair copper not for Litz[40] wire (as this would now be) and the attenuation in the ADSL frequency spectrum should be considerably lower than for comparatively thicker than standard 0.40 mm pair copper. With simple maths, the two strands of 0.40 mm pair copper is equivalent to about one strand of 0.565 mm pair copper as the cross sectional areas will be about equal.

But, at ADSL frequencies these two paired 0.4 mm strands may act as though they are more like 0.8 mm pair copper, and have a considerably lower attenuation per unit length, meaning the ADSL downstream speeds could be considerably faster than what is now expected. The reference[41] below shows some of the innovative possibilities, and the charts below indicate what may be possible and practical.



The chart shows the typical ADSL2+ expected downstream data rates for 0.40 mm pair copper as common in urban situations, and if this 0.40 mm pair copper was replaced with 0.64 mm pair copper (as sometimes available in country / rural areas).

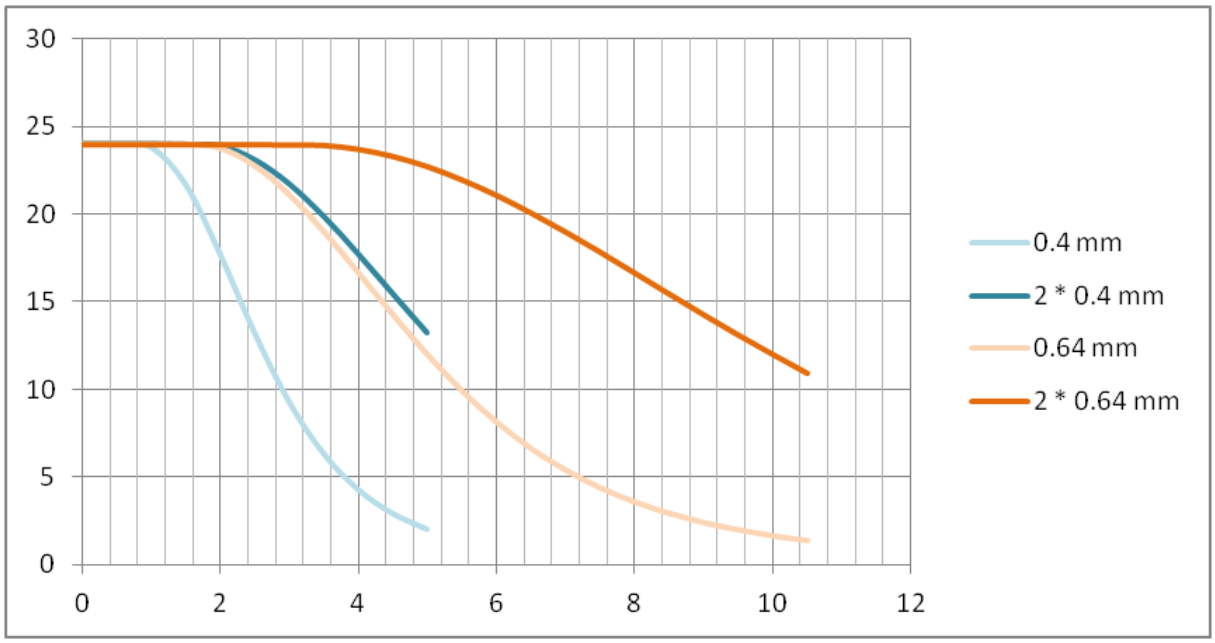
Note that by 4 km the 0.64 mm pair copper is facilitating about 17 Mb/s instead of 4 Mb/s, an increase of about 4.25 times the standard maximum length downstream speed in urban areas. Also the downstream speed stays over 20 Mb/s up to about 3.3 km.

This chart clearly shows that if ADSL was rolled out by an Infrastructure business, then every premises would have had at least 17 Mb/s to 24 Mb/s downstream speeds. We got the "Second Best" (crap) thanks to Competition.

[40] https://en.wikipedia.org/wiki/Litz_wire
[41] http://www.moore.org.au/comms/03/ADSLPhysicallyBondedPairs.pdf

Looking a little further, the chart below shows a range of physically bonded (Paired) pair copper cable estimations for a range of options.

The pale blue line shows the optimistic 0.40 mm pair copper (in good condition) and the expected ADSL2+ downstream data rate if two pairs are physically bonded. In a practical sense, this simple and innovative strategy could very inexpensively provide Quality ADSL2+ Broadband connectivity to over 50% of the existing metropolitan ADSL customer base where their distances exceed 2 km.



In a different aspect, most Rural cable is 0.64 mm pair copper (with a mix of 0.40 mm pair copper) so the overall attenuation (at 820 Hz) is nominally 6.5 dB. If the cable were purely 0.64 mm pair copper then the ADSL2+ downstream speed would follow the pale orange line and be about 5 Mb/s by about 7.1 km.

If this cable was physically bonded to a second pair then the expected downstream speed should be about 17 Mb/s at 8 km, or about 18 Mb/s at 7.1 km and bye about 12 Mb/s by 10 km.

In other words, even if the basics of ADSL engineering was done to make the cable match the conditions (instead of rushing in and competitively rolling out ADSL technology) then Australia would be not in the very expensive mess it is in.

Serious Lack of Trained Staff

Further compounding this failing situation was the age of experienced lines (field) staff was increasing so they were retiring and not being replaced, but when the problem finally hit home this work was handed out to contract staff.

This topic was raised by Senator Nick Minchin in the 2009 Select Senate Inquiry on Broadband and as I provided a supplementary Submission[42] to cover this and several other aspects that were raised in the hearing.

[42] http://www.moore.org.au/senh/2009/NBN2%20Sub45a%20Moore.pdf

As usual, none of this got into the Report because it was not "simplistic / warm and fuzzy" to match the contents of these Select Senate Reports.

The unseen situation is that employees in an Infrastructure Business environment work to a Quality Standard (i.e. do it once and do it right), where contract employees that work in a Competitive Business environment work to a Time Standard (i.e. piece rates - time is money, lost time is lost money) - so the work standard rapidly fell away and now a very high percentage of cable joints are faulty - or very soon to be faulty.

Question 27

27a. Is the current service description appropriate or have there been changes in either the ADSL technology or relevant markets that necessitate a change to the current wholesale ADSL service description?

27b. Should any changes be made to the service description?

27c. What are these changes and why are they required?

ADSL and Competitive Business

Some months ago I was very reliably informed that when ADSL technology was first introduced by Telstra in Australia (circa 1998) the equipment necessary in the Local exchange end of the CAN pair cable i.e. Digital Line Service Access Multiplexers (DSLAMs) was rather expensive and in short supply.

The executive decision (with a Competitive Business mindset) was to maximise the internal ROI of this equipment and install it in the main CBD areas to provide small / medium businesses with ADSL connectivity at a premium.

The problem for Telstra was that ADSL technology provided a quantum jump in Internet connectivity speeds that was far faster than a short distance pair-copper CAN using a Dial-Up modem (0.056 Mb/s), and this situation really threatened Telstra's established dominance of the telephony-based Internet connection market.

> *In the beginning of ADSL technology, I was visiting Telstra Headquarters in 1996 where one of the Senior Engineers there told me that they had just done an ADSL test (in Australia) that had a downstream data rate of 6 Mb/s over 4 km of cable.*
>
> *He was very scant on details about the cable physics, but I recalled that from about 1981 we (Telecom Australia) had been very reliably running 2 Mb/s over pairs of 0.64 mm junction cable, between telephony Exchange switches in the Inter-Exchange Network (IEN).*
>
> *It was extremely clear to me that the telephony market was very soon to be history and that wideband Internet connectivity was the immediate future; and no real surprise when the then CEO Frank Blount called a series of "ballroom meetings" with most of the staff to express the need to think in terms of wideband connectivity and not just telephony.*

With the knowledge about Competitive Business mindsets and Infrastructure Business mindsets, reading through the Wikipedia page about Internet[43] in Australia clearly demonstrates how and why Telstra deliberately throttled the available ADSL speeds so as to not compromise its retail product range (and this Competitive Business mindset, controlling the Infrastructure is certainly not in the interests of long term end users).

As the delivery of DSLAMs increased and their price plummeted the consideration was to continue rolling out ADSL on a maximum ROI basis (continuing Competitive Business mindset); line-by-line, exchange-by-exchange.

With the advent of ADSL1 technology being about the same price for DSLAMs the game very quickly changed to install ADSL1 DSLAMs and cease the ADSL rollout. Same story with ADSL2 but by now the major country cities were also getting ADSL technology.

When ADSL2+ came out in about 2004, the Competitive Business mindset continued because 24 Mb could be advertised (instead of 12 Mb/s) combined with marketing to push the needs button to upgrade.

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Question 28

28a. Should the service description cover the wholesale ADSL service nationally or be limited in geographic scope?

28b. If it is to be limited, on what basis and to what areas?

The wholesale Service must be strictly National and specifically include all Local 5028 Exchange sites

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Question 29

29a. What is the appropriate duration for the declaration?

29b. Why?

The duration of ADSL technology is not a commercial / competitive decision but an engineering decision - so this question is inappropriate.

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Question 30

30a. Is there any merit to aligning the declaration period for the wholesale ADSL service with the forecast completion date of the NBN?

30b. Please provide reasons why or why not.

[43] https://en.wikipedia.org/wiki/Internet_in_Australia

Broadband is Broadband be it ADSL or FTTP - it is Broadband

It therefore makes logical sense for all the ADSL DSLAMs from every ADSL "access seeker" (Competitive Business) Telstra / Optus TPG etc., to be handed over without cost or charge/rent or other strings to the NBN so that the NBN can sort out this Competitive Business mindset mess and put an Infrastructure Business mindset on all this infrastructure.

Date: now.

Question 31

31a. Having regard to the potential costs of declaration listed above, and the issues raised in relation to the coverage of the service description, would declaration of the wholesale ADSL service lead to a substantial increase in regulatory burden?

31b. If so, please provide details and where possible evidence of the likely change in regulatory burden, including any particular costs that the ACCC should take into account.

If the ACCC follow my lead and physically move all the telecoms infrastructure into the NBN and focus the NBN as an Infrastructure Business than the costs will be nil, the ASX will be much better off and Australian Competitive Business will be much better off.

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Question 32

32. Are there any particular costs that the ACCC should take into account when establishing the regulatory burden associated with declaring the wholesale ADSL service?

If the ACCC follow my lead and physically move all the telecoms infrastructure into the NBN and focus the NBN as an Infrastructure Business than the costs will be nil, the ASX will be much better off and Australian Competitive Business will be much better off.

