FIBRE-TO-THE-HOME: A SOLUTION IN SEARCH OF A PROBLEM

The case for the National Broadband Network is threadbare, says **Robert Kenny**

The debate over the future of broadband in Australia has been quite heated and politicised, with the National Broadband Network (NBN) being a significant outlier involving far more taxpayers' money and regulatory intervention than anywhere else in the world.

As we approach the general election, what is striking are not the differences between the NBN plans of Liberal and Labor (though those differences are substantial and important), but how alike they are from a global perspective. Both involve nationalising the access network (the 'last mile' connection to people's houses) and spending billions to improve broadband speeds.

Labor's plan forecasts a $44 billion investment in the NBN, while the opposition believes the actual figure will be higher.[1] Despite the scale of the investment, the public do not have a clear idea what they are getting for their money. There have been plenty of claims about the potential of the NBN, but alarmingly most do not stand up to any scrutiny.

NBN will deliver 'superfast' broadband. Superfast broadband is an ill-defined term, but for our purposes let us say it begins at 20 Mbps, a speed that for most households will require the installation of at least some new fibre-optic cable between the home and the telephone exchange.

This compares to typical basic ADSL broadband speeds (which rely on the existing copper network) of perhaps 5 Mbps.[2] ADSL connection speeds vary widely based on proximity to the telephone exchange: houses near the exchange will receive faster speeds than those farther away.

Although ADSL is far from perfect, it has delivered a cornucopia of benefits. For a great majority of households, it enables e-commerce, video-on-demand, social networking, and so on. Superfast can be justified only if it delivers more benefits and applications than are already possible with the existing infrastructure.

This may seem an obvious point, but it is a mistake that is made constantly. For instance, much is made of superfast's potential to reduce electricity consumption using smart meters in the home.[3] Smart meters are undoubtedly a good thing, and Italy has installed 30 million of them—but without a single strand of fibre.[4] The bandwidth requirements of smart meters are fairly trivial, measured in Kbps, not Mbps. Although smart meters can use fibre, they certainly don't need it, and thus are irrelevant to the case for superfast.

This mistake is made not only by amateurs but also by serious organisations one expects would know better. CISCO recently claimed that one of the benefits of superfast was that it would deliver online maps.[5] Tell that to the millions of smartphone users accessing online maps every day. In support of its fibre subsidies, the UK government cited an Australian remote education

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program as 'an excellent illustrative example' of the benefits of superfast.[6] This 2002 program used only 64 Kbps connections—just a fraction more than was possible on dial-up, and roughly 1/80th of the speed of a typical ADSL connection today, never mind superfast.[7]

It is not an accident that this issue is constantly fudged. We simply have not yet developed applications that require superfast broadband, as even fibre enthusiasts acknowledge. According to the FTTH Council, a lobby group advocating fibre-to-the-home (FTTH), there is 'no really compelling application yet' that requires fibre.[8] This important point is often lost in the noise of the debate.

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Bandwidth needs have a simple hierarchy—starting with text, followed by pictures, audio and finally video. In practice, the main way to use a lot of bandwidth is video. So how much bandwidth does video need? An HDTV stream needs about 6 Mbps while a standard definition stream needs 2 Mbps. These figures are already well within the reach of many ADSL connections—and falling every year. As video compression technology improves, the bandwidth needed for a given picture quality halves every seven years.[9]

Thus, the 'heaviest' applications we use do not provide much of a case for superfast. Fibre enthusiasts have two responses to this—'concurrent use' and 'build it and they will come.'

The 'concurrent use' argument goes like this: 'Yes, there's no single application that creates the need for fibre, but once you add up all the things going on in a household that use the Internet, in combination they require so much bandwidth that you need superfast.' This argument has some truth—aggregate use per household matters. The trouble is fibre advocates vastly overstate their case.

