

What Now for Australia's NBN?

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AJTDE - Vol 6, No 4 - November 2018 [2]

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Abstract

Australia, like other countries, embarked on deregulation and privatisation of its telecommunications market in the late 1980s. The success of infrastructure competition in the mobile communications sector in pushing Australia to being a world leader in that sector contrasts with the failure to achieve the same in fixed telecommunications.

Australia's politics, insular policies and categorisation of fixed telecommunications as a natural monopoly have made Australia a global laggard in the provision of broadband services. The return of government ownership of telecoms infrastructure in the form of the National Broadband Network and the continuing lack of investment in fibre infrastructure highlight the political and policy failures that have accumulated. A disaggregation of NBN Co into competing technology-based entities, along with the establishment of a regional telecommunications fund financed by a broad-based telecommunications levy, is recommended as the answer to fix these long-term problems.

Introduction

This paper is a contribution to a recurring debate on Australia's seemingly never-ending drama in its fixed telecommunications market, prompted by the near completion of the build phase of Australia's National Broadband Network (NBN), which is expected in 2020.

The last 30 years of market reform in Australia saw an initial push for deregulation and the introduction of competition while the government-owned monopoly, Telstra (formerly Telecom Australia), prepared for privatisation. This push faltered in the early 2000s when the issue of the full privatisation of Telstra had to be reconciled with its overwhelming market dominance in the fixed telecommunications market. Rather than push through further reforms favouring competition by restructuring Telstra (e.g. through structural separation prior to full privatisation), the Coalition Howard Government opted in 2005 for a regulatory framework that regulated pricing and service levels for Telstra's retail and wholesale customers but maintained Telstra's overall infrastructure dominance in the fixed network. The natural consequence of this policy framework was the lack of commercial drivers for investment in fixed telecommunications infrastructure (by either Telstra or its competitors) at a time when demand for bandwidth was growing exponentially as a consequence of the growth of the Internet.

Instead of revisiting the options to restructure a fully privatised Telstra, the Labor Rudd/Gillard Government returned to the government-owned monopoly model by creating the National Broadband Network Company (NBN Co). This new company was tasked with the following objectives: (i) to build the necessary wholesale access infrastructure needed for universal

high-speed broadband; and (ii) to negotiate a deal where Telstra would voluntarily relinquish its fixed telecommunications dominance, by transferring its lead-in conduits and renting space in its duct access network and exchange facilities to NBN Co. As a result the Australian government and taxpayer are responsible for the lion's share of investment in the fixed access telecommunications market, leading to the inevitable politicisation of the complex infrastructure upgrades necessary to support past, present and future growth in digital communications.

The current build phase of the NBN has now been reduced in scope by the post-2013 Coalition Government, being primarily reliant on minimal upgrades to the existing copper and HFC networks. As it nears completion (forecast for 2020), there is yet another opportunity for the failures of the policies of the last 30 years to be understood and addressed in order to ensure the necessary ongoing investment is forthcoming and Australia's lagging broadband status ([Ookla, 2018](#) [5]) is corrected.

Further drivers for policy reform are the strong technology development roadmap and investment growth in the mobile telecommunications sector. As competition and commercial imperatives drive new technologies, such as 5G, there will be significant spillovers into the fixed telecommunications market, further complicating and possibly jeopardising the NBN investment strategies.

This paper highlights the past policy mistakes and puts forward a disaggregation of NBN Co and gradual privatisation of competing NBN operational business units as the best way to restore the commercial drivers of investment to increase investment efficiency and minimise losses to the Australian taxpayer.

Economic and Technology Drivers of Reform

The Hawke Government kicked off the last 30 years of reform when it announced in May 1988 the establishment of a new dedicated telecommunications regulator, AUSTEL, and the restructuring of the government telecommunications commissions, Telecom Australia, OTC and Aussat, as corporatised Government Business Enterprises ([Australian Government, 1988](#)) [6].

The reasons for the reforms were numerous. Micro-economic reform of many of Australia's markets was in full swing as the Hawke Government sought to open Australia's economy and reduce protectionism and government control of key sectors. These policies were part of a global trend to reduce government controls in markets that were advanced, stimulated by new economic thinking developed during the 1960s and 1970s, now recognised as neo-liberal economics, and given political traction by the Reagan and Thatcher governments in the USA and UK in the 1980s. Commencing in the 1990s, privatisations and competitive reforms were undertaken in many Australian industries such as financial services, transport and electricity ([Reserve Bank of Australia, 1997](#)) [7].

However, in telecommunications there was a further important driver of change beyond just economic thinking. Technology was forcing the industry to change rapidly. The use of digital integrated circuit chips from the 1970s was having a large impact on telecommunications, which would later give birth to the internet and mobile phones. The analogue telephony model that had characterised most telecommunications networks for a century was being swept away by the digital revolution. New technologies were entering the industry that would enable cheaper long-distance calling, higher speed data transmission and wireless communications. The internet and mobile phone industries were in their infancy but many could see the revolution these new digital technologies would make to the industry and to society in general.

In hindsight, it is clear that, without the corporatisation of Telecom Australia as an independent Government Business Enterprise in July 1975 and the opening up of the telecommunications market in the late 1980s, Australia would not have kept pace with this digital revolution. If bureaucratic government department budget and approval processes had continued, then investments in new technologies, such as packet switching, cellular mobile and long-distance optical fibre networks, would have likely been non-existent or delayed, to the detriment of Australia's businesses and consumers. The first steps to transform Australia's telecom operators, Telecom Australia, OTC and Aussat, into corporatised Government Business Enterprises with boards of directors making commercial decisions in response to technological and market opportunities, were not just ideological, they were a pragmatic response to the fast changing and accelerating technology landscape of the time.

Mobile communications, being a totally new industry in the late 1980s when the reforms kicked off, have been subject to open competition and minimal government regulation and ownership from the beginning. Government involvement has been mainly left to regulating and selling access to the necessary spectrum and ensuring there is sufficient competition between mobile operators to drive investment. The story has been one of huge growth. Australia has become one of the leading markets for both the penetration and quality of mobile services ([OpenSignal, 2018](#)) [8]. The industry has transitioned through the large investments necessary to go from AMPS to GSM to 3G and 4G and is now gearing up for further

investments to enable 5G for the 2020s ([Telegeography, 2018](#)) [9]. At the heart of this innovation and growth has been competition between the mobile network operators. Government intervention has been limited to the amount necessary to ensure a functioning competitive market, access to scarce public resources, such as spectrum, and ensuring mobile operators have sufficient ability to deploy infrastructure effectively on public and private property.

The author is unaware of any arguments that it would have been more efficient in terms of investment and better for consumers if Telecom Australia had retained its government-owned monopoly status and been the sole operator of mobile services. The duplication in network infrastructure (antennas, towers, transmission networks, core networks) that results from having multiply mobile operators is not argued as causing inefficiencies that mean consumers are paying more or receiving less than what the mobile market is currently providing.

The contrast with the fixed telecommunication market evolution in Australia could not be greater. The established fixed market was more complex and subject to more political lobbying, given its legacy telephony structure and revenues, the diversity of new business market services being demanded, the rise of the internet and the involvement of media tycoons through the introduction of cable TV, and the historical vested interests of the telecom unions.

At the heart of the disconnect in Australia's fixed broadband policy has been the inability to create a stable policy framework for transition from the natural monopoly of the legacy telephony network of the pre-1980s to the modern competitive forms of technology that deliver broadband services.

