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## The NBN from 2009 to 2016 and Beyond

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#### **Abstract**

On 22 June 2016, Mike Quigley, the founding CEO of NBN Co, gave an address to TelSoc on his insights into, and predictions for, the Australian National Broadband Network (NBN). This article provides a brief summary of his presentation and a commentary on some of the issues raised. Mr Quigley contended that, if there had not been a hiatus and change of direction after the election of the Coalition government in 2013, the rollout of the NBN would have been completed by December 2021 within a peak funding of \$45 billion, broadly in accord with NBN Co's plans from September 2013. A major part of the original plan was for fibre to 93% of existing premises within the fixed-line footprint of the NBN. He noted that the replacement of the fibre plan in 2013 with a multi-technology mix had slowed deployment. He showed that the Coalition's assertions while in opposition about the cost and take-up of the NBN had not proved true up to December 2015. Mr Quigley's critique also raised a number of issues about the future direction of the NBN, particularly with regard to a future upgrade of technology and greater capacity needs.

# Introduction

On 22 June 2016, Mike Quigley, the founding CEO of the NBN Company (NBN Co) from July 2009 to September 2013, gave an address at the University of Melbourne sponsored by TelSoc and the Melbourne Networked Society Institute on 'The NBN: 2009 to 2016 and Beyond'. For many in the audience, his presentation provided a devastating critique of the Coalition government's mishandling of the National Broadband Network (NBN) and the disinformation campaign that had accompanied the changes in technology direction for the NBN. The media presented the talk as an intervention in the Federal Election ([Knott 2016](#) [5]; [Adhikari 2016](#) [6]).

This article is a summary of Mr Quigley's presentation. His full speaking notes have been published elsewhere ([Delimiter 2016](#) [7]). The emphasis and the commentary here, however, are the present author's own. Mr Quigley's talk raised a number of issues about the current state and future direction of the NBN that should be further pursued.

## Nation-Building or Not?

Mr Quigley believed that, when he was CEO of NBN Co, he was 'managing a nation-building public project'. (All unattributed quotations are Mr Quigley's words.) He quoted Felix Rohatyn ([Rohatyn 2011](#) [8]) on the US experience and asserted that 'public entities . . . can efficiently build economically and socially valuable infrastructure for the public good'. He emphasised that many of the staff in NBN Co were inspired by this vision and worked hard and innovatively to achieve it. He claimed he was approached by people who were willing to work without pay to support the NBN.

While nation-building was clearly a driver of the original NBN concept in 2009, it was not part of the Liberal Party's view. When the Liberal Party came to power in September 2013 as the senior partner of the Coalition Government, it decided to continue with a less capable NBN that could give a nudge to broadband availability in Australia, while leaving any future heavy lifting to competitive pressures. This was in line with Telstra's original proposal to the Government to co-invest in a fibre-to-the-node broadband network. The difference in attitude to the NBN between the main political parties has been, and remains, a contentious issue in the telecommunications industry and federal politics.

The Liberal Party's attitude to the NBN was accompanied by a disinformation campaign about the benefits, costs and timetable of the NBN. Much of Mr Quigley's speech was directed to countering the misconceptions promulgated by this campaign with a point-by-point examination of actual outcomes. He noted, however, that the campaign had been pervasively effective.

Mr Quigley told of visiting 'a very senior public servant in Canberra' after 'NBN Co had been running for a few years' (presumably 2012 or 2013). The public servant had asked why the NBN was 'so over budget'. At that time, according to Mr Quigley, the operating costs, capital costs and peak funding were 'virtually unchanged from the original projections'. The 'senior public servant' had been misled by the disinformation campaign.

## NBN Technology

The NBN access technology plan that Mr Quigley was working to consisted of three major parts:

- Fibre-to-the-Premises (FTTP) for most homes and business premises (93%) in Australia;
- Fixed Wireless access for a small proportion of premises (4%) in regional areas;
- Satellite access via some purpose-built satellites for premises (3%) in remote areas.

