Trusting the Coalition to deliver "superfast broadband"

By Vincent OGrady

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Former telecommunications consultant** Vince O'Grady **discusses the Coalition's trustworthiness and the question marks over Malcolm Turnbull's "superfast broadband" policy.

How "superfast" can a broadband plan be that involves redundant copper wire?

What Hath God wrought!

The first Telegraphic message to be transmitted was:

'Surely there is no enchantment against Jacob, neither is there any divination against Israel: according to this time it shall be said of Jacob and of Israel, What hath God wrought!'
~ Numbers 23: 23 (KJV)

So, in considering the advent, growth and change in the telecommunications environment worldwide: what *hath* God wrought?

Certainly, a lot of lies.

My father was fond of the expression that someone was a bigger liar than Tom Pepper. Only later in life did I learn the real meaning of this. Tom must have been one of the most accomplished fibbers ever. His claim to fame was that he was kicked out of hell by the Devil because he was a better liar than the Dark One. Apparently, it is a nautical term, which makes sense as Dad was in the Royal Navy in the Second World War.

Conservatives will point to Julia Gillard before the last election and say she lied. Conservative commentators such as Bolt and that "gentleman of the airwaves" Alan Jones have even given her a nickname: *Juliar*.

Such commentary is more akin to schoolyard bullying, than constructive comment on policy.

Not happy with that though, the conservative juggernaut has marched on relentlessly making accusation after accusation and believe it or not telling untruth after untruth. Or should we say misrepresentation after misrepresentation.

The job started after the election in 2010.

The first misrepresentation was that the Liberals had won more seats than the Labor party. The chief protagonist being Christopher Pyne.

And to prove he said it, look here.

He actually said:

"We did get more votes than Labor, more seats and more preferences and most people would have thought the commonsense thing

to do would have been to form a government with 73 Coalition MPs and three rural independents who obviously have more in common with us with than Labor."

The second by that upright individual was that the coalition had got more votes than the labor party. On the face of it this is not a lie. HOWEVER he was talking about primary votes. Not two party preferred votes. If you add up all of the votes of the parties who formed (supported) government, Independents, Greens and Labor. They actually polled 471,895 more votes than the Coalition. (Only included Greens here not the independents)

And in the tradition of IA here is the link for you, the reader to go and look at the actual factual information which backs my assertion: First Preferences by party

And here is my election vote summary:

2010 Federal election first preferences

Liberal	3,777,383	
LNP Qld	1,458,696	
Nationals	462,387	
Total Coalition		5,698,466
Total Labor		4,711,363
Coalition votes in excess of Labor votes		987,103
Greens		1,458,998
Labor and Greens votes in excess of Coalition		471,895
Total Labor Greens Alliance votes	6,170,361	
Total Coalition Votes	5,698,466	
Alliance outpolled Coalition votes		471,895

So that representation is summarily debunked.

The two party preferred vote can be seen here .

As you can see, the Labor party polled 6,216,445 and Coalition 6,185,918. If I do the simple arithmetic, and take one from the other, then the result is 30,527 more votes to the Labor party.

Is this a legitimate government? The plain and simple answer is "yes".

Several other Coalition luminaries have repeated this misrepresentation several times. Among them, Barnaby Joyce on Q&A and Mitch Fifield, Liberal Senator from Victoria; all probably taken from their speakers' notes.

These notes are a voluminous confidential document which Coalition MP's refer to, giving the Liberal National narrative. A recent iteration was leaked and can be seen here.

Is Christopher Pyne a Tom Pepper? I will leave that up to you, the reader, to decide. The other and more disturbing thing here is the serial failure by the ABC in letting Pyne's misinformation go out to the public unchallenged.

Tony Jones is a serial interrupter on Q&A. He is always correcting people when they get something wrong, but on the many occasions I have seen him interview Pyne, he has never interrupted him to correct his misinformation; at least, not that I can find.

I have written numerous emails to numerous ABC programs telling them of the misrepresentation. They have never responded to me and never corrected the untruths described above.

The Coalition has similarly giving the wrong information to the general public on various other matters.

Brad Orgill and his Taskforce investigated the BER implementation widely condemned by the Murdoch Press. He found it was a success.

The first is the installation of ceiling insulation into the ceilings of Australian households. Specifically, the deaths of those installers in Queensland. Of course, the deaths of those people is a tragedy, but it is wrong to blame the Federal Government for incident, since each Australian State has occupational health and safety laws, which it is their obligation to enforce. Indeed, when I used to teach the subject in TAFE in Victoria, the Act placed responsibilities on everyone involved in the occupation for everyone else on a work site.