For instance, NBN Co justifies 100 Mbps or more by painting a picture of different members of a household simultaneously watching a 3D HDTV, two HDTVs, and two SDTVs; talking on one video call and one video conference; using one regular phone and two smartphones; playing an online game; and surfing the web (plus a few other things).[10] Compare this simultaneous online multitasking by at least eight people to the average household size in Australia of 2.5 people. And, of course, wondrous as the Internet is, people don't spend their entire waking life online.

NBN Co is seeking (unsuccessfully) to justify 100 Mbps because this speed is only possible using FTTH. This technology is at the heart of the Labor government's version of the NBN, and it requires new fibre to be laid all the way to the front door of every household.

The Coalition's version of the NBN would instead use fibre to the cabinet (FTTC). New fibre is to be laid to the street corner, and from that point on the existing copper will be used for the last few hundred metres. This saves a great deal of money—numerous international estimates suggest FTTC costs one-third of FTTH—although FTTC does not deliver quite as much bandwidth as FTTH. In the United Kingdom, FTTC customers are receiving 70 Mbps, compared to up to 1,000 Mbps that FTTH might offer.[11]

If 'concurrent use' in eight-person households is why we need more than 70 Mbps, and therefore FTTH, it is unconvincing. Another reason to be wary of concurrent use is the imagined households are extremely rich. How many households have the room and budget for a 3D TV, two HD TVs, two SD TVs, and multiple computers and smartphones? Or indeed the expensive '4K' TVs—with four times the definition of HD—that NBN Co suggests need massive capacity?[12] (*Forbes* says the 4K TV is 'not only an extravagance, but an invisible extravagance to anyone with regular visual acuity').[13]

Of course, some households may be crammed with high-end electronics, but do they merit an expensive state subsidy to enable their entertainment needs, funded by the taxes of the one- and two-person households that comprise almost 60% of all Australian homes?[14]

This leaves the argument 'build it and they will come.' The contention is although we may not know today the applications that will need all

this bandwidth, they will be invented once there is critical mass of superfast. The fatal flaw in this argument is that we *have* built it (not, admittedly, in Australia, but elsewhere in the world), and those inventions have not yet come.

There are 107 million FTTH connections in the world today.[15] This is slightly greater the 103 million basic broadband connections in 2003, when there were already many of the applications (Skype, the iTunes store, streaming video, movie downloads, etc.) that drive broadband use today. If 103 million connections was ample critical mass for a plethora of broadband applications to be developed, why hasn't the same number of superfast lines led to 'compelling applications' for superfast?

Most of the world's superfast connections are in Japan, South Korea and Hong Kong, and are referred to with envy in policy debates in other countries. But when you ask enthusiasts what *applications* from those countries they envy, an awkward silence follows—without applications, fibre is just expensive glass in the dirt.

There is one further concern regarding FTTH in the East Asian markets. While penetration is respectable, it has been achieved by pricing superfast at roughly the same level as basic broadband. This matches experience elsewhere, where consumers have shown remarkably little willingness to pay for higher speeds. Indeed, this reluctance is precisely why commercial rollouts of FTTH are not viable outside densely populated cities (which are cheaper to serve).

However, the current NBN plan makes the heroic assumption that Australian consumers will be willing to spend substantially more on broadband via premium-priced higher speed products.[16] NBN Co's plan implies that average monthly spend on fixed broadband will rise from approximately $50 today to $100 in 2027.[17] To be clear, NBN Co is not saying prices for basic products will increase but that households will choose to pay more for premium products. This contradicts the trend over many years in many countries of consumers receiving rapidly increasing bandwidth for a flat or *declining* monthly spend. (As context, note that Australian per capita spend on telecoms is *already* 30% higher than in the United States, and almost double that in Western Europe.)[18]

This assumption about pricing is one of several reasons it is an implausible (though frequent) claim that the current NBN Co plan will make an acceptable return for the taxpayer.