From Monopoly to Competition and Back Again

The 30-year period between 1988 and 2018 for Australia's fixed telecommunications market is best understood in terms of three distinct phases.

The first phase, from 1988 to 2003, what I call the "Attempting Competition" phase, saw the restructuring of the government telco entities (Telecom Australia, OTC and Aussat) and the entrance of Optus in 1992 and further new entrants in 1997. An intense period of competition between Optus and Telstra in long-distance calls and cable TV (with hybrid fibre-coax cable infrastructure) ensued between 1997 and 2001, before Telstra came out the overall victor. The first partial privatisation of Telstra occurred in 1998.

The second phase from 2003 to 2005, the "Pivot Point", was when Telstra's full privatisation and market dominance had to be resolved, with a parliamentary inquiry being scheduled into the possible structural separation of Telstra. In the end, the federal government shut down the parliamentary inquiry in early 2003 and proceeded to prepare Telstra for sale in 2005 without structural separation, in a move guaranteed to maximise shareholder returns as opposed to promoting infrastructure competition.

The third phase, from 2003 to the present, in the "Back to Government Monopoly" phase, policy makers attempted to come to grips with Telstra's dominance with various forms of regulatory and policy initiatives, culminating in the eventual creation of NBN Co and the structural separation of Telstra to return to a monopoly fixed network wholesale infrastructure model.

1988-2001: Attempting Competition

After some intense debate in the Hawke Government in 1990 between the Treasurer, Paul Keating, and the Minister for Transport & Communications, Kim Beazley, it was decided to pursue Beazley's "strong national carrier" model by combining Telecom Australia and OTC, rather than Keating's "full network competition" with OTC merging with Aussat to compete with Telecom Australia ([Raiche, 1997](#)) [10]. A phased period of duopoly involving a new entrant, Optus (who was obliged to acquire Aussat), and Telstra began in 1991, to be followed by open competition from 1997 ([Productivity Commission, 2001a](#) [11]).

These first steps towards competition would be characteristic of future policy mistakes. Rather than reform the market in a manner that creates a semblance of balance between competitors, the Hawke/Keating Government ensured Telstra (the combined Telecom Australia and OTC) was a dominant player faced with a new entrant that was weighed down by the acquisition of Aussat but given access to Telstra's network at regulated access pricing for access to all customers.

In business markets, mainly located in CBDs and business parks, this policy was moderately successful after 1997 with new network operators building fibre networks (e.g. Optus, AAPT, PowerTel, Ucomm, Pipe Networks) that would bring many of the benefits necessary for large business customers. The unbundling of the local loop and the building of competing DSL service providers (e.g. RequestDSL and Nextep) enabled some small and medium businesses to also benefit from competition with enhanced business broadband services.

The residential telecommunications market, however, relied to a large extent on new entrants (e.g. AAPT and Primus, along with Optus) using regulated wholesale services acquired from Telstra to compete in the long-distance telephony market. The introduction of regulated wholesale ADSL and unbundling of copper access also enabled a number of strong internet retail service providers to emerge under the leadership of willing entrepreneurs (e.g. TPG Telecom, iiNet, Internode and Netspace) to take advantage of the growing demand for broadband services as the dial-up internet model declined.

There was hope that the “ladder of investment” hypothesis ([Cave, 2004](#) [12]) would enable these service providers to transition to sustainable infrastructure-based (or facilities-based) competitors rather than relying heavily on Telstra’s wholesale services. Infrastructure-based competition was seen by the ACCC as the preferred long-term structure for the fixed telecommunications industry ([ACCC, 2004](#) [13]).

Optus, prior to the 1997 full deregulation, had commenced the rollout of a new Hybrid Fibre Coaxial (HFC) network to bring cable TV and local telephony to residential consumers and bypass Telstra’s copper network altogether. Telstra, in a cable TV venture with News Corporation to be called Foxtel, responded by building its own HFC network in the same suburban areas as Optus. This early push into infrastructure competition was a bold initiative that had much to do with the introduction of pay TV and media mogul rivalries between Kerry Packer and Rupert Murdoch, rather than just pure telecommunication services ([Westfield, 2000](#) [14]). However, the end result was large financial losses for both companies, with Optus eventually losing the cable TV wars and Foxtel becoming the dominant subscription TV service provider. Optus retained its HFC network, which it used to provide DOCSIS-based broadband, but was eventually relegated to be a reseller of the Foxtel Pay TV service in the subscription TV market.

2001-2003: The Pivot Point

By 2001, Telstra had been partially privatised through two share offerings to the Australian public, the first labelled T1 at a price of \$3.30 in 1997 and the second labelled T2 at a price of \$7.40 in 1999 ([Telstra, 1999](#) [15]). A total of 49.9% of Telstra’s equity was sold during these two tranches, with foreign investors restricted to just 35% of this new equity. These sales had been politically contested at the federal elections of 1996 and 1998, where the Howard Government prevailed over first the Labor Keating Government and then the Beazley Labor Opposition.

During 2000 and 2001, the Productivity Commission undertook a review of the telecommunications market and the telecommunications specific regulatory framework that had been established under Part XIB and XIC of the Trade Practices Act. However, the inquiry’s terms of reference specifically did “not encompass the structural separation of Telstra, in line with Government policy on this issue” ([Productivity Commission, 2001a](#) [11]). The inquiry’s report did highlight that the regulatory processes were “slow, uncertain and inefficient” and that “there is a risk of reduced investment in core telecommunications infrastructure – with long-run consequences for consumers and for Australia’s overall economic efficiency” ([Productivity Commission, 2001b](#) [16], p. xxii).

The structural separation of Telstra, although not part of the Productivity Commission’s inquiry, had begun to surface as a key issue, given the pending full privatisation of Telstra (to which the Howard Government had re-affirmed its commitment in its successful 2001 election campaign). The key question was whether a fully privatised vertically integrated Telstra that accounted for 95% of local access lines (via its copper and HFC network) ([Productivity Commission, 2001b](#) [16], p. 99) could be regulated in a manner that would still ensure ongoing investment in networks and improvement of services in the fast evolving internet and digital market that Telstra and its competitors were vying over.

Telstra’s share price had hit a new post-T2 low of \$3.42 in March of 2003 after the tech boom had subsided. Many Australians, now investors in Telstra, were disappointed with the share performance and the losses since the T2 peak of \$7.40. Regional Australians were also dissatisfied with Telstra’s performance and the government promised not to sell any further Telstra equity until “the Government ... is satisfied that arrangements are in place to deliver adequate services to all Australians” ([Cth, 2002a](#) [17]). The issue with regional telecommunications was addressed through a Regional Telecommunications Inquiry led by Mr Dick Estens, the recommendations of which the Howard Government agreed to implement in full ([Cth, 2002b](#) [18]).

Telstra’s market dominance issue was not as politically charged as the quality of regional telecommunications, but it was also addressed through two other inquiries. In March 2002, the Howard Government Minister responsible for telecommunications, Richard Alston, asked the ACCC to undertake an inquiry into the emerging market structures of the communications sector, given the dominance of Telstra in both the telephony and pay TV markets and the emerging broadband market ([ACCC, 2003](#) [19]). In May 2002, the Labor Opposition Spokesperson on telecommunications, Lindsay Tanner, kicked off a review of possible Telstra reform options through a public discussion paper ([Tanner, 2002](#) [20]).