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Appendix

Vertical Integration - Eliminating the Waffle

The paragraph in section 2.2.3 of the ACCC Discussion Document is legal waffle / gibberish, until clarity is introduced by simply aligning the mindsets of Competitive Business and Infrastructure Business with vertical integration - and the paragraph(s) now makes simple sense:

NB: telecommunications: equipment research, equipment development and equipment manufacturing **are <u>not included</u> in this scope of vertical integration**.

A further consideration is whether an infrastructure operator is vertically integrated (from owning the infrastructure through to and including wholesaling and through to and including competitive retailing).

Where vertical integration exists (in this scope), if the **infrastructure** operator **does not have an Infrastructure Business mindset,** then the Competitive Business mindset will deliberately restrict infrastructure network access to any of its competiting retail resellers.

In addition, an infrastructure provider with a Competitive Business (commercial) mindset will discreetly arrange to intensely gouge the (downstream) competing retail resellers by raising the wholesale prices and / or minimising the available geographic market of telecommunications infrastructure to in turn maximise the Infrastructure Providers internal ROI (and at the expense of the national GDP that in turn produces tax that should be substantially funding the infrastructure business).

This Competitive Business behaviour of Infrastructure Businesses will deliberately reduce and if possible (all but) eliminate (fair) competitive retail reselling so that from the outside, competition in this area "looks healthy" and it is seriously in detriment to the long term interest to end users.

Failed Inquiries and Reports

The ACCC has been provided with far more than ample evidence from at least 1997 (**Networking the Nation** - the first massive failed attempt to put in telecomms infrastructure that was missing because of "privatisation"), that stripping the telecomms infrastructure out from a Sub-Government body and putting in the hands of private operators was a fundamental infrastructure mistake.

This massive NTN waste of funding was quickly followed up by the Inquiry into the National Bandwidth[44] (1998) and this Report[45] (1989) that came to nothing, followed by the Inquiry into the Regional and Remote Telecomms Network[46] (2002) that again came to nothing - then the fun began!

In 2003, the Higher Bandwidth Incentive scheme was yet another seriously failed Federal Government "initiative" to promote Broadband connectivity and Internet service (particularly in non-metropolitan areas) with shared ADSL modems. Perhaps the ACCC can do some homework and find out how expensive and useless this "initiative" to promote competition really was.

[44] http://www.moore.org.au/senh/1999/1998_National_Bandwidth_Inquiry_TOR.pdf
[45] http://www.moore.org.au/senh/1999/1999_National_Bandwidth_Inquiry_Report.pdf
[46] http://www.moore.org.au/senh/2002/AustTelecommsInquiryReport2002_4.pdf

In 2003, yet another really hare-brained "initiative" Coordinated Communications Infrastructure Fund[47] was launched to do exactly what telecomms Engineers have done for decades (before being privatised) - develop demand aggregation programmes and long-term plan the infrastructure so that it can be rolled out in a timely manner, at minimum overall cost, at a maximum overall coverage and the right technologies.

I very seriously doubt that Telstra now has a Long-Term Engineering Planning Section in it, because the focus is short-term marketing / advertising.

My understanding was the Coordinated Communications Infrastructure Fund had a life of less than a few months before being scrapped, along with the equally ill-conceived "Demand Aggregation Broker Program[48]".

2003 was a very busy year with yet another Select Senate Committee Inquiry into Broadband Competition, and this was brought about because many small Broadband players were trying to get into the market. These small players had a minimal knowledge about the Australian Telecommunications Regime and they were extremely frustrated about all the regulations that they (and the main players) had to manoeuvre to get their infrastructure in place. The real 'argument' of this inquiry was for 'cowboy operators' to find a way around the regulations that had been put in place to prevent 'cowboy operators' competition behaviour. It didn't work!!

Inquiry into the Australian Telecommunications Regulatory Regime

In 2005, the ACCC should have been like flies all over the "Inquiry into the Australian Telecommunications Regulatory Regime" where regulation was significantly increased to "manage irregularities in the economic competition regime".

Because of this Inquiry about the Australian telecommunications industry, my gut feeling was that Telstra Directors were petrified that Telstra was about the be Physically Separated into a Retail Reselling body on the ASX (i.e. nothing changes) and an Infrastructure body would be stripped out and would manage the whole Australian telecomms network and provide / sell Wholesale services to many retail resellers (including Telstra of course).

> *At that time I was working as a Supervising Engineer in Silcar (a major Telstra sub-contractor, doing what Telstra ND&C (Network Construction & Design) did - installing and commissioning in telecomms infrastructure.*
>
> *Silcar won a contract to total rebuild Telstra's very centralised Cable Internet (DOCSIS3.0) infrastructure in all metropolitan areas (State Capital cities and their Suburbs).*
>
> *In Sydney, I managed this rebuild that totally changed the centralised structure from one (1) Headend site per capital city, capable of nationally connecting about 124,000 premises with Cable Internet to a partially fleshed out distributed structure of 124 Local Exchange (Headend) sites (400 nationally), capable at that time to connect in the order of 1,000,000 premises with Cable Internet at a project cost of about $2.5 Bn nationally.*

[47] http://www.moore.org.au/senh/01/CoordCommsInfrastructureFund.pdf
[48] http://www.moore.org.au/senh/01/DamandAggregationBrokerProgram.pdf

> *If this distributed Cable Internet infrastructure was fully "fully fleshed", I believe it would be capable of providing over 4,000,000 metro premises with Broadband Internet capable of >30 Mb/s downstream speeds.*
>
> *Personally, I do not believe the street HFC infrastructure is anywhere near up to standard, because it was very rushed in "fierce competition"...*

Since then I cannot remember any advertising for Cable Internet from Telstra.

Regional Telecomm Review 2007

In 2007, yet another Regional Telecomms Review[49] had a wad of Submissions and surprise - surprise nothing of value came from this report to actually change anything.

At this stage the Australia general public were screaming about the pitiful Broadband connectivity in Australia and in 2008 there was yet another an Inquiry into the structure of a National Broadband Network in 2008, where an Expert Taskforce was created and almost immediately dismissed[50] as it had nil Telecomms Engineering[51] in it, making yet another serious Federal Government embarrassment.

In 2009 the new Expert Panel[52] came up with FTTN as yet another failed excuse, but the associate reference is worth the read.

In November 2010, the Federal Government's DICED produced a Discussion Paper relating some of the funding of the NBN with the funds that pass through the USO. This "Captain Obvious" conclusion begged for a Submission from me that shows how this funding should be channelled and how not to get into this same financially privatised mess again.

Re-Write of the ACCC Overview of DSL

The term **Digital Service Line** (DSL) is commonly used in a range of digitally-based transmission technologies that use pair-copper cable in the Customer Access Network (CAN) as the physical Data transport medium.

The purpose of DSL is to provide a both-way data transport link to facilitate Internet Protocol (IP) connectivity for end users between their Premises (Modem) through their pair-copper cable CAN infrastructure to their Local Telecomms Switching site's Digital Line Service Access Multiplexer (DSLAM) - otherwise known as a "Node".

The DSLAM equipment (or "Node") is connected to a large number of CAN pairs, facilitating concurrent Broadband connectivity using IP connectivity to all these premises. The combined data stream from the DSLAM (or "Node") is back-connected to the broader Inter-Exchange (Backhaul) Network (IEN) and through-switches by IP via the distant CAN infrastructure to a range of remote terminal facilities including at least: email servers, website host servers and other end users.

This general user-specified remote IP connectivity is loosely called "the Internet".

[49] http://www.moore.org.au/senh/2007/20071003_Regional_Telecommunications_Review_Discussion_Paper.pdf
[50] http://www.moore.org.au/senh/2008/2007_Expert_Taskforce_TOR_Response_01.pdf
[51] http://www.moore.org.au/senh/2008/2008_NBN1.htm
[52] http://www.moore.org.au/senh/2009/2009_NBN2.htm

The term Asymmetrical (data speeds) Digital Line Service (ADSL) refers to a group DSL technologies that have much faster downstream (to end user) data speeds than upstream (from end users) data speeds.

The term VDSL is an extension of ADSL technology where the downstream data speeds (or rates) are in excess of 24 Mb/s.

The term DOCSIS (Digital on Cable System Internet Service) is another common digitally-based Customer Access Network (CAN) technology that uses the Hybrid Fibre Coaxial cable (HFC) as the CAN data transport medium for IP.

Overview of ADSL

ADSL technologies enable telecommunications infrastructure providers to connect end-users with the Internet in a "broadband" capacity. ADSL technologies:

- Are typically used by households/consumers and small businesses.
- Use the pre-existing pair-copper wire component of the Customer Access Network (CAN) infrastructure that was originally engineered for Telephony.
- Facilitate the simultaneous use of both Voiceband Telephony and Broadband Data connectivity.
- Enable much faster upstream and downstream data rates than earlier dial-up technologies, hence the term "asymmetric".
- Are "permanently through-connected" once the premises modem equipment is installed and commissioned through the CAN to the Local telecomms DSLAM equipment.

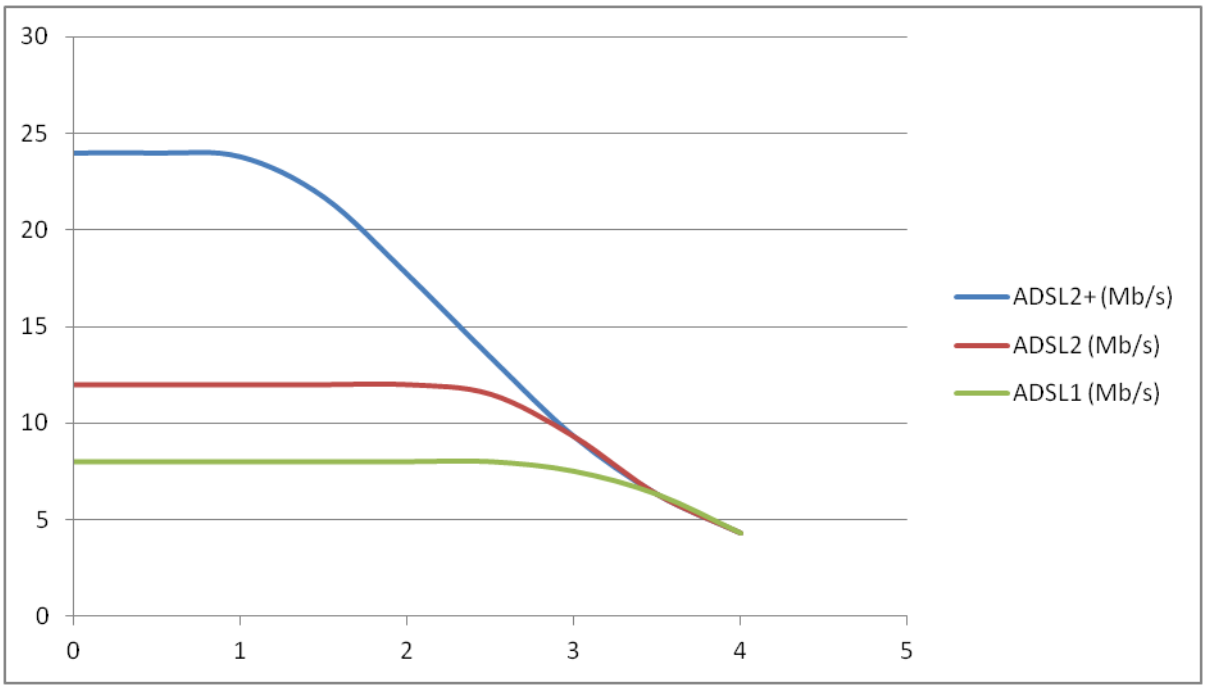
The technology of ADSL has progressed with quantum steps[53] as outlined here:

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+.