Secondly, there was the Building the Education Revolution scheme, which has been dubbed the "school halls program". The charge here is that there was an extreme waste of money. Three reports into this program showed it to be implemented well, which was misreported by News Ltd, as IA will discuss in an article by Sandi Keane to be published tomorrow. As for the Coalition, rather than being applauding the Government for the injection of funds into the economy, the creation of valuable school infrastructure and the retention of jobs, which saved us from the global recession, the Coalition chose to denigrate the program, label it wasteful and trash it.

Again, the scary thing is that balance was not shown by the public broadcaster, which unreservedly amplified the Coalition/News Ltd agenda.

Finally, we arrive at the latest 'campaign' by the Liberals over the NBN.

Last week, we had the NBN corporate plan update by communications minister Senator Stephen Conroy and NBN Co CEO, Mike Quigley.

If you are interested, you can read the actual plan here.

Immediately, the hysterical Australian news media went into a feeding frenzy — mainly about what they predictably called a "cost blowout".

Lyndal Curtis from the ABC interviewed Malcolm Turnbull on 9th August. He sat there with his glasses on, playing with his iPad, flicking from page to page and making the most outrageous claims about the Coalition alternative.

I sent the following email to Lyndal Curtis with some questions for Mr Turnbull.

Attention Lyndal Curtis and News editors,

Interesting interview with Mr Turnbull this afternoon.

What you forgot to ask him were the following questions.

1/ What do you consider Superfast Broadband?

The capacity of optic fibre is the speed of light. As that is what is transmitted. Light on = one light off = zero. That is the basic binary system of data transmission. You cannot shine light down a copper wire and so have to use two tones, one for zero and one for one.

The data carrying capacity of copper depends on its electrical characteristics and also what you bolt to it with software algorithms to compress data. So, it is severely limited capacity. I doubt that you could say "superfast".

So, taking an optic fibre line to a node outside the premises and then joining it to a copper cable slows down a huge pipe to a minute one. Hardly an elegant solution.

2/ Where is Malcolm Turnbull's cost benefit analysis of the Coalition broadband plan?

He made hay while the sun shone when he was asking for the Labor one and so did the press. So isn't it just fair to ask them for their costed business plan. And you know what, I bet they don't have one. And if you don't ask, then you are just not worth listening to.

3/ Malcolm Turnbull says that Mike Quigley has no experience in rolling out a network? What makes Turnbull so knowledgeable? How many networks has he rolled out?

He says Quigley just sold equipment.

As an ex-seller of Telecommunications equipment and also a Product manager for a major PABX, I had to understand all of the technical aspects of the product I was selling. I would love to have a conversation about Malcolm Turnbull's planned network. I bet I could shoot him down in about 30 minutes. And, by the way, we sold a lot of equipment to people who we had to convince that we had the best solution.

4/ Where is the technical plan for Turnbull's network? Which Telecommunications consultant engineers have they employed to cost and design the network?

If the design of the network doesn't exist, then they cannot have costed it. Sounds to me like three fifths of five eights of nothing.

5/ You have also missed the point about the cost of the network.

It is an investment which will give a 7% return. That means that the whole of the cost will be recouped plus 7%. As the plan is for the Optic cable to last for decades, I think that it is a complete disgrace for the ABC not to point this out. So no money is wasted. As an investment banker, surely Malcolm Turnbull would understand this concept?

It is about time that you raised your game as regards the level of due diligence you do about issues. You cannot credibly ask questions about a complex issue without understanding the issue yourself. If you haven't a clue what you are talking about, it is very difficult to ask the right questions. At least have a researcher find out about the NBN and then ask the questions. Not ask the wrong questions and then walk away satisfied that you have given the public "the DRUM".

Now I am going to give you the drum. Here is a URL which discusses the very issue. It debunks the Turnbull spin of “Superfast broadband”. Please bother to read it.

http://www.thefoa.org/tech/fo-or-cu.htm

In my opinion Malcolm Turnbull did a snow job on the ABC this afternoon.

Please treat the public of Australia with the respect they deserve. If the ABC are truly a news service then report the news, not a partisan politician's opinion. One would have thought that a technical organisation like the ABC would understand the issues and be leading the debate, rather than allow such rubbish to be peddled.

Regards [etc]

I didn't even get a response.

The day before, he made the same more detailed claims in an interview with Ross Greenwood.

Very believable, if you ignore the facts.

In order for the public to understand the truth of the matter, it is best to give an overview of the history of telecommunications in the world. I have done this below.

Whilst I do not have any electrical engineering or technical qualifications, I have a good understanding of the issues in transmission of data both as voice and pure data transmission. I used to sell the stuff and it's no good selling digital solutions without understanding their limitations or their benefits.

In 1990, I was part of a team which answered a Telstra tender for the whole of their urban and rural networks. During the process, a fanfold computer print-out appeared on my desk showing all the equipment installed in the Public Switched Telephone Network (PSTN). I asked one of my staff to place the data into a spreadsheet and do an analysis of the installed equipment.