The Labor discussion paper included an “option of structural separation – the idea of separating Telstra’s core network from its other businesses to effectively eradicate Telstra’s market dominance”. This prompted the Howard Government to instigate a parliamentary inquiry into structural separation of Telstra but it was abandoned the day before the first hearing in February 2003 after Labor announced it would pursue an “internal virtual separation” rather than full structural separation of Telstra (Ryan, 2003 [21]).

Labor had formally kicked into play the idea of “vertical” structural separation of Telstra into network and retail businesses. This reform option would live on, despite Labor’s initial backtracking, to eventually dominate the thinking of reform of Australia’s fixed telecommunications market and heavily influence the subsequent development of the NBN after Labor obtained government in 2007 (Gerrand, 2004 [22]; 2017 [23]).

However, the ACCC review kicked off by Alston also addressed the emerging dominance of Telstra. The ACCC’s advice was clear cut and very direct: Telstra should be made to divest itself of its HFC network assets and its 50% stake in Foxtel. This “horizontal” separation of Telstra was seen by the ACCC as a “significantly more restrained policy option than the vertical separation of Telstra as a means of increasing competition in the telecommunications sector” (ACCC, 2003 [19]).

The Howard Government rejected the ACCC’s advice on the grounds that the costs outweighed the perceived benefits of divestiture and the risk to taxpayers of compensation to Telstra’s 1.8 million shareholders (Alston, 2003 [24]). Labor, however, supported the ACCC’s horizontal separation recommendation (Ryan, 2003 [21]). Telstra’s lagging share price at the time was clearly a political issue. Telstra’s full privatisation was government policy and a higher share price would help the government’s finances and also assuage the concerns of existing Telstra shareholders, who were a key political constituency for the Howard Government. The prospects of an HFC divestiture would not have squared with these political imperatives. The ACCC advice was publicly released on 20 June 2003. The legislation to fully privatise Telstra was formally introduced into parliament on 25 June 2003 (after the Howard Government accepted all recommendations from the Esten’s Regional Telecommunications Inquiry). However, it would take the Howard Government another election victory in 2004 and significant political lobbying to get the decisive vote of a new National Party Senator, Barnaby Joyce, before the Howard Government would achieve its long-held goal of legislation authorising the full sale of Telstra in September 2005 (Sydney Morning Herald, 2005 [25]).

At the end of 2003 it was clear that Telstra’s fixed network dominance in the residential market would remain. The Howard Government had rejected reforms put forward by the ACCC and the Labor Opposition to substantially reform Telstra prior to full privatisation. The ACCC stated clearly that “Telstra’s market power across a range of telecommunications markets and a degree of horizontal and vertical integration remains a concern” (ACCC, 2003 [19], p. 24).

The resolution of the conflict between Telstra’s shareholders and competition had been decided in favour of the shareholders – and a much larger financial windfall to the federal budget. Telstra would be a private regulated monopoly. The consequences of this outcome would be far reaching. It would soon become clear that a private monopoly could be regulated in terms of pricing and, to a lesser degree, service quality, but it could not be forced to invest and upgrade its infrastructure and services. To the contrary, the regulation would be a reason to not undertake the necessary upgrade of its infrastructure to keep Australia in the global race for fixed broadband.

2004-2018: Back to Government Monopoly

The early months of 2004 set the scene for the next few years of regulatory skirmishes when Telstra started to flex its muscles in the growing ADSL broadband market. Optus and Telstra had negotiated a wholesale deal in November 2003 for Optus to resell Telstra ADSL services. This would enable Optus to enter the ADSL broadband market, which was at an inflexion point as the entrepreneurial ISP sector started to find ways to satisfy the residential market’s demand for a transition from dial-up to “always on” broadband (McCulloch, 2004 [26]).

A day before the launch of Optus’ new ADSL services, Telstra dropped its retail ADSL price by 25% without changing its wholesale price to Optus. Optus and the other ISPs called out the price squeeze and the ACCC took formal steps to investigate if Telstra had breached special telecommunications provisions of the Trade Practices Act. A protracted process followed while Telstra grew its ADSL market share in parallel. The end result was that Telstra gained a market-leading share of over 50% in this new and growing market — a market share that it still holds nearly 15 years later.

From 2005 to 2009, Telstra was subject to various forms of political pressure to upgrade its network to the next generation of fixed residential broadband – Fibre to the Node (FTTN) using VDSL technology. The Howard and Rudd governments tried to cajole and push Telstra into a new investment program for FTTN. Meanwhile, Telstra’s competitors played spoiling roles, presenting alternative upgrade options to government, but also looking for a windfall from government. However,

Telstra under its American CEO, Sol Trujillo, in conflict with the Howard and Rudd Governments (advised along the way by the ACCC), was never able to come to an agreement that would satisfy the need for more investment in fast broadband while ensuring fair access to Telstra's infrastructure for its competitors (Fletcher, 2009 [27]).

Eventually, the Rudd Government, in the darkest hours of the 2007-8 Global Financial Crisis and willing to spend big on an economic stimulus program, launched the bold Fibre to the Premises (FTTP) version of the National Broadband Network (NBN), creating a new, wholly owned Government Business Enterprise (NBN Co Limited) at an anticipated cost of \$A 43 billion, with the network to be completed by 2020. The newly created NBN Co would be a stand-alone enterprise funded by government equity and private debt, operating as a wholesale only, open access broadband network (Rudd *et al.*, 2009 [28]).

The governance framework for NBN Co, with its own board of directors, mimicked the structure set up for Telstra back in 1989 by the Hawke Government and would have the political advantage of remaining out of the federal budget spotlight. The core reasons stated for the huge government intervention were: (i) Telstra, as a private monopoly, would not agree to upgrade its network on acceptable terms; (ii) separation of Telstra from its monopoly infrastructure networks could not be accomplished either legally (Australia has no judicial anti-trust mechanism), operationally (e.g. IT systems) or financially (compensation was deemed too high); and (iii) Australia was seen to be lagging the world in fixed broadband deployments and an FTTP build over a 10-year period would enable it at least to catch up, if not leap ahead, of its recognised OECD and regional peers.

However, Telstra still had to be convinced to fall into line with the new NBN policy and not become a competitor to the nascent NBN Co. To achieve this, the Rudd/Gillard Government used a carrot and stick approach. The carrot was a deal worth \$ 11 billion, in net present value terms, over more than 30 years for Telstra to transfer its customers and lease its pits, ducts, exchanges and long-distance fibre to NBN Co. The stick was the threat of regulation for full functional separation (but not legal structural separation) of the Telstra copper network, along with divestiture of Telstra's HFC assets and Foxtel equity, and being excluded from the future 700 MHz spectrum auction. So, under either the deal or no-deal scenario, Telstra would effectively undergo a separation of its copper and HFC networks from its retail business. However, under the deal scenario, Telstra would be paid to lease its pits, ducts, exchange floor space and long-distance fibre to NBN Co and move its customers to the NBN, while, under the no-deal scenario, Telstra could keep its customers on its own network and force NBN to build its own infrastructure from the ground up. Effectively, both scenarios involved vertical and horizontal separation, at least at the functional level. Telstra's shareholders approved the NBN Co deal and the implicit vertical and horizontal structural separation of Telstra in October 2011 (Telstra, 2011 [29]). The ultimate goal of achieving Telstra structural separation had at long last been achieved some 8 years after it had been tentatively suggested and then withdrawn by the Labor side of politics (Havyatt, 2010 [30]). Telstra's fixed network would be both vertically and horizontally separated, with it retaining only its direct fibre connections to large enterprise customers.