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.

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



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).

Upstream data speeds are minimally affected by length because that part of the ADSL frequency spectrum on pair copper lines is far less attenuated (muffled) than the Downstream ADSL frequency spectrum.

The technology of ADSL is now well-matured and inexpensive.

The common (Commercially / Competitive Business mindset) driven expectation is that all Digital Line Service Access Multiplexers (DSLAMs) located in the Node; either in the Local Exchange site or Roadside Cabinet are ADSL2+ (M) compliant and that all urban pair-copper cable lengths totalling less than 1500 m to the premises from the DSLAM equipment, should provide Downstream data speeds exceeding 20 Mb/s.

++++++++++++++++++

The single ADSL service comprises of:

- A premises Modem
- Customer Access pair-copper cable between the Premise and the Local Telecomms site
- Connection into the DSLAM equipment in the Local Telecomms Site
- Back Connection of the DSLAM into the Inter-Exchange Network

A Wholesale ADSL Product comprises of (at least):

- All premises Modems
- Reportable management of all Customer Access Network pair-copper cable pairs between the Premises and the Local Telecomms site

- The DSLAM Equipment and its (remote) management
- All the DSLAM back connection of the DSLAM into the Inter-Exchange Network
- Properly Engineered Inter-Exchange Network connecting with the DSLAMs and all other equipment in the associated local exchange building
- Security of power, building, air conditioning of equipment etc.

None of this relates to customers - just Network Engineering.

In the My.Broadband website Excel data, only a few pertinent data fields were missing (Cable Length and Structure) - because if these extra data fields were included then it would have been rather straightforward to calculate the theoretical expectations and identify location by location which infrastructure has been let run to the ground (and most probably why)!

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ADSL is not an Isolated Technology

The problem of total ignorant irrationality in the ACCC Discussion Paper comes from the fact that ADSL technology is part of an integrated overall infrastructure[54] that when engineered properly, the Digital Services Line Access Multiplexers (DSLAMs) that are to be installed and commissioned in the Local Exchange telecommunications sites that connect with the pair-copper Customer Access Network (CAN).

The second part of the Engineering involves allocating suitable floor-space so that racks of DSLAMs can be installed, bolted into the floor and mounted into the existing ironwork mechanics at each telecomms exchange site.

Currently, Telstra has a massive set of leases on its telecomms sites floor-space with every competing telecomms infrastructure provider. Apart from being a legal nightmare of (competitive) contracts - this totally unnecessary leasing arrangement is stunningly inefficient, a massive productivity killer, highly expensive and in the worst interests of the LTIE, as these people pay for all these unnecessary overhead costs.

In most metropolitan exchange (400) sites, ideally one or two suites consisting of several racks of DSLAM equipment would be located and positioned on the same floor and within about 20 m of the Main Distribution Frame (MDF) so that pair-copper cables to and from the customer appearances in the MDF can be a minimum length.

In most non-metropolitan exchange sites (and there are about 4600 of these in Australia), over 2000 of these sites do not have any ADSL equipment installed. Why? Because they are perceived as (very) low ROI for shareholder profits. The data[55] for this was readily available and easy to analyse - but nobody in Government Departments seems to know how this data is analysed!

The third part of the Engineering involves the allocation of power and earthing from the Local Exchange's no-break power supply equipment - and the provision of air conditioning to account for the power being expended in the Local Exchange. Again

[54] http://www.moore.org.au/comms001.htm
[55] https://www.mybroadband.communications.gov.au/upload/documents/BQP_DATA_v4.xlsx

all this is tied down with wads of legal contracts that would be totally unnecessary and far more economic for the LTIE if there was only one infrastructure provider.

The fourth part of the Engineering involves the purchase, network design, installation and commissioning of suitable Network Router / Switches and Single Mode Optical Fibre (SMOF) transmission equipment in the Inter-Exchange Network (IEN) so that the IEN is not congested by electronic transport bottlenecks or substantially over-engineered so that these costs cannot be recovered in a suitable timeframe.

There is yet another part of the telecommunications network infrastructure that rose to significance from about 1985 and that is the facilitation of remotely monitored and controlled telecommunications equipment from a Global Operations Centre (GOC).

These GOCs require 24 / 7 manning by a number of well-experienced Technicians and Engineers so that nationally, equipment service problems can be identified and resolved within minutes, not days or weeks.

Australia has about 5020 exchange sites and this can be very economically managed by one GOC. The problem of introducing infrastructure competition in this area also introduces massive inefficiencies because then there are multiple (competitive) GOCs each looking at their own equipment in the same set of buildings.

> *Asymmetric (directional data) Digital Line Service (ADSL) is a data transport infrastructure technology that utilises pair copper wire in the Customer Access Network (CAN) to provide connectivity for Internet-based products, services and facilities from the Premises to the Local Telecomms building site.*
>
> *The CAN is analogous to the road / footpath network in a village / town / suburb that connects from premises to the nearest local business centre.*
>
> *ADSL technology cannot connect end-to-end by itself, as this partial Broadband CAN infrastructure technology requires to be back-connected through the Inter-Exchange Network (IEN) which is part of the Internet infrastructure - in much the same way that the transport infrastructure of highways, main roads, railroads, air and sea easements are there to "transport connect" cities, suburbs and towns.*

There are several other existing and emerging telecommunications infrastructure technologies that do and will have the capability to provide parallel Broadband connectivity, in the Customer Access Network (CAN) for Internet-based products, services and facilities.

All these existing and emerging CAN infrastructure technologies all require to be back-connected by the Inter-Exchange Network (IEN) infrastructure so these CAN infrastructure components can connect through to the other end (i.e. connect through the Internet infrastructure of IEN (Backhaul Network in USA language) and CAN at the distant end to connect into any other compatible technology terminal equipment).

Understanding ADSL Data Speeds

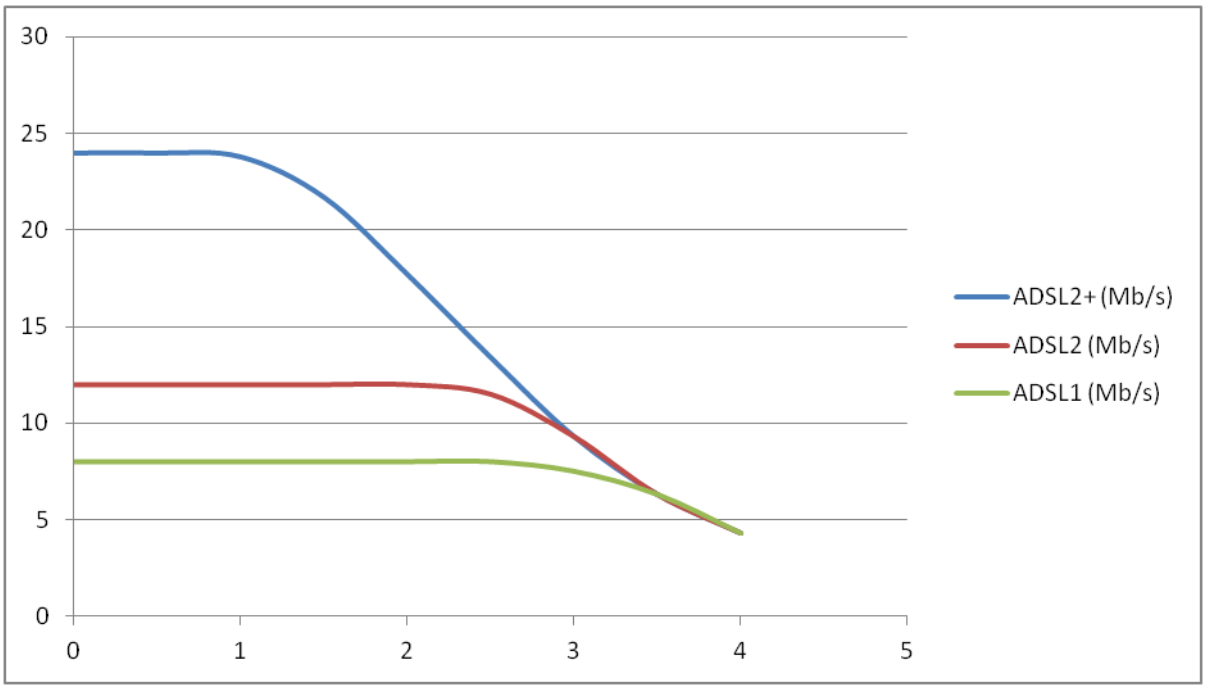
My (expert) opinion is that the technology of Broadband has stabilised and that for most Consumer applications a nominal downstream speed of 20 Mb/s (i.e. 17 Mb/s to 24 Mb/s) is adequate until at least 2025.

Consumers generally have a low Upstream data rate requirement with the exception of Video Conferencing - but Video Conferencing is bordering on Small and Medium Business requirements.

Apart from video conferencing on Internet Protocol and for multiple Voice on Internet Protocol (VOIP) for (IP) telephony, the upstream requirement should generally not need to exceed 0.512 Mb/s for general Consumers.

About 10% of Consumers (interactively playing games at different premises) will be looking for Upstream bandwidths exceeding 2 Mb/s and ADSL2+ (M) is capable of over 3 Mb/s in most cases (if the line length is less than about 3 km) - more about that later.

The chart below provides many answers about ADSL technology in graceful simplicity (and it has been matched for the Australian telecomms network):



Although this chart / graph diagrammatically shows ADSL technology downstream data speeds for a range of urban Customer Access Network (CAN) conditions using 0.40 mm pair-copper cable as standard in most urban areas; the problem is that very few people understand the significance of this chart and how it really affects end users.

The following area sorts out the CAN demographics in associations with ADSL technologies and shows what works what does not work and why having competition in ADSL rollouts is highly detrimental to end users and Australia.