The vast majority of the access build was FTTP. Mr Quigley described it as having two parts: a 'greenfields FTTP' for newly built premises; and a 'brownfields FTTP' replacing the current telecommunications networks to existing premises. He claimed that the greenfields FTTP solution was, in 2013, 'running below the budgeted cost and was keeping up with the growing demand from housing developers'. His main emphasis in the talk was on 'brownfields FTTP', as this had been the most contentious issue regarding technology.

Mr Quigley noted that, in addition to the access portion of the NBN, other essential technology successfully delivered during his time as CEO included:

- The transit network (consisting of more than 65,000 km of fibre links and about 1,000 access nodes) that connects the NBN access networks to the Points of Interconnection (Pols);
- The required IT systems, that never became a bottleneck to deployment?;
- A National Test Facility;
- A Network Operations Centre.

Mr Quigley's charts showed that, by September 2013, about 78 Pols had been integrated (out of the 121 mandated by the ACCC), about 45,000 Fixed Wireless premises had been covered, about 40,000 satellite premises had been activated and more than 60,000 new premises in greenfields areas had been passed by FTTP. This represented solid progress in the NBN rollout.

## The FTTP Rollout in Brownfields Areas

The 'brownfields FTTP' rollout has been the most contentious area of the NBN plan. It is the future rollout of this part of the NBN that has been replaced, after the NBN Strategic Review (NBN, 2013), with a mix of reusing the current Hybrid Fibre-Coax (HFC) networks, built by Telstra and Optus in the 1990s, and a new build of Fibre to the Node (FTTN), which reuses Telstra's copper distribution network. The debate over cost will be described in the next section, while here we discuss progress in the rollout itself.

Mr Quigley presented a chart of the numbers of premises passed by brownfields FTTP during his time as CEO. He noted, firstly, that they had set ambitious targets in the first Corporate Plan in 2010. They were 'perhaps' too ambitious? and were not achieved for brownfields FTTP. There were some trials in 2011, but the volume rollout did not begin until early 2012.

A major cause of the delay was the time taken to conclude a deal with Telstra for access to its ducts and other access infrastructure. This deal, including its approval by the ACCC, took longer than had been anticipated, and caused a delay of nine months in the schedule. Mr Quigley was silent on why the deal had taken longer to finalise than had been planned, but he outlined the complexity of it. He noted that a 'mandatory requirement in that original deal was Telstra taking responsibility for ensuring everything they provided to NBN Co was fit for purpose?'. In other words, Telstra was required to take on some of the project risk from NBN Co.

The rollout volumes rose from the start of 2013 and reached a peak of about 90,000 premises passed in the June quarter. After that, volumes declined again when a problem of asbestos in Telstra pits was discovered, leading to less than 50,000 premises passed in the December quarter. Telstra resolved the asbestos issue during the second half of 2013, but by September the Coalition Government had been elected and was de-emphasising FTTP.

While there was some pickup in the rollout in the March quarter of 2014, rollout volumes for the remainder of 2014 were below 60,000 premises passed as the NBN was replanned. With a new plan in place and a renewed emphasis on FTTP until the alternative solutions were ready, the brownfields rollout grew again in 2015, reaching a peak of 150,000 premises passed in the June quarter, before declining again as FTTN started to be rolled out.

Given the stop-start nature of this history, it is perhaps hard to predict what the future would have held if the FTTP rollout had continued. Mr Quigley noted that NBN Co would have needed only to double the peak rate of 150,000 premises passed per quarter in order to complete the rollout by June 2022, about six months later than forecast in 2013. He believed this improved rate could have been achieved and sustained.

During the question and answer segment at the end of the formal talk, one questioner asked for comment on the enormous difficulties in cost and schedule experienced by the construction companies engaged by NBN Co to build the brownfields FTTP. The questioner noted that all the companies had lost money. Mr Quigley's answer was enlightening. He suggested that the NBN was 'not a typical construction project?', more 'like a distributed factory?'. That is, one should treat the rollout like a production line, learning over time how to optimize the construction processes. He felt that the construction companies would have learnt how to do this but they were stopped before they became good at it.