However, the result was the creation of a new wholesale monopoly fixed infrastructure provider. Infrastructure competition was actively discouraged by legislation passed by the Gillard Government in 2011, with so-called "level playing field" or "anti-cherry picking" provisions introduced into the legislation to protect NBN Co's monopoly (Cth, 2010 [31]).

The Labor Rudd/Gillard Government NBN policy was controversial and far from bipartisan. In a time of turmoil for Australian politics in the form of the minority Labor Gillard Government, the federal opposition Coalition was keen to find an alternative to differentiate itself from Labor at the next election due in 2013. Despite its controversial nature, the Labor NBN policy was popular with the electorate and Malcolm Turnbull, the future Prime Minister, as Opposition Spokesperson for Communications, was keen not to be seen as an early "wrecker" of the NBN. The Coalition thus took to the 2013 election a watered-down NBN that would involve an FTTN architecture (rather than FTTP) with supposedly lower costs and faster rollout but still offering an improvement on the existing Telstra ADSL networks available to retail service providers (Coalition, 2013 [32]). The Coalition did not challenge the separation of Telstra or the creation of NBN Co as a new monopoly provider; rather, it chose to represent itself as a more responsible, economical and pragmatic owner of NBN Co to minimise the financial risks and impacts to the taxpayer.

After winning the 2013 and 2016 elections, the Coalition Abbott and Turnbull Governments proceeded to roll out a Multi Technology Mix (MTM) using FTTN, FTTB, FTTC and HFC technologies, as well as continuing Labor's use of terrestrial and satellite fixed radio technologies, after renegotiating the 2011 deal with Telstra. The rollout of the revised network was slower than originally promised by Turnbull with significantly higher costs (NBN Co, 2018 [33]) and has attracted a high level of complaints regarding its service performance and prices from both residential customers and retail service providers (ACMA, 2018 [34]). According to NBN Co's Corporate Plan released in August 2018, the peak funding had increased to \$A 51 billion (NBN Co, 2018 [33]), significantly higher than the Coalition's election campaign plans and its initial projections made once in government.

On top of the cost increases and customer complaints, it is also now widely accepted that the investment in NBN Co by the Australian Government will not make a commercial return. While the August 2018 Corporate Plan is forecasting a return of 3.2% *per annum* on shareholder equity of \$A 29 billion (the remaining funding to be a mixture of government and private debt), a report by Standard & Poors has forecast that a write-down of the investment is “inevitable” ([AFR, 2018b](#) [35]).

Both Labor and Coalition Governments have sought to protect NBN Co financially by legislation and regulations that seek to dissuade competitors (who in many cases are NBN Co’s own customers, such as Telstra, Optus, Vocus and TPG Telecom) from building new fibre-based networks that “cherry pick” NBN Co’s more valuable customers. ([McLaren, 2016](#) [36]).

The result has been that Telstra, Optus and TPG Telecom (after announcing a planned merger with Vodafone) are likely to invest heavily in 4G and 5G networks as alternatives to the NBN for providing fixed broadband services to residential consumers. This wireless NBN bypass option is currently not restricted by regulation or legislation, but will require significant investment in spectrum, fibre and other facilities to be able to offer a compelling alternative to NBN Co ([Asher, 2018](#) [37]).

At the end of 30 years of reform, Australia’s telecommunications market has ended up a more-or-less bifurcated industry, involving, on the one hand, a competitive and innovative mobile industry and, on the other, a largely monopolistic and expensive fixed network industry dominated by NBN Co.

Lessons from the Last 30 Years

As in other markets where government telecommunication incumbents were privatised, the Australian government has had to grapple with the conflict of promoting competition to benefit consumers while maximising shareholder value to the taxpayer. In Australia, the Coalition right-leaning governments have favoured the latter, with an initial focus on maximising the sale proceeds of Telstra by minimising the competitive threats to Telstra through either vertical or horizontal structural separation of Telstra. During the NBN phase the Coalition’s focus has been on reducing the cost of the rollout through maximising the re-use of Telstra’s assets (copper and HFC networks) rather than investing in higher quality network infrastructure (i.e. FTTP). The Labor left-leaning governments have preferred to commit to larger amounts of taxpayer’s money with the goal of increasing competition, albeit competition at the retail level only, and a monopoly wholesale infrastructure provider.

The current NBN outcome is in effect the realisation of the vertical structural separation of Telstra initially proposed, and then withdrawn, by Labor in 2003. The initial NBN FTTP architecture hoped to recover lost ground and propel Australia to the forefront of broadband networks globally. The Coalition saw this goal as extravagant and sought to wind back the costs to the minimal amount, although the costs have since increased to be higher than its own initial estimates and the initial Labor estimates for FTTP. The NBN political argument today boils down to whether the government should commit more taxpayer dollars now for a high-speed broadband future (Labor) or take incremental investment steps when the demand for high-speed broadband is obvious and most likely overdue (Coalition). Both parties have seemingly agreed on the vertical structural separation model for Telstra and the national wholesale NBN monopoly – a reform first proposed by Labor back in 2003. Investment in further fibre infrastructure is a political question that will depend on reconciling the benefit in faster broadband with the demands of Australia’s fiscal budgetary position.

But, while this structural monopoly outcome is effectively bipartisan policy, it is becoming clear many of the problems of Telstra’s original market dominance still remain and may be in fact worsening. The structural separation of Telstra has just seen the problems transferred to NBN Co under a new monopoly. The primary reason for structural separation was a reduction in Telstra’s dominance and a more vigorous retail market enabled by a “level playing field” for retailers. “The biggest winners should be customers who will be offered a better choice of providers” ([Havyatt, 2010](#) [30]). This has not eventuated. Complaints by retailers and end customers regarding the quality of NBN Co’s service delivery ([ACMA, 2018](#) [34]) are strikingly similar, if not worse, than those made against Telstra when it was the monopoly fixed access service provider. Complaints by retailers of a “margin squeeze” ([Computerworld, 2018](#) [38]) are reminiscent of those made against Telstra in 2004, discussed above, when the current chairman, Ziggy Switkowski, and a director, Justin Milne, of NBN Co were, respectively, CEO of Telstra and head of Telstra’s BigPond ISP business.

Furthermore, rather than resulting in a “better choice of service providers”, the structural separation of Telstra and creation of NBN Co have resulted in Telstra’s retail market share increasing and an overall more concentrated fixed broadband market. Consolidation of the challenger ISPs Internode, Netspace and iiNet into the TPG Telecom group has led to 95% of the fixed broadband market being supplied by just 4 independent operators (Telstra – 51%, TPG Telecom - 22%, Optus – 17% and Vocus – 6%) in 2018 ([ACCC, 2018](#) [39], p. 21). This compares to 2009-10 when the top four providers supplied 75% of fixed broadband services (Telstra – 41%, Optus – 16%, iiNet – 10% and TPG Telecom – 8%) ([ACCC, 2011](#) [40], p. 10). The Herfindahl-Hirschman Index (a metric used to estimate the level of market concentration) has risen to 3500 in 2018

([ACCC, 2018](#) [39], p. 21), compared to 2554 in 2010 ([ACCC, 2011](#) [40], p. 10), highlighting that consumers have significantly less choice now than before the creation of NBN Co.