Sorting out the Demographics

When lightly analysed, the MyBroadband DataCube (December 2014) data provided me with a lot of interesting information. Because the physical size of Terminal Switches somewhat defines the demographic size of a locality, I defined a series of Terminal Exchange sizes, and grouped the data to match these sizes.

Locality Demographic	Terminal Lines	Average Lines / Locality
Village	1 to 250	90
Small Town	251 to 1,000	521
Large Town	1,001 to 2,400	1,592
Small City or Small Metro Suburb	2,401 to 7,000	4,234
Medium City or Medium Metro Suburb	7,001 to 10,000	8,442
Large Country City or Large City Suburb	> 10,000	16,685

In looking through this data the Demographics for the Village, Small Town and Large Town fit very comfortably, but above this there is a crossover between metropolitan (i.e. State Capital City and associated Suburbs) and non-metropolitan (i.e. the rest).

In looking through the Small City / Small Metro Suburbs, about 88% of these localities are country cities - so the remainder are small metropolitan suburbs. Similarly, with the Medium Country Cities / Metro Suburbs about 40% are country cities and the nominal 60% are Metro Suburbs. With the large Terminal exchange sites about 67% are metropolitan. By splitting these locality demographics, the following table now shows the Metropolitan / Non-Metropolitan breakup.

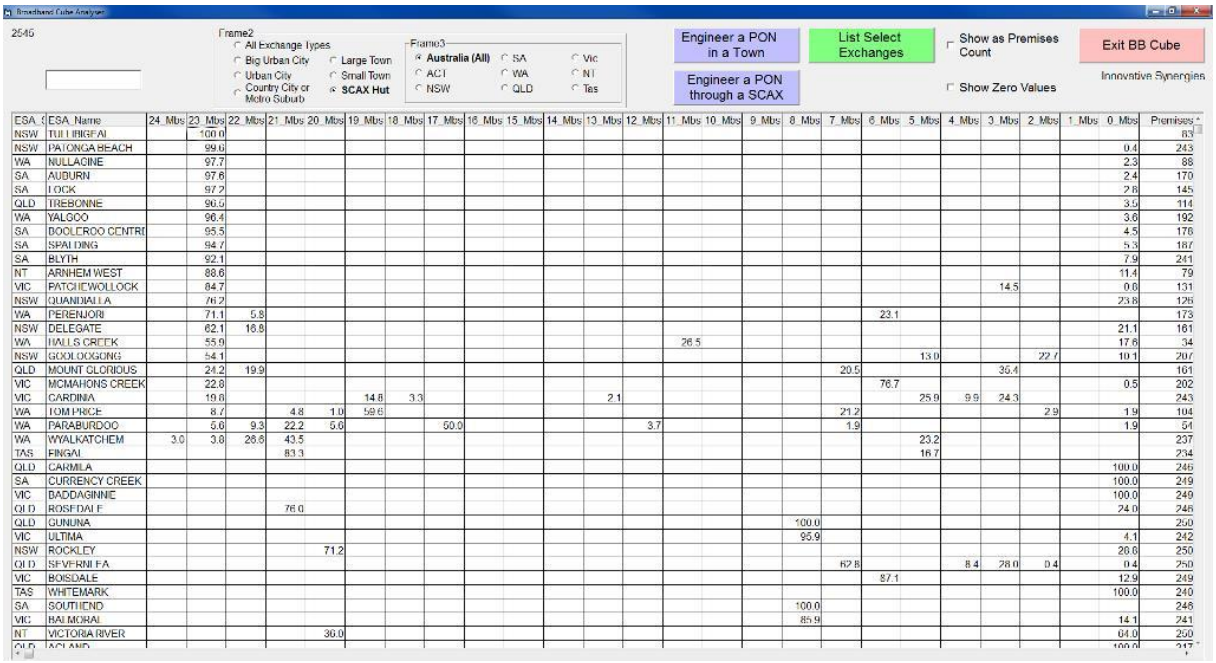
Demographic	Sites	Total Lines	Lines/Site	Urban	Non-Urban
Village	2,545	228,514	90	205,663	22,851
Small Town	1,136	591,768	521	532,591	59,177
Large Town	415	660,639	1,592	594,485	66,154
Small Country City	343	1,486,180	3,811	1,426,733	59,447
Medium Country City	58	616,300	8,442	603,974	12,326
Large Country City	131	2,642,951	16,685	2,629,736	13,215
Non Metro Sum	**4,628**	**6,226,352**	**31,141**	**5,993,182**	**233,170**
Small Metro	47	165,131	423	165,131	0
Med Metro	88	616,300	8,442	616,300	0
Large Metro	265	3,964,427	16,685	3,964,427	0
Metro Sum	**400**	**4,745,857**	**25,551**	**4,745,857**	
Minor Urban (V, T, SC)	**4,439**	**2,967,101**	**6,014**	**2,759,472**	**207,629**
Major Urban (MC, LC, Met)	**589**	**8,005,108**	**50,679**	**7,979,567**	**25,541**

The Non-Urban count was initially done as a percentage of the total lines for that demographic, noting that Metropolitan areas simply do not have any non-urban content.

Non Metropolitan Situations - Village

Consider a Village (less than 250 Premises); the radial distance of Premises in a Village is typically less than 500 m (usually less than 250 m in radius). So taking the worst case 1.5 * 500 m = 750 m, which shows that literally all Premises in a Village should be able to connect at 24 Mb/s (if the Village DSLAM is ADSL2+ (M) compliant).

A specific software program was created / written by me in Visual Basic to work directly from an Access Database that was transferred directly from the Excel Spreadsheet from the My Broadband[56] Website.



ESA_S	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
NSW	TULLIBIGEAL		100.0																							83
NSW	PATONGA BEACH		99.6																						0.4	243
WA	NULLAGINE		97.7																						2.3	88
SA	AUBURN		97.6																						2.4	170
SA	LOCK		97.2																						2.8	145
QLD	TREBONNE		96.5																						3.5	114
WA	YALGOO		96.4																						3.6	192
SA	BOOLEROO CENTRE		95.5																						4.5	176
SA	SPALDING		94.7																						5.3	187
SA	BLYTH		92.1																						7.9	241
NT	ARNHEM WEST		88.6																						11.4	79
VIC	PATCHEWOLLOCK		84.7																				14.5		0.8	131
NSW	QUANDIALLA		76.2																						23.8	126
WA	PERENJORI		71.1	5.8																23.1						173
NSW	DELEGATE		62.1	16.8																					21.1	161
WA	HALLS CREEK		55.9												26.5										17.6	34
NSW	GOOLOGONG		54.1																	13.0				22.7	10.1	207
QLD	MOUNT GLORIOUS		24.2	19.9															20.5				35.4			161
VIC	MCMAHONS CREEK		22.8																	76.7					0.5	202
VIC	CARDINIA		19.8				14.8	3.3					2.1								25.9	9.9	24.3			243
WA	TOM PRICE		8.7		4.8	1.0	59.6												21.2					2.9	1.9	104
WA	PARABURDOO		6.6	9.3	22.2	5.6			50.0					3.7					1.9						1.9	54
WA	WYALKATCHEM	3.0	3.8	26.6	43.5																23.2					237
TAS	FINGAL				83.3																16.7					234
QLD	CANUNDA																								100.0	246
SA	CURRENCY CREEK																								100.0	249
VIC	BADDAGINNIE																								100.0	249
QLD	ROSEDALE				76.0																				24.0	246
QLD	GUNUNA																	100.0								250
VIC	ULTIMA																	95.9							4.1	242
NSW	ROCKLEY					71.2																			28.8	250
QLD	SEVERNLEA																		62.8			8.4	28.0	0.4	0.4	250
VIC	BOISDALE																			87.1					12.9	249
TAS	WHITEMARK																								100.0	240
SA	SOUTHEND																	100.0								248
VIC	BAIMORAL																	85.9							14.1	241
NT	VICTORIA RIVER					36.0																			64.0	250
QLD	ACLAND																								100.0	247

The screen shot below shows a simple analysis of the ADSL data grouped by Local Exchange sites and based on Villages (in this case). The cells (except the right hand column) are in percentages to facilitate fast and accurate analysis.

Note the following about the Village associated Small Country Automatic Exchange (SCAX) huts:

- In the top left, the count is **2,545 Villages** in Australia **accounting for 228,514 Premises in inland Australia**.
- Sorting on 24 Mb/s there is 1 Village
- Sorting on 23 Mb/s there are about 24 Villages
- Sorting on 22 Mb/s there are about 28 Villages
- This totals about **53 Villages (out of 2,545 Villages) using 24 Mb/s DSLAM Equipment** and getting 24 Mb/s ADSL in virtually 100% of all Premises.
- **Virtually all 228,514 Village Premises are capable of 24 Mb/s or near to that** (because the CAN line length as theorised - is typically less than 750 m).
- Some Villages in this screenshot have a maximum ADSL speed of 8 Mb/s.

[56] https://www.mybroadband.communications.gov.au/upload/documents/BQP_DATA_v4.xlsx

- Sorting on 8 Mb/s shows there are about 170 Villages on 8 Mb/s max (ADSL **very old equipment**) accounting for about 26,198 Premises.
- Sorting on 7 Mb/s shows another 143 Villages (21,724 Premises) and 9 Mb/s 5 Villages (1,380 Premises) also on old ADSL equipment.
- All these 318 Villages (49,302 Premises) **on old ADSL equipment** could be on 24 Mb/s ADSL2+ (M)

The argument is that because of "competitive Pressures" there is no financial incentive for Telstra to install 24 MB/s DSLAM equipment in every (even a large majority of) inland SCAX Village huts and service these Villages with Broadband.

Nationally, it is these people and Businesses that are the Primary Producers of Australia and to me it makes sense that these areas should be the primary recipients of ADSL2+ equipment (ADSL2+ DSLAMS in their rather small Local Exchange (SCAX huts) buildings so they can do business much better, and therefore pay larger taxes with much less Social Support.

So, not only are these areas provided with virtually nil ADSL DSLAMs, but the small proportion of SCAX huts that have ADSL, these are really old hand-me downs that in most cases are incapable of more than 8 Mb/s when an extremely high percentage of lines are shorter than 750 m and in good condition and capable of 24 Mb/s.

Clearly the ADSL rollout was driven by competitive corporate greed that put these inland / rural / remote Regional areas are consistently put at the very bottom of the priority list for ADSL2+ (M), when these SCAX huts (if done with an Infrastructure Business mindset) would have been at the top of the priority list.

Over the past 20 years there have been several Federal Government Inquiries that have had avalanches of evidence from these Regional areas very clearly stating how and where the inland / regional telecommunications infrastructure is very far from being adequate.