The following was the result: 8% was step by step, 32% was crossbar, 32% was computer controlled crossbar and 17% was digital (Ericsson AXE). (I can't remember what happened to the other 11%.)

The history below will allow you to understand how old the network is. It will also allow you to understand Telstra's low share price and the need for a completely new network.

The network consists of Equipment to switch calls and lines. Some of which were installed 50 years ago.

Malcolm Turnbull's solution of taking the fibre to the node and then attaching it to the copper begs a lot of questions.

He claims speeds of 80 mbps to 100 Mbps (megabytes per second).. That is, at best, a complete misrepresentation and, at worst, a lie. What about local area networks? Well, they work at 100 Mbps per second, but they are 8 wires (4 pairs of category 5E) whereas the phone line you have to your house is 2 pairs (category 2). So, to achieve those speeds you would have to install a new cable. So why not use optical fibre?

There is also a problem with Turnbull's length from the node. He says maybe one kilometre. Transmission of data down a 2 pair cable (and for that matter a Cat5e ethernet cable) is limited to about 100 metres because the waveform of the signal degenerates. So, his solution would need signal repeaters on the copper pairs. More expense the Coalition apparently hasn't costed.

The third problem with the copper solution is that the cable is not shielded, so is susceptible to electromagnetic interference. This destroys the data waveform and hence the data.

Finally, the fourth problem with Turnbull's copper solution is that many of the cables have several joins in them. Bad joints are therefore a problem, restricting speed and causing a cost blowout of his proposal, because of the maintenance costs involved in a bandaid and completely outdated solution.

One last piece of truth I would like to inform the public of is the excessive cost of such services to the Australian public.

I will give you two concrete examples.

The first is my computer man and ex-colleague in a telecommunications firm in which I worked. His sister lives in Eastern Europe, in what was a communist country 25 years ago and with an out-of-date telephone system, like Australia has now. They upgraded to optic fibre. She pays 15 Euro per month for unlimited broadband at 60Mbps.

The second is my own personal experience. Last year, my wife and I went to France and, with another couple, hired an apartment in Paris. International telephone calls to Australia, as well as a computer with unlimited fast Broadband access, was also available to us as part of the standard weekly cost. The cost to them was 40 euros per month (at today's exchange rate, about $47 per month). For the same service, minus the international calls, I pay $110 per month.

What follows is the history of the telecommunications environment.

The electric telegraph

The words 'What God hath wrought' were the text of the first telegraphic message to be sent by Samuel Morse from The Capitol in Washington to Baltimore in Maryland on 24 May 1844.

They ushered in a revolution in the electric transmission of messages along copper wire.

The Morse code

The first way this was done was by the use of a code invented by Samuel Morse and named after him. At first, the message was printed on paper in the form of dots and dashes, but operators of the telegraph later sent and received messages by memorizing the Morse code. Word speeds of up to 50 words a minute were transmitted in this way.

Originally, the transmission was unidirectional — meaning that only one message could be transmitted along the line in either direction.

Following the spread of telegraph companies all across America, mainly along the railways, there were several innovations.

In 1913, for example, multiplexing was introduced. Multiplexing means sending more than one message down a line at a time. It was possible to send 4 messages in each direction at the same time on the same line.

The telephone

We are, however, running ahead of ourselves because on the 10 March 1876, Alexander Graham Bell invented the telephone. This device converted the sound of the human voice into electrical impulses of various frequencies and then, at the other end of the copper wire, back to the original sounds of the human voice.

In 1877, he founded the Bell Telephone company and the first exchange was in Hartford, Connecticut. They have mainly disappeared to the antique shops now, but the first Switches were plug and cord boards, where the operator manually connected the parties to one another.

The Stowager switch

The first Automatic exchange was designed by Almon B. Strowager, a Kansas City undertaker, in 1889. This switch used relays and sliders to connect one line to up to 100 others automatically and became known as the Stowager switch. The first one was opened in Indiana in 1892 — a bare 118 years ago.

It is also known generically as a “step by step switch”.

Rotary dialing

The initial design of the Telephone has a button on the phone where the number was tapped out. Later, in 1896, the rotary dial was introduced. This is known as “decadic dialing” — where the dial produces the requisite number of pulses rather than having to tap them out.

Touch tone dialing

Touch tone dialing was introduced in 1962. Each of the numbers on the dial were represented by a different tone, instead of a number of pulses. It is also known as dual tone multifrequency (DTMF).

Crossbar switching

An improved electromechanical switch design, which could accommodate many more subscribers by adding modules.

With the introduction of semiconductors, these exchanges became more sophisticated; and with the introduction of computers, could be controlled by this device.

Drawbacks of electromechanical switches.

As populations grew in cities, the provision of telephony services became much more problematic by the addition of extra switching gear to accommodate new telephony subscribers.