What of the alternative technologies? The FTTN rollout has now started to ramp up (Mr Quigley's chart suggesting at a greater rate than was achieved with FTTP), passing about 300,000 premises by the March quarter of 2016 (and about 100,000 in the quarter itself). Under a Coalition Government, this rollout will continue, presumably with higher volumes each quarter for some months. The Labor Party alternative would see the FTTN rollout phased out and the FTTP rollout ramped up again, leading eventually to about 2 million premises passed by FTTP. Mr Quigley believed that a transition back to FTTP could be achieved with careful management.

Either government would reuse the HFC networks, both now to be transferred to NBN Co. The HFC transformation was not present in the March 2016 quarter figures, so the future trajectory of this rollout is very uncertain. Mr Quigley noted that the decision in 2010 to overbuild the HFC networks with FTTP was taken with awareness of ? just how much effort it would have taken to use this older infrastructure both in hardware upgrades and IT development?.

In order to include the HFC networks in the NBN, NBN Co has renegotiated its arrangements with Telstra. Mr Quigley noted that this has diluted the protections for NBN Co while reducing the cost exposure of Telstra. The cost and risk consequences of this will only become apparent in future years as the HFC is transformed. Telstra has been given a contract worth \$1.6 billion for planning and designing the HFC portion of the NBN.

## The Cost and Funding of the NBN

The cost of the NBN has been contentious since it was first mooted but the debate became seriously distorted when the Coalition, then in opposition, proposed a new model based on a multi-technology mix (MTM) in April 2013. This proposal would have peak funding of \$29.5 billion (as against NBN Co's estimate of \$45 billion) and would deliver at least 50 Mb/s to 90% of fixed-line premises by the end of 2019. This was fully two years earlier than under the then-current plan. But Mr Quigley noted that ?as we now know, those original MTM estimates were fiction?.

NBN Co's estimated completion date is now the end of 2020 and the peak funding is projected to be below \$56 billion, with a target of \$49 billion. Mr Quigley stressed that the cost and schedule changes were all due to the costs and timing of the FTTN and HFC rollouts, not due to the original FTTP costs. Indeed, the peak funding estimates had only risen from \$43 billion (the Labor Government estimate in April 2009) to \$45 billion by NBN Co's estimate in September 2013. Most of the funding increase, Mr Quigley claimed, was due to the inclusion of a deal with Optus for its HFC network closure, a change that improved the internal rate of return for the NBN project.

As part of its campaign to discredit the FTTP rollout and to justify a change of plan, the Coalition and the replacement NBN Co management put out a variety of estimates for the peak funding of an FTTP-based NBN. These ranged from an unlikely \$94 billion in April 2013 to \$64-\$73 billion in the *Strategic Plan* (NBN, 2013) of December 2013. There was also an estimate of \$74-\$84 billion in August 2015, but this turned out to be the cost of returning to the original FTTP plan after some years by replacing the FTTN build and the rejuvenated HFC. This variety of estimates, as Mr Quigley hinted, has sown confusion in the minds of many.

Based on current data, what should be believed about the peak funding estimate for the NBN? Mr Quigley believes the original NBN plan could have been delivered with peak funding of \$45 billion (the September 2013 estimate from NBN Co). His argument rests on analysing the three contributors to peak funding: cost, timing and revenue. We have already discussed timing in the previous section: a delay of one year to the original plan makes only a small difference to the cost of the ten-year project.

The cost per premises passed for the FTTP is critical. Mr Quigley noted that NBN Co's latest estimate of capital expenditure for brownfields FTTP is \$3,700 per premises. The Government has implied that this is \$2,000 more than planned, but the comparison is complicated by changes to accounting standards. NBN Co now reports costs differently from when Mr Quigley was in charge. His estimate is that the difference is more like \$500 per premises, which, if sustained, would lead to a blowout of \$5 billion. However, he believed that capital costs would decline. He noted that trials of ?skinny fibre? in Ballarat and Karingal had reduced costs by 12%. In addition to technology changes, there would also be operational improvements: he noted that Verizon in the US had reduced its FTTP costs by 38% in the years 2004-2006. Cost improvements are common in well managed network rollouts.