In most of these same Inquiries, several Telecommunications Engineers (including myself) with relevant knowledge and expertise have produced very economic strategies on how to provide far better telecommunications infrastructure in these areas - but with astounding consistency - virtually nil of this extremely valuable information gets through the minds of those on these panels and virtually nil getting into any Reports. Consequently nothing gets done - election after election.

The compounding problem is that the vast majority of Politicians have a Competitive Business mindset (there is nothing more important than being re-elected) - short term thinking. As a direct consequently virtually all "initiatives" to introduce infrastructure is driven on a re-election promise and these fail - but the real cost is far greater because inland businesses cannot flourish and the costs of Social Services balloons in the background.

It seems that the Department Communications (and the ACCC) has very few (if any) experienced Telecommunications Engineers on its permanent staff and consequently cannot comprehend even the most basic of telecommunications engineering strategies without referring to consultants - or simply "glazing over"!

My understanding is that the instant that the NBN project was started, Telstra immediately stopped rolling out ADSL2+ (and very quickly moved to GSM4 / GSM5 in the inland) because I believe that Telstra found a way to make far higher profits in a monopoly market of inland areas that would have nil option but to buy.

Most of these (inland) Villages have about 90 physical lines on average in their CAN and the cost of ADSL2+ mini-DSLAM equipment is now very inexpensive. Most of these inland Villages have extremely under-utilised Single Mode Optical Fibre (SMOF) connecting with them.

In my professional opinion, it would be extremely inexpensive to restructure much of this inland telecomms infrastructure so that virtually all of these SCAX huts could very economically provide ADSL2+ (M) services to the vast majority of these Village localities (at about 1% the cost of Satellite connections to premises and in most Village premises cases, have reliable 24 Mb/s Internet connectivity instead of Dial-up Internet at a maximum of 0.056 Mb/s).

Cleary, increasing competition severely reduces infrastructure rollout. So, the ACCC really needs to comprehend that **increased competition with infrastructure is a really negative factor** - **and partly explains why Telstra / Optus etc. must be Physically Separated along the lines of Retail Reselling (on the ASX) and combined Infrastructure (as a sub-Government Commission)**.

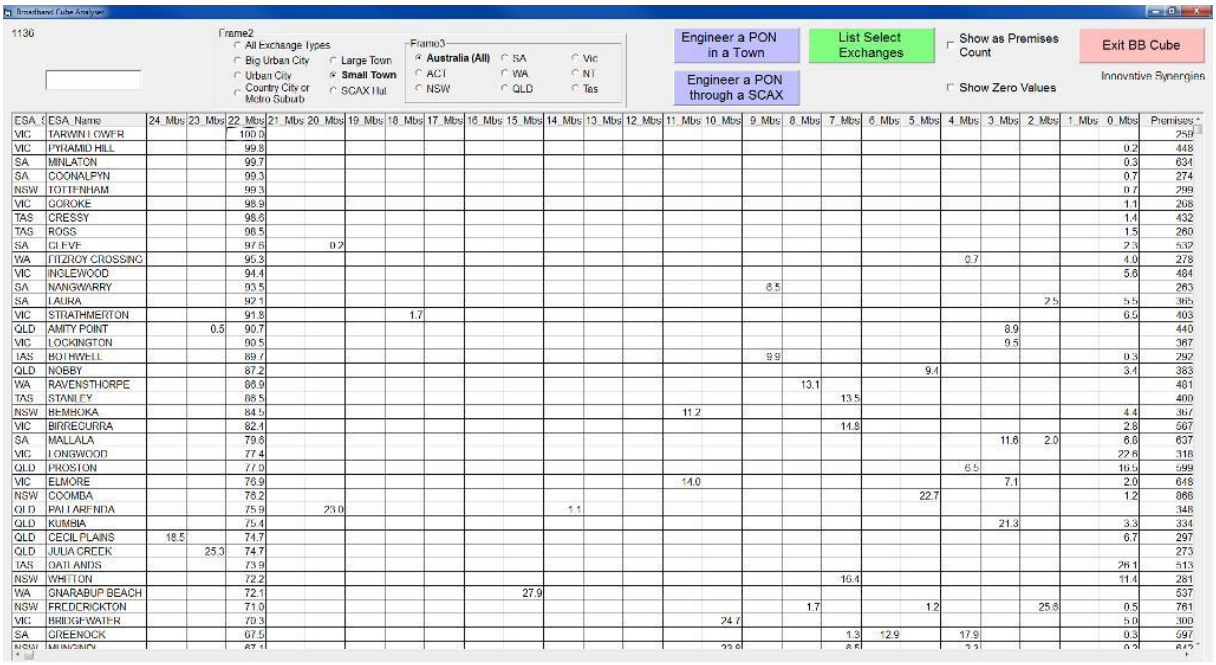
Non Metropolitan Situations - Small Town

Consider a Small Town (251 to 1040 Premises); the radial distance of premises in a Small Town is typically less than 1000 m (usually less than 750 m in radius). So taking the worst case 1.5 * 800 m = 1200 m. So almost all Premises in a Small Town should be able to connect at 24 Mb/s (if the Small Town DSLAM is ADSL2+ (M) compliant).

The screenshot of a Small Town profile (sorted on 22 Mb/s Downstream speed) shows some interesting points:

- In the top left, the count is **1,136 Small Towns** in Australia **accounting for 591,768 Premises in inland Australia**.
- Sorting on 24 Mb/s there are about 51 Small Towns that are primarily ADSL2.
- Sorting on 23 Mb/s there are about 30 Small Towns that are primarily ADSL2.
- Sorting on 22 Mb/s there are about 80 Small Towns that are primarily ADSL2.
- Most of these **591,768** Premises in these Small Towns can connect at 24 Mb/s (if they have ADSL2 DSLAM Equipment at the Local Exchange sites) because the CAN length - as theorised - is not in excess of 1,200 m (some Premises out of town are beyond 1,200 m).
- There are about 123 Small Towns, totalling about **46,915 Premises without any ADSL Broadband facilities**.
- Further sorting on ADSL Downstream speeds clearly shows the remaining Small Towns that have DSLAM equipment installed, have more than one vintage of DSLAM equipment
- The maximum speeds are not 24 Mb/s as ADSL2 but 12 Mb/s or 8 Mb/s as ADSL1 for a high percentage (76.8%) of Small Town Premises.

- The amount of old ADSL (i.e. not ADSL2) equipment in Small Towns is inordinately high when compared to metropolitan areas (more on this later).



ESA_	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
VIC	TARWIN LOWER			100.0																						259
VIC	PYRAMID HILL			99.8																					0.2	448
SA	MINLATON			99.7																					0.3	634
SA	COONALPYN			99.3																					0.7	274
NSW	TOTTENHAM			99.3																					0.7	299
VIC	GOROKE			98.9																					1.1	268
TAS	CRESSY			98.6																					1.4	432
TAS	ROSS			98.5																					1.5	260
SA	CLEVE			97.6		0.2																			2.3	532
WA	FITZROY CROSSING			95.3																		0.7			4.0	278
VIC	INGLEWOOD			94.4																					5.6	484
SA	NANGWARRY			93.5													6.5									263
SA	LAURA			92.1																			2.5		5.5	365
VIC	STRATHMERTON			91.8				1.7																	6.5	403
QLD	AMITY POINT		0.5	90.7																		8.9				440
VIC	LOCKINGTON			90.5																		9.5				387
TAS	BOTHWELL			89.7													9.9								0.3	292
QLD	NOBBY			87.2																	9.4				3.4	383
WA	RAVENSTHORPE			86.9														13.1								481
TAS	STANLEY			86.5															13.5							400
NSW	BEMBOKA			84.5											11.2										4.4	367
VIC	BIRREGURRA			82.4															14.8						2.8	567
SA	MALLALA			79.8																			11.6	2.0	6.6	637
VIC	LONGWOOD			77.4																					22.6	318
QLD	PROSTON			77.0																		6.5			16.5	599
VIC	ELMORE			76.9											14.0								7.1		2.0	648
NSW	COOMBA			76.2																	22.7				1.2	868
QLD	PALLARENDA			75.9		23.0						1.1														348
QLD	KUMBIA			75.4																			21.3		3.3	334
QLD	CECIL PLAINS	18.5		74.7																					6.7	297
QLD	JULIA CREEK		25.3	74.7																						273
TAS	OATLANDS			73.9																					26.1	513
NSW	WHITTON			72.2																					11.4	281
WA	GNARABUP BEACH			72.1							27.9															537
NSW	FREDERICKTON			71.0														1.7			1.2			25.8	0.5	761
VIC	BRIDGEWATER			70.3												24.7									5.0	300
SA	GREENOCK			67.5															1.3	12.9		17.9			0.3	597
NSW	MUNGINDI			67.1												23.8			8.5			3.2			0.2	842

The argument is that because of "competitive Pressures" there is no financial incentive for Telstra to install 24 MB/s DSLAM equipment in every (even a large majority of) inland SCAX Small Town huts and service these Small Towns with ADSL Broadband.

Cleary, increasing competition severely reduces infrastructure rollout. So, the ACCC really needs to comprehend that **increased competition with infrastructure is a really negative factor** - **and partly explains why Telstra must be Physically Separated along the lines of Retail Reselling (on the ASX) and Infrastructure (as a sub-Government Commission)**.

