

Sorry Professor Tucker, but your 'facts' are not what they seem

For sheer cant, almost nothing beats the pro-FTTH and highly political NBN keynote presentation given by Rod Tucker yesterday to the Institute of Electrical and Electronics Engineers' annual international communications conference currently being held in Sydney.

On credentials alone, Tucker deserves attention. He is a Laureate Professor at the University of Melbourne. He is a director of two telecommunications academic bodies, has held positions at four international universities and four commercial research organisations and has been awarded nationally for his academic achievements.

But if you wanted to write the history of the sorry tale of the NBN—the progression from the cancelled FTTN tender in 2009 to a near-universal FTTH rollout that by this year has demonstrably failed in execution and any form of national benefit commensurate with its cost, then Professor Tucker would certainly feature as one of the lead characters, if not villains.

Tucker was the lead qualified expert panellist who recommended to Stephen Conroy in early 2009 that the Rudd Government should sink \$43 billion—some three times the investment previously envisaged—into a national access network extending fibre to 90%, later revised to 93%, of premises.

Contrary to the view that this was all dreamed up on a beer coaster on a government jet, quite a lot of thinking and work went into this advice through late 2008 and early 2009.

Of course, the rest is history—the network's schedule and costs blew out, the government changed and now the NBN has been partially re-booted and is pursuing a more modest technology mix that attempts to make greater use of existing copper and HFC assets.

But Tucker seems determined to ensure he is viewed as righteous, fundamentally correct and misunderstood. Yesterday he railed against media commentators who had spread "misinformation" about telecommunications technologies, guilty of lauding the potential of wireless while failing to appreciate the self-evident benefits of fibre.

He lamented the lack of engineering expertise in the debate and cast himself as an almost singular figure of factuality resisting the rhetorical failings of the politically motivated.

And in doing so he referred back to a series of his own utterances and public statements back in 2009 and 2010, which, unfortunately for him, demonstrated just why it is perilous for the vertical expert to become involved in horizontal policy debates. For if one is to criticise the factual accuracy of one's opponents one must take special care to ensure one's own facts are accurate.

Tucker's greatest criticism yesterday was for those who suggested that developments in wireless technology would overtake those of fibre optic technology, falling back on the correct rule of physics that light spectrum can carry more information than radio spectrum.

Unfortunately no one in this debate has done more to misrepresent the capabilities of wireless than Tucker.

Throughout 2010 his various presentations and power-point shows depicted a slide, featured here and adopted by others such as then NBN CEO Mike Quigley, that attempted to "visualise" what a wireless NBN offering 100Mbps to the household would look like. This would be a world of 10 metre tall steel towers pinned in front of every second premise in Australia, rendering the streetscape as the world's ugliest and obviously requiring ridiculous amounts of civil works. What did Tucker base this assumption on? That a wireless NBN (and by his inference, the nation's aggregate broadband demand) would only have access to one 20MHz slice of spectrum.



Rod Tucker's 2010 slide showing an LTE tower outside every 2nd premise....

What is the reality? If one adds up all the allocated spectrum available for microwave, cellular, Wi-Fi and other radio spectrum links, there is close to 85 GHz in service of the nation's communications needs. That includes several hundred MHz for conventional mobile broadband usage, tens of GHz for microwave and, latently, similar resources for unlicensed uses such as Wi-Fi. Increasingly, carrier aggregation techniques allow much more of that spectrum to be collectively harnessed in pursuit of greater end user performance. That spectrum is reusable, down to radii of fractions of kilometres and even scores of metres in a country measuring 7 million square km in size.

Any shortage of spectrum is an artificial constraint caused by the rationing policies of national treasuries. Indeed one of the greatest preoccupations of broadband-friendly governments, such as the administration of President Obama, is to free up hundreds of megahertz of spectrum for ever-improving mobile broadband technologies. Wireless is where the market action is both in terms of the mainstream of industry revenue generation and its role in real universal access and usage. Dismissing its reality out of hand as unfit and by inference, irrelevant to NBN policy and economics on a deception about spectrum constraint is a dangerously misleading tack.

Tucker also defended the FTTH advice given to the government in early 2009 on the grounds that he was not able to predict the emergence of vectoring, and the impact it would have on DSL bandwidth. But in articles published a year later, such as in the Telecommunications Journal of Australia, he was still comparing baseline VDSL to FTTH in advocacy of the latter.

Indeed VDSL2, a distinct advance on VDSL, was first standardised in 2005 and the principles behind vectoring were first given airing in academic journals one year earlier, in 2004. Vectoring was standardised by the ITU in early 2010.