NBN Co is facing a future threat from wireless broadband that will undermine its business case while regional customers are demanding more investment to improve service quality. The NBN technology debate (i.e. FTTP vs MTM) is not the root cause of these issues – the real issue is the wholesale monopoly business model. The artificial, regulatory enforced, split between wholesale and retail at Layer 2 of the OSI model (also referred to as “bitstream” access) creates significant duplication and confusion regarding responsibilities for network performance between wholesaler and retailer. Retailers have very little incentive to compete on the quality of the service provided to retail customers. Retailers have been successful in shifting the “blame” to NBN Co for service quality that is effectively under their control (e.g. Connectivity Virtual Circuit (CVC) dimensioning). NBN Co, in order to protect its brand, is responding by offering plans that take CVC dimensioning away from the RSP (i.e. a fixed allocation of CVC per Access Virtual Circuit), thus making it impossible for RSPs to compete on quality. The end result is that NBN Co is effectively defining the retail product offering from its wholesale position, leaving customers minimal choice in the normal trade-off between quality and price.

Disputes between NBN Co and its wholesale customers over pricing, products and operational performance will continue in much the same way as the industry complained about Telstra’s wholesale performance during the 2000s. End customers will continue to face confusion and frustration as both NBN Co and retail service providers deflect blame over faults and provisioning foul-ups to each other. Investment in infrastructure will be limited unless political pressure can be brought to bear on NBN Co to respond to local community issues.

A more fundamental consequence of the structural monopoly is the inherent disincentive monopolies have to invest to expand supply. This stems from the well-understood profit maximising condition of monopoly firms. Monopolies, as the sole supplier of a product, maximise profits by restricting supply and selling at a price significantly above their marginal cost. This compares to a competitive market where price is more or less the same as marginal cost ([Hubbard & O'Brien, 2017](#) [41], chapter 15). This leads to the excessive returns or so-called “rents” that monopolies earn to the detriment of consumers and the need for price regulation. Price regulation can be successful in stable markets where demand is not changing. However, in markets where demand is increasing (e.g. demand for bandwidth in telecommunications markets as technology evolves), monopolies can simply restrict investment to restrict supply relative to the increasing demand. Regulators are not able to force monopolies to invest to increase supply and meet demand, so price regulation is insufficient to avoid effective increases in price relative to the prices a competitive market would deliver. This explains Telstra’s reluctance to invest in fixed broadband when it was the monopoly infrastructure provider. The same applies now for NBN Co. Investment will not occur for commercial reasons, instead it will be solely driven by political or other non-economic drivers.

The wholesale monopoly market model pursued in Australia has not been adopted in most other markets globally. Only New Zealand and the United Kingdom have followed a similar model using a Layer 2 broadband wholesale product. Singapore has elements of the Australian model but the retail service providers are able to obtain direct fibre access in most cases and hence act more like vertically integrated operators rather than having the wholesale/retail split at Layer 2.

Telecom New Zealand underwent vertical structural separation through the demerger of its fixed telecommunications assets into a new separate company, Chorus, in 2011. The demerger was necessary to allow Chorus to participate in the New Zealand government’s Ultra Fast Broadband (UFB) FTTP initiative. The New Zealand government started this initiative by entering into agreements for the rollout of wholesale-only networks with three electricity distribution companies, which collectively covered approximately 30% of the planned UFB network. Chorus, after its demerger from Telecom New Zealand, was awarded the remaining 70% of the UFB network. Competition clearly forced Telecom New Zealand to restructure and Chorus to come to terms with the government to be able to participate in the UFB ([Crown Fibre Holdings, 2018](#) [42]) or face loss of its entire fixed network monopoly. This was New Zealand’s own version of the carrot and stick approach used in Australia to induce Telstra to voluntarily separate its fixed access network.

In the United Kingdom, British Telecom underwent functional separation into wholesale and retail units in 2006 based on undertakings given to Ofcom, the UK telecommunications regulator. However, without any government funding as in New Zealand, the wholesale company Openreach’s investment in new fibre infrastructure has been limited to FTTP and found to be lagging the rest of the world ([Sidak & Vassallo, 2015](#) [43]). The UK government, eager to see more FTTP investment, is pursuing further reform and Ofcom has put in place new regulations requiring Openreach to share ducts and poles for fibre access to enable infrastructure competition to drive further fibre investment ([Ofcom, 2017](#) [44]).

A big issue for Australia’s NBN after the completion of its rollout under the Coalition’s MTM architecture is that the split into wholesale and retail networks does not, of itself, encourage sustainable long-term further investment in fibre buildouts in residential networks. In New Zealand, government grants led to investment in FTTP, but in the United Kingdom and

Australia, without extra funding, there is no pathway to FTTP. As described above, the wholesale company, as a monopoly, is encouraged to restrict rather than grow supply of bandwidth from a purely commercial perspective.

The argument for a wholesale monopoly fixed network largely relies on the proposition that fixed telecommunications is a natural monopoly in much the same way that electricity, water, and sewage networks are natural monopolies. Natural monopolies are defined by large economies of scale that have constantly reducing costs per quantity of the product or service supplied. The fixed access telephony network was once such a natural monopoly (Davidson, 1982 [45]) and unfortunately this is an anchor that continues to weigh down the characterisation of fixed telecommunication networks as natural monopolies.

The digital computing and information revolution has fundamentally changed the monopoly characteristics of the fixed telephony network. This revolution has created new technologies that increase the demand for bandwidth and the means to supply such bandwidth. On the demand side, there is a huge wealth of information that is now digitised and available on demand over the internet, with the transition to online video being the most obvious and largest driver. This new wealth of information drives demand for more bandwidth. There are many competing technologies on the supply side – e.g. DSL, G-Fast, GPON, DOCSIS, 3G, 4G, 5G. Wireless technologies not only increase the supply but also the locations where bandwidth can be consumed. The end result is that the copper fixed line telecommunication networks are no longer natural monopolies – their costs per unit of bandwidth are increasing rather than decreasing as more bandwidth is being consumed. But new entrants can build and operate networks using new technologies that can deliver the higher quantities of bandwidth demanded at cheaper per unit costs than the old copper monopoly network. The end result is competition can and does drive network investment to satisfy the higher demands being placed on the networks and new entrants can do this more efficiently than the incumbent network. The incumbent, seeing this as a threat, will invest as well, sometimes in a timely manner and hence head off the competitor or sometimes too late in which case the competitor will survive and become a viable longer-term player.

That broadband networks are not everywhere natural monopolies has been economically postulated since the very early days of broadband (Faulhaber & Hogendorn, 2000 [46]). Empirical research supports the view that access regulation of monopolies discourages investment in broadband networks and hinders infrastructure competition (Grajek & Roeller, 2012 [47]). Furthermore, separate empirical research highlights a positive correlation between infrastructure competition policies and broadband penetration (Bouckaert *et al.*, 2010 [48]). This same research, published during the critical period when the Labor NBN policy was being first bedded down, showed that markets relying on retail competition (what the research referred to as service based intra-platform competition) had a negative correlation with broadband penetration (i.e. the NBN model). A third model of facilities-based intra-platform competition, analogous to Australia's experience with the unbundled local loop and DSL investment by the service provider, had an insignificant effect on broadband penetration

The European Union identified the prospects for infrastructure competition between cable TV and telecommunications companies in 1998 when it advised regulators of the dangers of incumbent telecommunications operators owning cable TV networks (EU, 1998 [49], para 7). The German and Portuguese markets were examples where regulators took active steps to force the incumbent monopoly to divest itself of its HFC cable businesses during the early and mid-2000s.