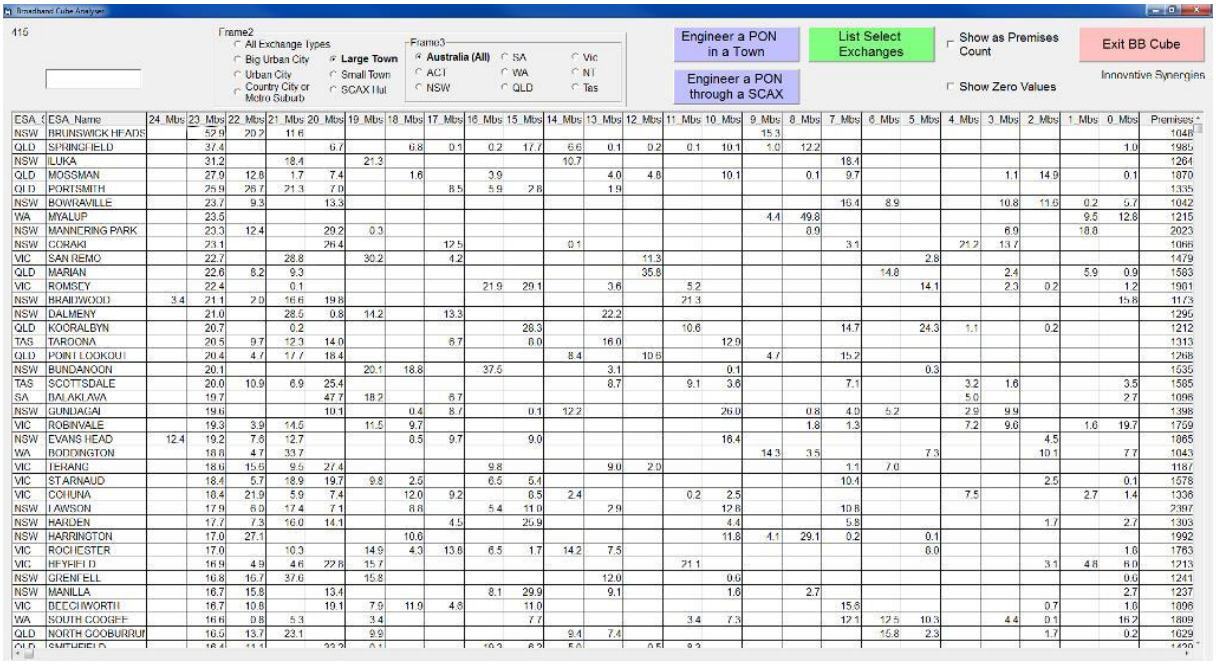
Non Metropolitan Situations - Large Town

Consider a Large Town (1041 to 2400 Premises); the radial distance of premises in a Large Town is typically less than 1500 m (usually less than 1200 m in radius). So taking the worst case 1.5 * 1500 m = 2250 m. So a good majority of all Premises in a Large Town should be able to connect at 24 Mb/s (if the Large Town DSLAM is ADSL2+ (M) compliant), and nearly all Premises in the Large Town should connect with at least 17 Mb/s downstream speed.

The screenshot below shows a typical sorted view (on 23 Mb/s) of a Large Town and the cells are sprayed with percentages. I was expecting to see the large majority of Premises connecting at over 20 Mb/s but there is a real spread of DSLAM technologies in these localities, and:

- In the top left, the count is **415 Large Towns** in Australia **accounting for 646,051 Premises in inland Australia**.
- Only one Large Town has nil ADSL Broadband (Miena in Tasmania, with about 1363 Premises, (2.8 people per premises) or about 3,816 people).

- The spread of Downstream speeds was expected to be "quantum" based around 24 Mb/s - 17 Mb/s, 11Mb/s - 13 Mb/s and 7 Mb/s - 9 Mb/s, but it is not.



ESA_S	ESA_Name	24_Mbs	23_Mbs	22_Mbs	21_Mbs	20_Mbs	19_Mbs	18_Mbs	17_Mbs	16_Mbs	15_Mbs	14_Mbs	13_Mbs	12_Mbs	11_Mbs	10_Mbs	9_Mbs	8_Mbs	7_Mbs	6_Mbs	5_Mbs	4_Mbs	3_Mbs	2_Mbs	1_Mbs	0_Mbs	Premises
NSW	BRUNSWICK HEADS		52.9	20.2	11.6												15.3										1048
QLD	SPRINGFIELD		37.4			6.7		6.8	0.1	0.2	17.7	6.6	0.1	0.2	0.1	10.1	1.0	12.2							1.0	1985
NSW	ILUKA		31.2		18.4		21.3					10.7							18.4								1264
QLD	MOSSMAN		27.9	12.6	1.7	7.4		1.6		3.9			4.0	4.8		10.1		0.1	9.7				1.1	14.9		0.1	1870
QLD	PORTSMITH		25.9	26.7	21.3	7.0			8.5	5.9	2.8		1.9														1335
NSW	BOWRAVILLE		23.7	9.3		13.3													16.4	8.9			10.8	11.6	0.2	5.7	1042
WA	MYALUP		23.5														4.4	49.8							9.5	12.8	1215
NSW	MANNERING PARK		23.3	12.4		29.2	0.3											8.9					6.9		18.8		2023
NSW	CORAKI		23.1			26.4			12.5			0.1							3.1			21.2	13.7				1066
VIC	SAN REMO		22.7		28.8		30.2		4.2					11.3							2.8						1479
QLD	MARIAN		22.6	8.2	9.3									35.8						14.8			2.4		5.9	0.9	1583
VIC	ROMSEY		22.4		0.1					21.9	29.1		3.6		5.2						14.1		2.3	0.2		1.2	1901
NSW	BRAIDWOOD	3.4	21.1	2.0	16.6	19.8									21.3											15.8	1173
NSW	DALMENY		21.0		28.5	0.8	14.2		13.3				22.2														1295
QLD	KOORALBYN		20.7		0.2						28.3				10.6				14.7		24.3	1.1		0.2			1212
TAS	TAROONA		20.5	9.7	12.3	14.0			6.7		6.0		16.0			12.9											1313
QLD	POINT LOOKOUT		20.4	4.7	17.7	18.4						8.4		10.6			4.7		15.2								1268
NSW	BUNDANOON		20.1				20.1	18.8		37.5			3.1			0.1					0.3						1535
TAS	SCOTTSDALE		20.0	10.9	6.9	25.4							8.7		9.1	3.6			7.1			3.2	1.6			3.5	1585
SA	BALAKLAVA		19.7			47.7	18.2		6.7													5.0				2.7	1098
NSW	GUNDAGAI		19.6			10.1		0.4	8.7		0.1	12.2				26.0		0.8	4.0	5.2		2.9	9.9				1398
VIC	ROBINVALE		19.3	3.9	14.5		11.5	9.7										1.8	1.3			7.2	9.6		1.6	19.7	1759
NSW	EVANS HEAD	12.4	19.2	7.6	12.7			8.5	9.7		9.0					16.4								4.5			1865
WA	BODDINGTON		18.8	4.7	33.7												14.3	3.5			7.3			10.1		7.7	1043
VIC	TERANG		18.6	15.6	9.5	27.4				9.8			9.0	2.0					1.1	7.0							1187
VIC	STARNAUD		18.4	5.7	18.9	19.7	9.8	2.5		6.5	5.4								10.4					2.5		0.1	1578
VIC	COHUNA		18.4	21.9	5.9	7.4		12.0	9.2		6.5	2.4			0.2	2.5						7.5			2.7	1.4	1336
NSW	LAWSON		17.9	6.0	17.4	7.1		8.6		5.4	11.0		2.9			12.8			10.8								2397
NSW	HARDEN		17.7	7.3	16.0	14.1			4.5		25.9					4.4			5.8					1.7		2.7	1303
NSW	HARRINGTON		17.0	27.1				10.6								11.8	4.1	29.1	0.2		0.1						1992
VIC	ROCHESTER		17.0		10.3		14.9	4.3	13.8	6.5	1.7	14.2	7.5								6.0					1.0	1763
VIC	HEYFIELD		16.9	4.9	4.6	22.8	15.7								21.1									3.1	4.8	6.0	1213
NSW	GREMELL		16.8	16.7	37.6		15.8						12.0			0.6										0.6	1241
NSW	MANILLA		16.7	15.8		13.4				8.1	29.9		9.1			1.6		2.7								2.7	1237
VIC	BEECHWORTH		16.7	10.8		19.1	7.9	11.9	4.8		11.0								15.8					0.7		1.0	1898
WA	SOUTH GODGEE		16.6	0.8	5.3		3.4				7.7				3.4	7.3			12.1	12.5	10.3		4.4	0.1		16.2	1809
QLD	NORTH GOOBURRUM		16.5	13.7	23.1		9.9					9.4	7.4							15.8	2.3			1.7		0.2	1629
QLD	SMITHFIELD		16.4	11.1		22.2	0.1			19.2	6.2	5.0		0.5	8.2												1429

The results here are quite startling because the nominal maximum (urban) line lengths are not enough to cause a wide spread in downstream speeds, and the proportion of non-urban lines is very low, so the results should be "quantum".

Cutting Corners (Increased Shareholder Value)

Looking at this issue from an Engineering view, the attenuation in the pair cable is the prime reason why the downstream speed is reduced, and the chart shows that by about 2200 m or so, the ADSL2 downstream will have gradually (with length) slowed to about 17 Mb/s and the ADSL1 would be nominally 12 Mb/s (with no slow down) while all the ADSL should have a downstream data rate of about 8 Mb/s (with no slow down due to length).

Attenuation (particularly in the ADSL "x" spectrum range) is very sensitive to water ingress, because water has a relative capacitance of about 80 times that of dry air. So, a few metres of cable with water vapour in it will appear much like several metres, and a few hundred meters of cable with water vapour will look like another one or two extra km of cable for ADSL "x" frequencies - spreading out the ADSL downstream results in a Large Town to be anything but "quantum"

Several decades ago, all main cables were constructed from paper insulated pair copper and the sheath was lead. Since then polyurethane / polyester insulation is used with polyvinyl sheathing, and more recently gel filled cables have been used to minimise water ingress.

These cable technology advancements worked (to a good degree), but in order to maximise "shareholder profits" i.e. "cut corners" the executive decision was to discard experienced lines (field) staff and replace these with Contractors (who they could pay significantly less), but the Contractors work to a Time standard, not a Quality standard, so the Quality of jointing and sealing joints collapsed - with the result that many cable joints are not watertight sealed and have water ingress.

To compound this problem, some decades ago (some time before ADSL technology came in) in another move to "cut corners" the Telstra executive decision was to stop pressurising main cables with dry / nitrogen air - to maximise "shareholder value". As far as telephony was concerned this was "not a major problem", but with ADSL this is a major problem because it can seriously degrade the ADSL connectivity.

With a Competitive Business mindset, not using in-house, well-trained, experienced Lines Field Staff makes lots of sense, because Contractors cost far less (so the profits go up); not performing full maintenance on faulty joint seals makes lots of sense because Contractors cost far less (so the profits go up); not gas pressurising main cables to minimise water ingress makes lots of sense as this is overhead that can be "avoided" (so the shareholder profits go up)!

With an Infrastructure Business Mindset, using in-house, well-trained, experienced Lines Field Staff is the only way to have work done to a Quality standard that does not require "checking" because they know everything is always fixed properly. All cables non-gel filled would be all gas pressurised to minimise the maintenance issues, keep the cable in excellent repair and maximise the Service Quality. Overhead costs are low because the need to urgent maintenance is virtually zero, and most maintenance is "pro-active" - fixed before problems happen.

It is these two diametrically different mindsets that form one of the pillars of **why and how Telstra / Optus etc. must be Physically Separated** as Retail Reselling (ASX) - Competitive Business mindsets, and as a single sub-Government Commission to manage the combined infrastructure, with an Infrastructure Business mindset, for the good of the future of Australia.