By late 2010, Tucker was still presenting graphics suggesting that FTTN nodes would have to be deployed at a rate of seemingly one per every home or two with loop lengths of mere tens of metres to achieve 100Mbps bandwidth. The "vectoring" sweet spot for 100Mbps bandwidth is now closer to half a kilometre. Indeed the type of network visually depicted by Tucker in his damnation of copper would more likely offer bandwidth of up to 500Mbps or more. But yesterday Tucker suggested that vectored DSL only improved bandwidth performance by a "factor of two."



... and another 2010 slide showing a DSL node outside every second premise

If Tucker's focus on FTTH obscured him to the reality of developments in DSL and wireless, then perhaps he had a better handle on HFC? Sadly not. Yesterday he also invalidated HFC on the grounds that it has difficulties with achieving symmetrical and high upload bandwidth. Bunkum.

The download and upload profiles of HFC DOCSIS technology are a matter of the commercial channel allocation policies of the network operator. One common specification for the latest DOCSIS standards is about 1.25Gbps down and 245Mbps up—a factor of about 5 to 1. FTTH plans for the NBN range from about 5 to 2 at best to 12 to 1 downstream/upstream ratios at worst—hardly a radical point of difference. Indeed, there is a quite a debate currently taking place in international telcos as to whether high speed broadband will see even higher asymmetrical demands as IP video dominates. Incorrectly dismissing a technology because of one's prejudices about the undesirability of asymmetrical speed is not a good basis for public policy.

Tucker was also at pains to downplay the teething problems experienced by the NBN Co with its cost and speed of FTTH deployment.

In one slide yesterday, he attempted to explain that the delays would only set back an FTTH-centric NBN by a year or less, from 2021 to 2022. But in an accompanying slide, he seriously misrepresented the NBN plan announced in April 2009, the version of the NBN that bore the imprint of his advice and expertise before others took that over that task.

On that slide, he said that the “original” NBN plan announced in April 2009 would roll FTTH out to 93% of premises, cost \$45.6 billion and be finished by 2021. Not true. The original NBN plan called for 90% FTTH reach, provision of bandwidth “up to” 100Mbps, cost up to \$43 billion and take eight years to build—to 2017 in other words. Indeed the network was to have been sufficiently mature and developed by 2015 to have begun privatisation under this Tucker-advised original announcement. The reality? By mid 2014, after five years and eight billion dollars of spend and with four years of all the political support possible, the network is less than three percent deployed!

Tucker also opined against the concept of fibre on demand: the idea that those people who want fibre to their home can order it, paying a percentage or all of its real cost, as an extension from the node. Those unlucky people that are “hundreds of metres” away from nodes one could be up for “thousands of dollars” to get a connection and this struck against the idea of “equality of access,” Tucker argued.

And this is where Tucker gives the game away in terms of his understanding of markets and politics. Clearly service providers would likely amortise the cost of a fibre on demand connection over a contract, just as they do now with all manner of other telecom service offerings characterised by costly one-off imposts such as smart phones. That is if they thought there was a viable market.

But worse, Tucker is venturing away from dispassionate physics here and into the field of political philosophy.

In much of life, premium products that create increased private benefits for their purchasers tend not to need public subsidy or cross subsidy from other users of their basic equivalents. Suggesting otherwise for a broadband service is a statement of political values, not technical argument.

Indeed, by privatising that additional connection cost to the minority who want direct fibre and avoiding the civil works of last mile excavations to several million premises who will never want it, significant levels of publicly-raised debt can be avoided, helping to make the overall network more affordable for the average user.

For example, this cost reduction should take some of the heat off that \$20 per megabit connectivity virtual circuit charge and some of the other artificial imposts which have nothing to do with true costs and more or less guarantee that a real world NBN FTTH delivered service will be as contended and unsatisfactory for the masses as anything seen today.

Or in another scenario, unaffordable and barely used.

In my opinion, Tucker has done as much to contribute to misinformation in the NBN debate as anyone. But unlike a media commentator who can be safely debated and debunked in public space, Tucker’s heavily redacted and unchallenged 2009 advice led to a real world policy costed at \$43 billion and eight years deployment, which if it had proceeded unchecked might have cost \$78 billion and four or more years longer than envisaged, almost all the cost of which transferred risk to the public at large for mostly private benefits.

Contemporary observation tells us that politics is often prone to capture by the specialist or sectional lobby which conflates its own world view with that of the national interest.

One of the jobs of effective politicians, ideally, is to seek out alternative forms of advice and protect the community from well-disguised pecuniary claims. Thankfully, for the sake of good policy, quite a lot of that advice is due in the next few weeks.



Tucker’s 2010 depiction of a standard LTE base station



Alcatel-Lucent’s LightRadio cellular network cube