Australia's reluctance to embrace infrastructure competition and ongoing acceptance that fixed telecommunications is still a natural monopoly stems largely from the Telstra-Optus cable TV wars of the 1990s described above. The financial losses incurred by both companies are said to show that the market cannot support two competitors. This view only looks at the issue from a shareholder perspective and does not consider the consumer benefits. Despite the initial losses, the two networks have remained in operation with their revenues presumably exceeding their operational and incremental capital costs. It is only under the NBN Co monopoly that the networks have come under consideration of being decommissioned, although the Telstra network is planned to be used by NBN Co. Hundreds of thousands of consumers have benefited from the higher speed broadband available on these networks. This consumer benefit far outweighs the original losses, which have been reduced by subsequent positive cashflows to both companies from these networks. In fact, David Thodey, a former CEO of Telstra, described its Foxtel investment as "the best thing we've ever done" (AFR, 2012 [50]).

Far from being proof of the natural monopoly, the Telstra-Optus cable TV wars highlight why infrastructure competition should continue to be pursued to the benefit of consumers. The horizontal, rather than vertical, separation of Telstra, as advised by the ACCC in 2003, would have fundamentally changed Australia's fixed telecommunications trajectory.

In summary, the main lessons that should be taken from the last 30 years of Australia's fixed telecommunications market development are:

1. Fixed telecommunications is no longer a natural monopoly (as it was under the century-old telephony service model until the 1980s) due to major advances in the technologies in the digital era.

2. The information economy has created a large increase in the demand for bandwidth but a monopoly provider has limited economic incentives to invest to create more supply, since profit maximisation occurs at lower supply levels than in a competitive market.
3. The structural separation of Telstra and creation of a wholesale-only NBN Co has not resulted in more aggressive retail competition, rather the intensity and scope of retail competition has reduced with a focus on price rather than quality.

To finish this section, I would like to present a hypothetical counter-factual scenario of what could have been achieved if Telstra had been forced to divest its HFC network in 2003:

1. Telstra would have sold the HFC network and its 50% stake in Foxtel to News Corporation.
2. Telstra would have commenced the build of an FTTN network in the mid-2000s and become a content aggregator using IPTV technologies to compete with Foxtel.
3. Foxtel would have launched DOCSIS 3 – 100 Mbps services in the late 2000s.
4. Telstra would have commenced upgrades from FTTN to FTTP in the early 2010s.
5. Foxtel would have increased its HFC footprint to grow its broadband market share.
6. Optus, AAPT, TPG Telecom would have still been successful in retail market on the back of Telstra's wholesale and unbundled local loop products.
7. Australian Government would have focussed government funding on regional and remote communications where competition did not encourage investment by the private sector.

The above scenario has occurred in many markets where cable TV and traditional incumbent operators have been in competition. The closest comparison to Australia is Canada where Bell Canada is now rolling out FTTP networks to compete with DOCSIS networks supplied by Rogers and Shaw Communications.

However, instead of the above, Australia's fixed telecommunications market faces similar conundrums as in 1988 when Telecom Australia was Australia's monopoly telco Government Business Enterprise, pondering how it will survive in the future as the new digital technologies unleash a range of innovation that will likely disrupt it in many unpredictable ways. The current market only has the veneer of competition as four retailers spar with NBN Co, which largely sets the parameters that determine the quality and pricing received by the end user. NBN Co, the new Telecom Australia, is restricted by politics and its wholesale remit confronts a future where its own wholesale customers can use new 5G wireless technologies to cherry pick and disrupt its business model.

Australia's Bush Telecommunications Problem

Australia's unique geographic circumstances are often raised as the reason why the fixed telecommunication market is so hard to fix. Despite Australia being one of the most urbanised populations in the OECD, the large land mass and remote populations do make provision of telecommunication services to the "outback" or "bush" costly and largely uneconomic without a subsidy of some kind.

Prior to its privatisation and deregulation, Telecom Australia was charged with managing this problem and effectively absorbing the losses in regional areas by making higher profits in urban areas – that is, via a hidden internal cross subsidy. After deregulation in the 1990s, attempts were made to expose this cross subsidy via the Universal Service Obligation (USO) levy system that applied to all operators to compensate Telstra for its losses. The funding arrangements became controversial and politicised during the period when the Howard Government was seeking full privatisation of Telstra (Fletcher, 2015 [51]). Disputes over the quantum of the subsidy led the Howard Government to simply impose a cap on the total levy. As a result, Telstra had no commercial incentive to improve regional telecommunication services and, after many regional telecommunication enquiries, there were still high levels of complaints regarding the quality of service provision in regional Australia (Coutts, 2015 [52]).

Competition can only work to drive investment in geographic areas where density is high enough to sustain more than one operator. It cannot work where telecommunications is fundamentally uneconomic or where the revenue can only support investment and operations by one operator. Hence, a subsidy arrangement of some kind is necessary to create conditions for improved telecommunications in regional and remote areas.

However, the NBN model, with its commitment to universal wholesale pricing, has simply reverted back to the old Telecom Australia model prior to the introduction of competition. There is no commercial incentive for improving Australia's regional telecommunications after the initial fixed wireless and satellite services are put in place. Regional communities must rely on raising the profile of their complaints about service levels in order to get attention and funding via publicity of these issues,

as evidenced by the recent demands for upgrades to the NBN fixed wireless network ([iTnews, 2018a](#) [53]).

A Regional Broadband Service levy has been proposed to require fixed competitors to NBN Co to contribute to some of the cross-subsidy provided by NBN Co. The proposed levy amounts to approximately 10% of the retail broadband price of \$70 per month; however, because of its narrow incidence, it will raise little actual revenue (\$40 million in first year) ([Computerworld, 2016](#) [54]). Its main affect is thus to suppress competition rather than assist funding of NBN Co with its regional USO obligations.

To be effective, a levy must be broadly applied and raise substantial funds at minimal impact to competition in the industry. A 2.5% levy on the entire telecommunications industry's retail revenue (mobile and fixed) would raise approximately \$1.0 billion per annum. These funds could be used to establish a regional telecommunications investment fund that is dedicated to the uneconomic parts of the Australian telecommunications industry (mobile and fixed), addressing the problems on a sustainable basis into the future. A publicly accountable and ring-fenced fund that was dedicated to improving the telecommunication services in uneconomic areas could de-politicise the issue of regional telecommunications. The funding could also be competitively disbursed in ways that promote efficient investments and operations to ensure all remote and rural Australians benefit, rather than just those in marginal electorates.

NBN Reform Options

This paper has focussed on the mistakes made during the 30 years of reform of the Australian fixed telecommunications market. The big question is: can policy makers learn from these mistakes and create a framework for investment and improved performance of this market?

As described, NBN Co is facing many challenges that will need significant changes to address them. The most pressing are as follows:

1. Revenue shortfalls due to missed forecasts of ARPU (average revenue per user) are likely to mean negative cashflows will continue indefinitely.
2. Competition from 4G and 5G wireless networks is likely to lead to customer losses and more capital expenditure to differentiate service offerings and retain customers.
3. Regional services will need to be upgraded as capacity limitations in fixed wireless and satellite continue.

The current NBN Corporate Plan assumes positive cashflows of \$0.1 billion in FY22 ([NBN Co, 2018](#) [33]). However, a more realistic scenario would assume that ARPU does not increase further (i.e. remains at \$44 per month), loss of 10% of customers to 5G along with \$0.3 billion extra of capex for regional networks: then, the FY22 negative cashflow is \$1.5 billion per annum. This may improve after the final Subscriber Payments are made to Telstra and Optus but is likely to still involve losses of approximately \$1.0 billion per annum. A write-down of the government's investment, as canvassed by Standard & Poors (see above), is in line with these more realistic financial metrics for NBN Co. Labor's Opposition Spokesperson on Communications, Michelle Rowland, has publicly stated that Labor is "keeping its options open" in respect of a write-down and "there is no way NBN Co is going to meets its average revenue per user forecast" ([The Australian, 2018](#) [55]).