For Australia or for Shareholders

The My Broadband data, when simply analysed tells a very different story in that it shows me that in a disproportionately high percentage of Premises in metropolitan suburbs are connected with ADSL2+ DSLAM equipment (and being under-utilised because the pair cable is too long on many cases), while a disproportionately low percentage of country cities are connected with ADSL2 and ADSL1 DSLAM equipment, and being under-utilised because the high proportion of pair-copper lines are short enough to be capable of 24 Mb/s (ADSL2+), or faster than 12 Mb/s (ADSL2) and faster than 8 Mb/s (ADSL1).

Each Exchange Switching Area (ESA) has to be (map) visualised to comprehend the physical size / length of the CAN structures; this knowledge comes from several years personal analysis and experience of thee and associated technologies. Exhibition in Melbourne, Kent in Sydney, Charlotte in Brisbane, etc are all physically very big Local Exchanges with very small ESAs where no ADSL2+ technology should be less than nominally 24 Mb/s.

The over-riding factor is that as the ADSL technology was introduced, it was fairly obviously rolled out on a Commercially oriented manner (Competitive Business mindset) where the maximum (short term) ROI could be gained ASAP, so the biggest metropolitan city CBD areas were the first choice for ADSL1 (8 Mb/s downstream maximum) as these were perceived to be the biggest ROI areas. In other words "maximised shareholder value" - not meaning maximised value for Australia, as it would mean with an Infrastructure business mindset.

From there, in the ensuing years as the technology of ADSL advanced from ADSL1 (8 Mb/s) to ADSL2 (12 Mb/s downstream maximum), there was a Competitive Business mindset problem because the apparent highest ROI customers were using ADSL1 technology, so the obvious process was to install new ADSL2 DSLAMs in these same Local Exchange buildings and re-wire the apparent high ROI customers to ADSL2 DSLAMs, and provide ADSL to more customers but give them ADSL1 technology (and preferably not tell them).

The next stage of ADSL2+ (24 Mb/s downstream maximum) came up with the same Competitive Business mindset scenario to focus on the apparent highest ROI customers (to again maximise shareholder value) - but more than that - a lot of the old ADSL1 and ADSL2 DSLAMs must have been relocated to apparently much lower ROI areas (i.e. into the country from the metropolitan areas).

with an Infrastructure Business mindset and with it, the engineering understanding of the physical limit of ADSL2+ at 24 Mb/s being about 1100 m the primary focus would have been to roll out ADSL2+ as a priority in all country exchange sites and properly fix the masses of complaints about far less than acceptable Broadband connectivity in the non-metropolitan areas. Clearly this Infrastructure Business mindset project did not happen and it has again cost Australia very dearly in massive country-based Social Services costs and severe opportunity lost GDP from the inland.

Being within 1200 m, then these end users (i.e. Consumers) should be able to have 20 Mb/s or greater - but this is not the case, and the DataCube shows this!

All Villages, Small Towns and Large Towns have a small number of Homesteads (nominally four) outside the urban limits but inside the nominal 2000 m range, so in these situations, these Homesteads should connect at greater than 17 Mb/s using ADSL2+ (M)

Beyond this 2000 m range the physical cable lengths (and pair wire diameters) are engineered so that the attenuation at 820 Hz is no greater than 6.5 dB and this leaves the ADSL Downstream data rate at about 4 Mb/s, which is effectively the lower limit of "Broadband" as we know it.

A little rather simple analysis of the My Broadband Data Cube[57] shows very clearly that very few Villages and few Small Towns have ADSL2+ (M) DSLAMs installed - (or any DSLAM equipment at all in their Local Exchange sites). More detail on this is in the Appendix in the rear of this Submission.

There are about 2525 Villages, and about 1136 Small Towns in Australia. It is no wonder the inland have been screaming for Broadband for almost 20 years.

In a very similar vein, it is astounding that the ACCC and the Productivity Commission have not reviewed all the Select Senate Inquiries and Reports and the Regional Inquiries and Reports and taken immediate action to Physically Separate Telstra (and Optus etc) for the sake of Australia. The failing of this basic action has cost Australia about $10 Bn pa, or about $200 Bn in the past 20 years and counting much heavier now with the cost of the NBN.

[57] https://www.mybroadband.communications.gov.au/upload/documents/BQP_DATA_v4.xlsx

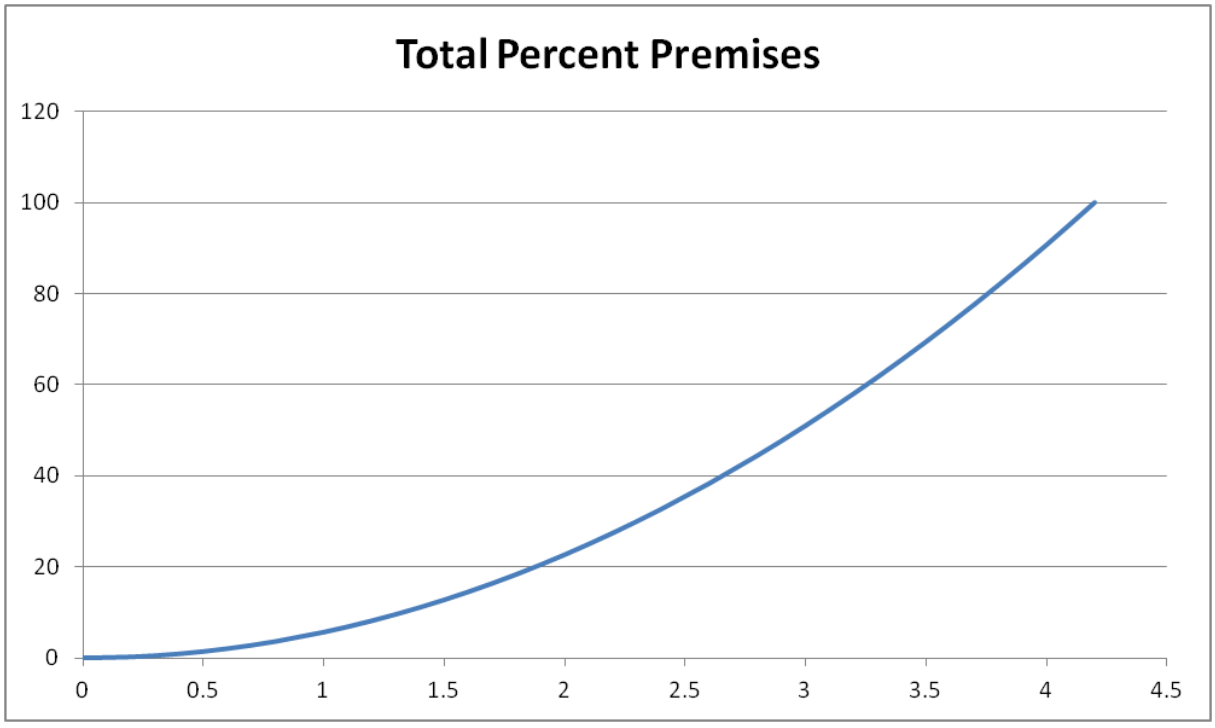
Country Cities, Metropolitan Suburbs

Again, with a little bit of basic analysis of the My Broadband DataCube spreadsheet, this provided an amazingly large amount of information about how non-metropolitan Cities and metropolitan Suburbs fare with ADSL connectivity.

In most of these localities, the urban Premises density is amazingly consistent throughout each Exchange Switching Area (ESA) and in the large majority of cases. the Local Exchange site (where 98% of all ADSL technology's DSLAM equipment is located) is quite central, and the nominal maximum pair copper cable length is 4100 m. So, the "average length" is fairly closely related to half the radial area, which works out at about 2900 m and not about 2000 m

By summing the Premises per incremental 200 m and graphing this, as shown below (here) the 50% Premises level (on the Y axis) coincides with a CAN length of almost 3000 m, so now there is a fairly good "rule of thumb" to work back from in terms of expected ADSL performance in terms of population locality and expected CAN length

The graph below shows in a rather simplistic picture that in these large urban situations where the maximum CAN length in these ESAs is nominally 4100 m, that percentage wise, a far higher percentage of Premises are located beyond the magical 2000 m limit, and this should visually explain why the "average telephony based ADSL CAN length" for suburban areas is far closer to 3 km than 2 km.



Put another way around, in these large urban localities, only about 8% of the total pair copper cable infrastructure is within about 1200 m of the Local Exchange site, so only nominal 8% of the urban population (nominally near the CBD) would get 24 Mb/s downstream speeds - and even then, only if DSLAM2+ equipment is installed in these Local Exchange sites to these premises.

In practice. most of these Suburbs / Cities has a Central Business District, that has a nominal radius of about 200 m - but even then the density of ADSL connections is

not that much greater than suburban premises (be they free-standing homes or home units - depending on the suburbs).

Assuming the CBD has a double Premises density that of the outer-lying Exchange Switching Area (ESA) then this area is only about 0.22% of the total ESA, and if this is CBD partial ESA extended to a 400 m radius then this will account for only 0.91% of the total Premises count in the ESA.

Looking further, because the average length is nominally 2900 m then physically, the expected downstream data rate will optimally be in the order of 10 Mb/s. If the central business district (CBD) had a larger concentration of ADSL services (say double) then the average nominal length would be in the order of 2700 m relating to about 12 Mb/s on average if using ADSL2+ (capable of 24 Mb/s) or using ADSL2 (capable of 12 Mb/s).

The Basics of Global Engineering

Global Engineering and manufacture is very efficient - but it is Northern Hemisphere based.

In the mid-1980s, the technologies used to manufacture electronic products went through a revolution where printed circuit boards used robotic component placement became standard manufacturing practice.

This new assembly technique was relatively inefficient because all electronic components up to that time had axial leads or dual-inline pins (DIP) that required at least two holes to be drilled through the printed circuit per component. The then new technique of surface mounted components radically increased manufacturing productivity because from then virtually no component required drilled holes and the components could be made considerably smaller.

Because the number of holes to be drilled came down to a few per printed circuit board, the manufacturing costs dramatically reduced, the reliability dramatically increased and the clocking rate could be dramatically increased. The other unseen change was that multiple locations (around the world) could manufacture the same printed board assemblies - so the number of design areas dramatically decreased and centralised into the Northern Hemisphere (Europe, China and the USA).

Global Marketing of Global Engineering

The flow-on in the mid 1990s was that the marketing changed focus from locally structured sales marketing to Northern Hemisphere based sales marketing, and this was very subtle.

Consider a project is conceived in a country, then the local Contract Marketing team would liaise with the prospective buyers and ascertain an overview of the project scope.

From here, a range of Globally manufactured products would be considered and the local contract marketing team would then use the facilities of the Global marketing team's very extensive facilities (in the Northern Hemisphere) to pull together a Tendering Bid for the complete project that with considerable computer assisted software will have the detail right down to the rack count, sub-rack mounted equipment and associated software (and, naturally, the pricing).