Superfast broadband brings little benefit to the home, but what of businesses and organisations? Perhaps they can use all that speed and justify the NBN? Sadly, this idea too is fatally flawed for two reasons. First, most organisations already have superfast available even without the NBN. As far back as 2010 (when NBN Co was not much more than a scribble on a napkin), 63% of Australian schools were *already* connected with fibre, and that figure was rapidly increasing.[19]

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Second, organisations do not watch a lot of HDTV and so generally use relatively little bandwidth. More than 90% of schools in the 2010 survey were using less than 20 Mbps (though speeds were increasing). A typical per-user figure in an office might be 80 Kbps, so an office of 100 workers would only need 8 Mbps.[20]

FTTH's fundamental problem is that it is a very expensive solution in search of a problem. In placing a bet on a near-national, government-owned FTTH network, Australia is taking an enormous gamble. It is a gamble that is already unique in its scale, and looks increasingly isolated as emphasis in other parts of the world shifts to the far cheaper option of FTTC.

It may be a worthwhile bet, but surely the burden of proof is on those asking for the billions of dollars of extra spend? If the threadbare case made so far for FTTH is all there is, then the money is surely better spent elsewhere.

Endnotes

1 NBN Co, *Corporate Plan 2012–15* (August 2012). Cumulative government and debt funding to 2021.
2 There are no public figures for the average achieved ADSL speeds in Australia. The average in the United Kingdom is 6 Mbps (OFCOM, *UK Fixed-Line Broadband Performance: The Performance of Fixed-Line Broadband Delivered to UK Residential Consumers*, November 2012)). For various technical reasons, the figure in Australia may be lower. Offsetting this, the UK figure includes those who have *chosen* slower packages, and so understates the technical capability of the lines in question.
3 See European Commission, *European Broadband: Investing in Digitally Driven Growth* (October 2010).
4 Sergio Rogai, *Telegestore Project: Progress & Results*, presentation to IEEE ISPLC (26 March 2007).
5 CISCO, *Get Up to Speed—How Developed Countries Can Benefit from Deploying Ultrafast Broadband Infrastructures* (2012).
6 BIS (Department for Business, Innovation and Skills) and DCMS (Department for Culture, Media and Sport), *Britain's Superfast Broadband Future* (2011).
7 Essential Equity, An Evaluation of the Satellite Internet Access Pilot Project for School of the Air (August 2002).
8 FTTH Council Europe, 'Creating a Brighter Future' (20 February 2013).
9 Zetacast, *Technical Evolution of the DTT Platform* (28 January 2012).
10 Trent Williams, *NBN Co Community Engagement—Working with Communities & Councils* (2011).
11 OFCOM, *UK Fixed-Line Broadband Performance*, as above.
12 Steve Langdon, 'NBN fibre is ready for Ultra HD TV: Are you?' *NBN Co Blog* (31 January 2013).
13 Sharif Sakr, 'How Long Before a 4K TV Becomes a Realistic Purchase? Give It Two Weeks,' *Forbes* (9 April 2003). Sakr does suggest that 4K's resolution may be useful for gamers using next-generation consoles sitting close to the screen—though this scenario makes no use of superfast broadband.
14 ABN (Australian Bureau of Statistics), *Year Book Australia* (2012).
15 FTTH Council Europe, as above.
16 NBN Co, as above.
17 NBN Co as above; Telstra, 'Financial results—Full Year Ended 30 June 2012 (Supporting Material)' (9 August 2012). See my CommsThought blog for a more detailed discussion of the underpinning analysis.
18 OFCOM, *International Communications Market Report 2012* (13 December 2012).
19 DEEWR (Department of Education, Employment and Workplace Relations), 'School Broadband Connectivity Survey 2010' (8 October 2010).
20 Derrick Wlodarz, 'How to Estimate Bandwidth Needs for Your Customers,' Technibble.com (26 May 2012). Note that any given active user would receive much more than this—such estimates depend on the fact that most people in an office at any point in time are doing other things besides using the Internet.