However, a write-down is also likely to trigger calls for NBN Co to lower its wholesale prices below current levels. The linkage between lower NBN Co prices and a write-down has been made by both industry participant and regulators. Bevan Slattery, founder of Pipe Networks, Superloop, NextDC and Megaport, has consistently called for a write-down in order to reduce NBN Co's wholesale prices ([Slattery, 2018](#) [56]; [AFR, 2017a](#) [57]). In its draft report for its Communications Sector Market Study, the ACCC called on the government to consider debt relief, asset revaluation and direct budget financing in order to allow NBN Co to lower its prices ([ACCC, 2017](#) [58], p. 133; [AFR, 2017b](#) [59]). Telstra, Optus, Vocus, Macquarie Communications and Regional Development Australia (NT) all supported the ACCC's draft recommendation, although push-back from the Department of Communications resulted in the ACCC publishing a "slightly toned down" recommendation ([AFR, 2018b](#) [35]; [ACCC, 2018](#) [39], p. 103-104) in its final report. Telstra's CEO, Andy Penn, has compared NBN Co's ARPU of \$44 per month to the charges the ACCC has approved for Telstra's wholesale prices of approximately \$20 per month. He has called for a reduction of more than \$20 per month in NBN Co's charges ([iTnews, 2018b](#) [60]).

From a financial perspective, a fall in NBN Co's ARPU of \$1 equates to an approximately \$100 million per annum fall in cash-flows in FY22 ([Sydney Morning Herald, 2018](#) [61]). Hence, a reduction in NBN Co's ARPU of \$10 per month (or half of the reduction called for by Telstra's CEO) would result in a further reduction of \$1.0 billion per annum in NBN Co's cashflows.

A summary of the impacts described above on NBN Co's financials is presented in the following table.

Table 1: NBN Co Financials in FY2022

	FY19 Corp Plan		Realistic Scenario		Decrease in ARPU of \$10 Scenario	
Revenue	\$	5.6	\$	4.3	\$	3.3
Operating Expenditure	\$	(2.7)	\$	(2.7)	\$	(2.7)
Subscriber Payments	\$	(0.4)	\$	(0.4)	\$	(0.4)
Capital Expenditure	\$	(1.2)	\$	(1.5)	\$	(1.5)
Interest & Working Capital	\$	(1.2)	\$	(1.2)	\$	(1.2)
Cashflow	\$	0.1	\$	(1.5)	\$	(2.5)

While the focus of much of the NBN Co financial debate has been on the possibility of a write-down of the government's investment in NBN Co, a bigger concern going forward will be the weakness of its underlying cashflows, which are linked with its ARPU and take-up projections. If these projections are not realised, then NBN Co will need to cut operational and capital expenditure in addition to making purely financial adjustments. Any such reductions are likely to have significant impacts on the quality of the service provided and the investment in new technologies and deeper fibre deployments.

This financial reality will be a big factor in determining the next possible steps for NBN Co.

Gregory has outlined four possible options for reform of NBN Co as it approaches the end of its build in 2020 ([Gregory, 2018 \[62\]](#)). I will consider each of these options in turn.

Option A: NBN Co not sold off

Under this scenario NBN Co would continue to operate as a wholly owned Government Business Enterprise.

As discussed above, NBN Co will most likely be operating with negative cashflow and require regular government equity and/or debt to be able to continue operating. A write-down of the government's equity to less than \$20 billion is likely – producing a one-off hit to the budget bottom line of approximately \$30 billion. Cuts in operational expenditure will be drastically needed to avoid the need for further government funding just to keep NBN Co operating.

Further investment in new fibre infrastructure will be politically contested and subject to the fiscal constraints of the Australian Government. If the government does provide funding, it will need to be as a grant and not as an equity investment (i.e. on budget). However, fibre investment will be vital to resist competition from wireless broadband operators in key urban markets.

While NBN Co has provided mobile backhaul services in regional “mobile blackspot” areas ([iNews, 2017b \[63\]](#)), additional investment in metropolitan fibre to assist mobile operators with fibre infrastructure for 5G build-outs will raise large conflicts within NBN Co, as such investments will actually increase competition at the residential customer level. For every extra revenue dollar NBN Co gains from servicing mobile operators with 5G, it runs a significant risk of cannibalising more of its wholesale fixed access revenues. As a result, any such mobile backhaul service arrangements are likely to require substantial co-investment from mobile operators who will require exclusivity for such infrastructure. Such arrangements will be difficult to construct to avoid contradicting NBN Co's non-discrimination obligations. A mixture of policy, commercial and competitive tensions will likely mean this path will remain in the “too-hard basket” as it has been for NBN Co in its existing deliberations about providing mobile backhaul to the mobile operators in metropolitan areas.

The ability for NBN Co to invest in uneconomic areas will be heavily constrained by its weak financial position. Its ability to cross-subsidise the costs of regional telecommunications by charging higher fees in urban areas will come under pressure, given its likely ongoing financial challenges.

In short, this option is only viable if the Federal Government is prepared to commit ongoing regular funding contributions to improve NBN Co's competitive position and sustain its operational capability. After a decade of funding NBN Co, it will be difficult for any political party to request taxpayers to continue to pour money into NBN Co with no prospect of any return. Higher pricing will be both politically untenable and likely to lead to greater loss of end users to the wireless broadband market.

In the unlikely event that NBN Co is able to reach a position of positive free cashflow, then, if directed by its Minister shareholders, it could use all profits to invest in upgrading its network. These upgrades are unlikely to result in significant increases in revenues, as retailers will continue to compete on price rather than innovative and/or higher quality services as has already been seen to date given the limited retail competition.

As a result, whether NBN Co is financially viable or not, upgrades to the network will be political rather than commercial decisions. Given the normal changes of political cycles and Australian governments and the manner in which politicisation of telecommunications and broadband has led to the current predicament, this future path is fraught with likely disappointment.

Option B: Sold off as a single entity

Private ownership in and of itself does not change the financial conditions faced by NBN Co. Regardless of the price paid, NBN Co will still have similar revenues and overall cashflows as under government ownership, with the changes likely to be mainly at the operational expenditure line as the new owner seeks to operate as a leaner, fitter outfit. This will have consequences for service quality. This option assumes that the sale would not change the regulatory settings under which NBN Co must offer uniform wholesale pricing supervised by the ACCC, and that any of the current retail service providers are not able to acquire NBN Co and seek to exploit synergies with their retail operations. Any relaxation of these rules would simply move NBN Co closer to the complaints made against the Telstra model that were the original reason for pushing structural separation of Telstra and the creation of NBN Co.

A new private owner would have only one reason to invest on its own account in more fibre infrastructure, namely to make profits by retaining revenues against competition from other operators (fixed or mobile). Some investment may be possible in partnership with mobile operators in the private ownership model, if NBN Co can strike innovative deals to share some of the revenue with the mobile operators. However, NBN Co's non-discrimination obligations would need to be relaxed considerably to enable this approach to proceed.

In essence, this path is similar to the privatisation of Telstra in the 1990s and 2000s, which, combined with its market dominance and resulting monopoly position, clearly hindered investment in the fixed broadband infrastructure market rather than the opposite.