The question is how can this be done in a few days - if not several hours? The answer is that most of these Global manufacturing business already have a range of project templates that can be very easily aligned to suit virtually any situation.

> *In 1998 while I was working with Nortel Networks as the Alternate Operators Bid Manager for several Sales Execs, a Tender came in for a competitive telecomms infrastructure and retail reselling business intending to roll out a 3G network of Radio Base Stations and associated Towers and antennae in the Sydney Basin.*
>
> *After a brief meeting with the Sales Execs, I contacted the London office in England and queued up their production teams for equipment availability. Then I contacted the Nortel office at Research Triangle Park (RTP) in the USA and discussed the possible structure of the proposed network and left it to them.*
>
> *Overnight, these Nortel Global office bases created and electronically delivered a very detailed Geographical Information System (GIS) map of the Sydney Basin with all the necessary Radio Base Station at 128 locations, together with a (computer generated) complete listing of all the equipment for each site right down to the patch cord lengths for each site and the totalled costing for this proposed project for "turnkey delivery".*
>
> ***That marketing technology was available in 1998 and it is now 2016.***

The problem is that this marketing technology is Northern Hemisphere based, and it does not take much trave in the Northern Hemisphere to realise that the topography of Australia / New Zealand is very different from that in most of the Northern Hemisphere.

So, while most of the Global marketing templates can be altered to match much of the Australian urban situations - there are no Global templates that match the inland Australian topography.

This "Global mentality" is one of the prime reasons why for some decades grossly inappropriate telecommunications technologies have been pushed by the Global telecommunications manufacturers into Australia's inland.

The really upsetting problem is that very unfortunately, ***because most of Australia's telecommunications infrastructure is now privatised, the engineering memory is far too short and more Northern Hemisphere urban telecommunications solutions are incorrectly recommended and ignorantly approved for Australia's inland telecommunications infrastructure.***

> *The McKinsey's Cost Benefit Analysis (CBA) Report produced for the Federal Government (circa 2010) that was "interesting" from several avenues, but particularly from the point of "Global Marketing" into countries that do not have the demographics that match the Northern Hemisphere template!*
>
> *This CBA Report pondered heavily when it came to non-urban areas because there was no Northern Hemisphere demographic template that matched inland Australia. The CBA Report referenced the Australian*

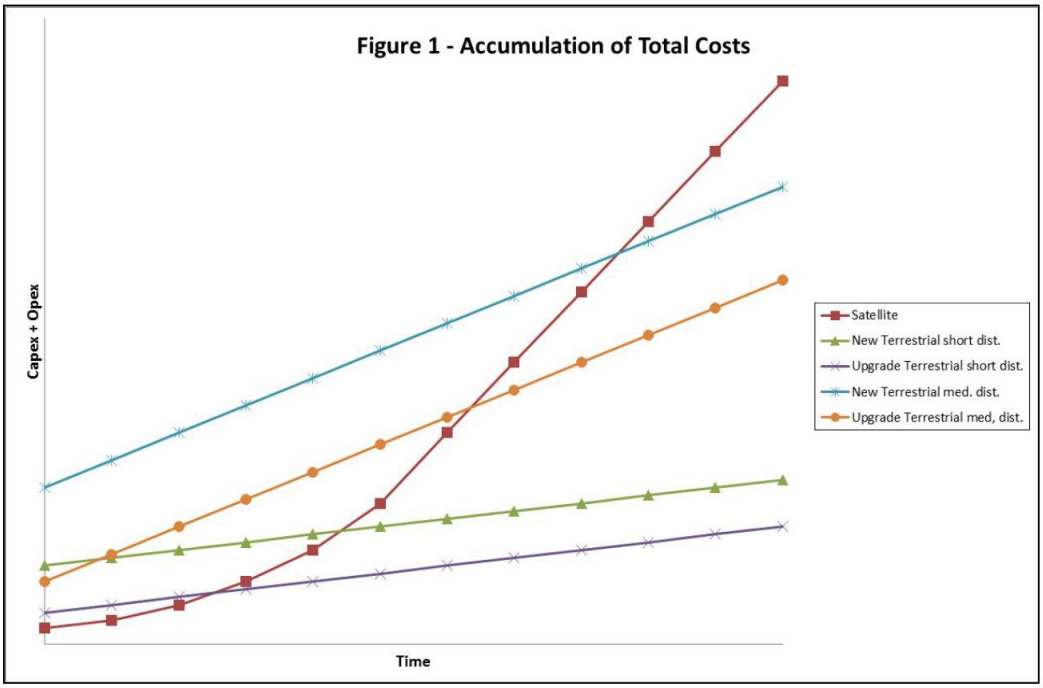
Bureau of Statistics (ABS) map to show that most of Australia was virtually not populated!

Consequently, a range of extremely expensive and short life Satellite strategies were provided when there is/was already extensive long life telecommunications infrastructure in the inland that was totally overlooked because this did not fit into the Northern Hemisphere marketing template.

It seems that nobody from McKinsey's had flown over Europe, and flown over inland Australia to visually recognise that Europe is a cluster of towns and villages spaced about 6 km to 10 km apart with virtually nil isolated homesteads, which is virtually opposite to inland Australia.

Australia has towns and villages typically spaced 20 km to 200 km apart (based on Cobb & co Stage Coach horse changeovers) of about 40 km hops, and a large number of inland Station Homesteads that are largely co-linear, and are pre-connected by Digital Radio Concentrator System (DRCS) or High Capacity Radio Concentrator (HCRC) masts and antennae (circa 1980) to provide reliable telecommunications connectivity.

The McKinsey's Report is (in my opinion) fundamentally flawed by deliberately not utilising all of the existing and very underutilised inland Telstra (telecomms) infrastructure - particularly the DRCS / HCRC towers and antennae, but instead utilising very expensive and very short life Satellite technology for a large proportion of the inland.



The above chart[58] *clearly shows that Satellite technology is by far the worst and most expensive technology choice beyond the short term of a couple of years.*

Because the Global Modelling is based on European demography - which is basically urban, there is no concept of "non-urban" FTTP by trenching in

[58] http://telsoc.org/ajtde/2013-11-v1-n1/a2

shared CAN/IEN SMOF cables as a "loose grid" to very inexpensively interconnect many inland towns, cities and villages (and Homesteads) and provide a solid and very inexpensive telecomms future-proofing structure.

Gouging with GSM4 / GSM5 (and Wi-Fi)

The compounding problem is that instead of Telstra rolling out ADSL and FTTP into these inland localities, to do the Broadband network connectivity installation properly and in a timely fashion (albeit at least 10 years too late); I believe that the Telstra executives have realised that radio-based GSM4 / GSM5 technology will lock the end users into mobile devices (and fixed GSM4 wireless modems) into very expensive contracts where the end users are now and will be continually gouged until Telstra (infrastructure / retail) is relieved of its command.

Very recently Australians have been shown glimpses of publically available Wi-Fi as yet another connectivity medium to "get onto the Internet".

History has shown that retail prices stay as high as possible to maximise profits. So, it makes really common sense that anyone that has a GSM4 / GSM5 device and has a side contract to connect onto privately available Wi-Fi, then the cost for connecting onto the Wi-Fi for Internet connectivity will be on a level footing as connecting with GSM4 / GSM5. Time will tell...

How Enabling Competition is Dead on Arrival

Introducing (or "enabling") competition does not fix this problem - we have already seen that introducing infrastructure competition significantly increases the wholesale prices, making retail reselling not a commercially viable scenario.

In 2008, I attended a Global Broadband Conference in Sydney (Australia). This was a three-day conference with the large majority of competitive telecommunications providers in attendance.

On the third day we had an open discussion about infrastructure and competition, and most people in the room spoke very openly about how infrastructure competition does not work because it is extremely uneconomic. In all this time the ACCC has never got the message...

A typical example was that a competitive provider did their marketing research and discovered that a route (say Sydney - Brisbane) that Telstra has was apparently running at 85% occupancy.

On the strength of this information, this infrastructure competitor then commissioned their own SMOF cable and transmission system for say $35 M to connect in competition to Telstra - in many cases this equipment would be in Telstra exchange sites.

So, yes, they could transfer their traffic to their own cable system and occupy about 10% but they needed other competitive carriers to come on board to make this cost effective. They got to about 35% occupancy which is not quite enough to break even (in their short-term timeframe).

So now another potential telecomms infrastructure provider on the strength of this second SMOF system saw potential for investment and put

in a third transmission system, and has about 4% occupancy, so it slashed its user prices and putt both in severe financial stress. There were several other similar stories in this line of infrastructure competition.

If and when Telstra rolls out GSM4 / GSM5 / Wi-Fi (for mobile and premises modems / devices) in these inland Village / Small Town areas, it will most likely be done under the disguise of the "Radio Black Spots (initiative)" - where the Federal Government will be (again) paying Telstra to roll out the telecommunications infrastructure that Telstra was charged to do for with the prime purpose of "privatisation".

This situation should be more than ample evidence for Australia's growth and economic future that Telstra should be Physically Separated as a matter of urgency.

In the first instance it has to be understood that because Telecom Australia (Commission) was deliberately (and in my opinion very sensibly) spun out of the earlier PMGs Department in the mid 1970s, a large range of Federal Government limiting inefficiencies were removed, making this Commission very efficient. This spinning-off freed up Federal Parliament so that nil of everyday business in the PMGs Department needed Acts to be debated and carried through the Senate.

The next phase of "commercialisation" was a severe backward step for Australia and I believe that it has cost Australia well over $200 Bn in lost productivity.

Before about 1980 digital switching and digital transmission were in their infancy, and Optical Fibre was a dream. Consequently the range of telecommunications products was very small, and this is why Telecom Australia had virtually nil commercial shop frontages, but worked out of the Post Office shopfronts. (Maybe a massive efficiency could be made by merging the Telstra and Post Office shopfronts!)

Internationally the commercial / Competitive Business world had recognised "rivers of gold" that were pouring through infrastructures and every action legal or otherwise was moved to "privatise" infrastructures in Australia (and elsewhere in the world).

Hence the Davidson Inquiry (1980-1981) to split up (fracture and crush) a massive "economy of scale" Infrastructure Business so that the "rivers of gold" could be passed through commercial launderers for false reasons of "efficiency" etc.

Only because of really significant advances in silicon / solid state electronic technologies from about 1965 that by about 1990 these technologies combined to dramatically advance the nature of telecommunications and business technologies and practices.

But - instead of Australia having one large single economy of sale infrastructure business (as a sub-Government Commission) rolling out telecomms infrastructure in a timely and very inexpensive manner - **Australia had the opposite**.

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