If the costs can be controlled, what of the revenue? The prices that NBN Co charges Retail Service Providers are set by a Special Access Undertaking approved by the Australian Competition and Consumer Commission (the Australian competition regulator). In June 2015, NBN Co reported Average Revenue Per User (ARPU) of \$40, which is higher than the \$39 predicted for the same date by Mr Quigley's NBN Co in 2013. ARPU in December 2015 was \$43. The actual figures are substantially higher than the estimates made by the Coalition in April 2013 when in opposition.

Take-up rates are less certain but are holding up. Mr Quigley believed that take-up in early FTTP sites had been over 70%. The NBN Corporate Plan now assumes a long-term take-up rate of 73% (for, Mr Quigley pointed out, an offering less attractive than FTTP), not much different from the 2013 estimate of 74%. Again, these numbers are higher than the 64% suggested by the Coalition in opposition.

One can conclude, therefore, that revenues would have held up in the FTTP version of the NBN, which, together with cost reductions for premises passed, would lead to a peak funding commitment of \$45 billion, as planned. Whether this would have come to pass we will now never know.

For the current, MTM-based NBN, the peak funding target is \$49 billion. The great imponderable in this is the integration and upgrade of the existing HFC facilities. The costs are still to be fully worked out as detailed design work progresses. The history of NBN costing would suggest that the costs have been underestimated. This could be material to the overall cost, as the HFC is a significant component of the current NBN, with about 3 million premises passed out of a total of 10 or 11 million.

## The NBN Satellites

The number of satellites to be launched to provide service to outer regional and remote premises has also been a matter of contention. Mr Quigley recalled 'hours spent in Joint Parliamentary committees defending NBN Co's decision to design and launch two satellites'. This was due to the then Opposition's assertion that they would not be fully utilised and were too expensive. In the event, however, the NBN Corporate Plan from August 2015 has confirmed that at least two satellites would be needed.

In answer to a question, Mr Quigley noted that the satellites, although 'very sophisticated machines', have a limited capacity. It was always expected that some spot beams would become exhausted. Mr Quigley suggested that, as the NBN is 'a huge cash-generating machine', NBN Co could eventually extend the footprint of the Fixed Wireless access to relieve some of this congestion.

## What the Future Holds

Whichever party is in government, Australia now will be provided with an NBN with a much lower proportion of FTTP than was originally envisaged. Whatever the technology, completing the full rollout by 2020 would be 'heroic'. Mr Quigley's estimate, given the current uncertainties surrounding the HFC component, is a completion date some time in 2022.

The rollout will probably continue to accelerate for some time to come and revenues for NBN Co will continue to increase. Capital costs of deployment per premises passed will eventually fall. Operating cash flows will be less than would have been achieved with the FTTP plan because maintenance costs for the FTTN and HFC will be greater than for FTTP.

The current NBN, as Mr Quigley noted, does not 'allow for any significant growth in demand over the next 10 or 20 years', which is 'incredibly short-sighted'. He claimed that the revised technology plan 'has turned out to be short-sighted, expensive and backward looking'. Meanwhile, others are turning away from FTTN in order to accommodate growth. He cited the examples of AT&T, which is facing demand in the US for faster broadband speeds than can be delivered with FTTN, and BT, which is under pressure from the British regulator, Ofcom, to take a 10-year perspective on fibre access. If the long-term vision for the NBN is 'a future-proof FTTP solution', it is 'now going to happen over a longer period and at a greater cost to taxpayers' than was envisaged in 2009.

The effective disinformation campaign ? or, if one prefers, the NBN estimates put forward in good faith but which later largely proved misleading ? mounted by the Coalition will continue to colour perceptions of the NBN, no matter how well it performs and how efficiently NBN Co executes the plan. The nation-building vision of the NBN, whereby Australia would have been equipped with modern, high-speed Internet infrastructure, almost certainly has been lost.

One aspect of this sorry saga that will continue to have repercussions, but was not mentioned by Mr Quigley, is the *ad hominem* attacks made on his reputation by the Coalition. Mr Quigley rose in Alcatel to be one of the most influential Australians ever in the global telecommunications industry. That his reputation was attacked in the pursuit of political advantage is to be deprecated. It can only be hoped that other, well experienced Australians will not be deterred by his experience from contributing their knowledge and leadership to future Government projects.

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