In short, this pathway creates some opportunities for lower operational expenditure but will set up a rerun of long-lasting regulatory and policy battles that occurred during the Telstra privatisation period. Private owners will seek to remove regulation over pricing and seek to dismantle existing non-discrimination and other regulatory safeguards to find new ways to grow profitability. Investment in more fibre may occur in some areas where the economics are favourable and competition demands it to retain market share, but otherwise government funding will be necessary to push more investment.

Australia's regional telecommunications market will continue to suffer, as it has for many years, as the new private owners seek to minimise costs where there is no prospect of profits or returns.

Option C: Disaggregated technology footprints sold off separately

This model has been recommended by the Government's Panel of Experts ([Vertigan, 2014](#) [64]) and also endorsed by the ACCC "to provide a market structure that will facilitate greater infrastructure-based competition" ([ACCC, 2018](#) [39], p. 5). Despite these recommendations, there has been little discussion on how this model would work in practice.

An essential element of this model would be the need to create competitive tension between companies responsible for the different technology footprints. Currently, NBN Co's technology planning assigns premises to the different technologies in a way to minimise the capital cost but still meet its Statement of Expectation goals. Under the FTTP model, this was largely pre-ordained, with FTTP going to the least expensive 93% of premises and with Fixed Wireless and Satellite to cover the rest.

Under the Multi-Technology Model, there are now options for FTTN, FTTB, FTTC (i.e. FTTx), HFC and even Fixed Wireless within the previous FTTP footprint. The FTTx options are largely dependent on copper loop lengths and the presence of multi-dwelling units. The HFC is restricted to existing Telstra HFC network coverage.

An important fact is that the Telstra HFC network is not uniform in its coverage of approximately three million homes within the more affluent suburbs of Melbourne, Sydney, Adelaide and Brisbane. HFC is a residential service that avoided many multi-dwelling units, due to building access issues, as well as commercial business areas for which HFC was technically not suitable. As a result, the FTTx options are mostly being used to fill these "holes". It also means that the FTTx services can be easily expanded into the HFC areas by connections to the relevant copper cables that also existing in parallel with HFC to all premises.

Furthermore, NBN Co's Fixed Wireless network covers many of the outer suburban areas of Australia's metropolitan and regional cities using both 2.3 and 3.5 GHz spectrum. This coverage naturally also extends into the FTTx coverage areas. With capacity upgrades, the Fixed Wireless can compete with the FTTx coverage areas. Even the Satellite service will have spare capacity in some beams, which could be used to service customers in some larger regional towns that may currently be assigned to the FTTx technologies.

As a result, there is significant overlap between the HFC, FTTx and Fixed Wireless technology footprints that can be used as a starting point for creating competitive tension.

The end game would be to have separate ownership of firstly HFC, secondly FTTx (i.e. FTTP, FTTN, FTTB and FTTC) and a third entity owning access using Fixed Wireless and Satellite links together. I will refer to these three companies as NBN_HFC, NBN_FTTx and NBN_Wireless for simplicity.

The transition to this end game would need to be gradual to maintain operations and reduce disruptions. NBN Co could be split operationally into these three groups before the end of the build and without changing ownership structures before a Productivity Commission inquiry, both of which are currently required under existing NBN legislation (Cth, 2010 [31]). An NBN_Core operating entity could be set up to manage the Transit network and IT systems and hold the key relationships with Telstra for infrastructure leasing purposes. The key requirement is that each operating entity would start planning and augmenting its network separately and engaging separately with retail service providers.

After the build is finished and a Productivity Commission inquiry is held, these entities could commence taking private equity investment, which would involve legal separation of these entities. Ownership restrictions would need to be put in place to ensure no one company can take control of multiple entities. Subject to recommendations of the Productivity Commission and the ACCC, retail service providers would be able to invest in these entities as long as competition issues were also addressed.

Telstra's proposed InfraCo (Telstra, 2018 [65]) may have a role and could be merged with NBN_Core in a way that enabled open access to ducts and exchanges for the NBN operating entities and also for mobile operators looking to expand their fibre networks. Regulatory oversight would still be necessary to ensure equal and fair access to duct and exchanges for the NBN operating entities and new entrants. The transition would be gradual and managed with oversight and direction from policy makers and competition regulators.

Financially, the NBN entities as stand-alone operations should be encouraged to compete and stand on their own without government support. Private investment should be used to raise funds for network expansion. NBN_Wireless would need access to the regional telecommunications fund described above to subsidise its business for the uneconomic areas it is required to serve. NBN_FTTx may also need access to these funds to improve its service in areas where it lacks economic reasons to invest.

A further option may be to break NBN_FTTx into separate geographic entities to make sure this company is not too large and able to dominate the other companies, like Telstra has done in the past. An NBN_FTTx_South (covering Victoria, Tasmania, South Australia and Western Australia) and NBN_FTTx_North (New South Wales and Queensland) may be necessary to cover this eventuality.

The valuation of new equity provided by the private sector would need to be realistic and should follow a competitive bidding process wherever possible to ensure valuations are reasonable. In the early stages, it would be expected that investors would receive better valuations given the risks involved. Government's shareholding in the entities would reduce as new equity is raised. Eventually, once the business model is proven and risks are reduced, the entities can either be listed or sold in ways that can eliminate the government shareholding altogether.

Option D: Disaggregated technology footprints (excluding satellite and fixed wireless) sold off separately

This option is essentially the same as Option C with government retaining full ownership of NBN_Wireless.

This option may be preferable to Option C given the need for ongoing annual subsidies to sustain the uneconomic operations and ongoing investments for these technology footprints. The Government would need to manage the ongoing industry levy and distribution under Option C and it may be more efficient and have greater accountability if this is continued to be held in a Government Business Enterprise. This will reduce the risk that NBN_Wireless diverts funds received from the universal service fund for use in areas where competition, rather than subsidies, should drive investment. Taxpayers may also be more comfortable having the levy-funded entity responsible via normal government expenditure scrutiny processes such as parliamentary committees and enquiries.

However, this entity should be able to compete for business, wherever possible and sustainable, to supplement its revenues and thus reduce the burden on taxpayers and the industry from the levy.

Conclusion

The Australian fixed telecommunications market has suffered through 30 years of reform that have involved significant policy

mistakes and the politicisation of Telstra's privatisation and the investment needed for Australia's telecommunications infrastructure. The end result is that Australia's fixed telecommunications is in a very similar position to what it was in the 1980s at the beginning of the reform process, with a government-owned monopoly attempting to survive as consumer demands grow and new technologies are deployed by competitors.

Only a thorough reform of NBN Co can address the issues and increase infrastructure competition as the driver of investment and improving customer outcomes. A sustainably financed regional telecommunications fund is also needed to ensure all Australians have access to the necessary services and infrastructure to participate in the 21st century's network economy.

In the past, politicians and policy makers have made short-term decisions that have given preference to shareholders over consumers and resulted in taxpayers being required to support investments in metropolitan areas that could otherwise be financed by private investment and driven by infrastructure competition. Politicians and policy makers need to recognise these mistakes and make long-term decisions that benefit consumers rather than shareholders, by bringing infrastructure competition to be the driving force for new fibre investments and by reserving government taxpayer funding for those regional areas where it is fundamentally uneconomic for infrastructure competition to be the driver of investment.

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Cite this article as:

Gary McLaren. 2018. *What Now for Australia’s NBN?*. *ajtde*, Vol 6, No 4, Article 162. <http://doi.org/10.18080/ajtde.v6n4.162> [122]. Published by Telecommunications Association Inc. ABN 34 732 327 053. <https://telsoc.org> [123]

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