1. Traffic

In Australia, exchanges (switches) were designed to have a grade of service of one call failing in 100. This meant that there had to be enough switching equipment to cater for 99 calls out of every 100. Telephone traffic is measured in “erlangs”. An erlang (E) is one telephone subscriber talking to another for one hour.

One of the strangest presents I have been given, was a book containing the table of erlang loss formulae. The giver was a Swedish Telecommunications engineer.

2. Population growth and technological change

With the rapid expansion of populations in exchange areas, coupled with the rapid growth in technology, such as the introduction of computerised switches in the late 1970’s, old electromechanical exchanges, whilst robust units in themselves, were totally unsuitable for the growth in the population and also the change in computerization and the introduction of the internet.

3. Designed as a voice network

The public switched telephone network, as we know it today, was designed for analog voice communication. The copper network, which connects us to the exchanges, is totally unsuitable for the transmission of data.

4. Data transmission

Because data is transmitted as zeros and ones, it has a square wave form. The problem this poses in a voice network is that the signal degrades and, over longer distances, needs to be regenerated to maintain a good wave form.

This problem was overcome by the use of Modems — a device which assigns (modulates) a tone to zero and a tone for one. At the other end, it demodulates it back into a data wave form. Hence the word MODEM, short for modulator/demodulator.

5. Maintenance of a copper wire network

As you travel around in your car, you may see a technician working at a telephone pillar by the side of the road. Inside that pillar are physical connections — and back at the exchanges there are lots of other physical connections. If one of these is a bad connection, then it is a nightmare trying to find and repair faults. It is also a manual job to find and repair.

The digital (or computer based switch)

Technological advances, such as the multiplexing of the telegraph lines in 1913, allow telephone engineers now to have 30 simultaneous conversations on a twisted pair cable. For this to happen, however, the voice needs to be digitized either at the telephone or in the switch. This is done by sampling the voice (sine wave) 800 times in each second, which gives a digitized voice stream of 64,000bps, by means of a “codec” (coder/decoder).

The addition of data transmission on the PSTN is problematic for the reasons described above. What we are trying to do is communicate through a 20th century network designed – and, at least until the internet arrived – used primarily for voice communication.

ADSL (asymmetric digital subscriber line)

ADSL is a type of multiplex device which splits the copper pair into a Voice component and a data component. The data component utilises other than voice frequencies and is a clever way to make maximum use of a copper pair for data and Voice transmission.

There are limitations as to speed and distance (because of the data wave form) described above.

According to Wikipedia:

DSL signals may be degraded by older telephone lines, surge protectors, poorly designed microfilters, radio frequency interference, electrical noise, and by long telephone extension cords. Telephone extension cords are typically made with small-gauge multi-strand copper conductors which do not maintain a noise-reducing pair twist. Such cable is more susceptible to electromagnetic interference and has more attenuation than solid twisted-pair copper wires typically wired to telephone jacks. These effects are especially significant where the customer's phone line is more than 4 km from the DSLAM in the telephone exchange, which causes the signal levels to be lower relative to any local noise and attenuation. This will have the effect of reducing speeds or causing connection failures.

At best, it is a band aid solution and has limited technological life because of the age of the network and the technological drawbacks of ADSL to be installed in older exchanges.

Optical Fibre

The speed of light is 299,792,458 metres per second. It takes sunlight 8 minutes and 19 seconds to reach earth from the sun. The sun is about 150 million kilometres’ distance from the earth.

Of course, speeds of that magnitude will not be achieved because they are slowed down by the equipment attached to the fibre. It is, however, a lot faster than copper.

The characteristics of optic fibre cable can be found here.

The Coalition have asked repeatedly for a cost benefit analysis of the NBN, but haven't provided one for their own policy option. This would require, of course, an investigation of the cost of upgrading the PSTN, as well as maintenance of the network to provide their stated policy goals.

Such an undertaking would involve a huge amount of work, including an audit of the network, to properly ascertain the age, reliability, and indeed suitability, of such equipment for the Coalition policy to be made to work.

Conclusion

For the reasons stated above, it is a good idea to start again with the a network that not only provides high speed data flows, but also replaces the PSTN as the backbone for the delivery of existing telephony and video (i.e. Foxtel) services.

There are numerous applications that a high speed broadband network can be used for as well as a number of existing companies that will probably be redundant if they do not grasp the mettle.

I hope that some of this history has given the reader an idea as to the reasons to go to an optic fibre network.

Optic fibre is the fastest existing transmission media (speed of light down a glass tube). The complexities of services provided to consumers relate to the equipment connected to the network. Thus, a solution which keeps the copper network is short sighted and silly in the extreme. It stifles innovation and retains the high charging option we have now.

I want to see Malcolm Turnbull's network diagram and costings that are able to overcome the problems highlighted in this article. Prove to me, Mr Turnbull, that you are not another clone of Tom Pepper!