

Chapter 3

Fixed wireless and satellite

3.1 The Fixed Wireless and Satellite Review (the FWS Review) was undertaken by NBN Co between February and April 2014. A redacted version of the final report was released publicly on 7 May 2014.¹

3.2 NBN Co advised that the total cost of the FWS Review, as at 30 June 2014, was \$1.576 million.² This included payments to consultants Boston Consulting Group (BCG), who assisted NBN Co in the preparation of the report.

3.3 Like the Strategic Review, the FWS Review used NBN Co's 2012-15 corporate plan as the basis for its financial and operational comparisons.

Key findings of the Fixed Wireless and Satellite Review

3.4 NBN Co's previous corporate plans took a conservative estimate of NBN take-up in non-fixed line areas to allow for the potential of competition from fixed line broadband provided over Telstra's copper network in the fixed wireless and satellite footprint.³

3.5 However, the FWS Review's demand projections were more bullish. The review estimated that by 2021 there would be approximately 1.02 million premises outside the NBN fixed line footprint, approximately 8 per cent of the total rollout, an increase on the one million estimated in the 2012 Corporate Plan.⁴ The Review assessed that take-up of fixed wireless and satellite services by 2021 would be two to three times higher than the 22 to 25 per cent, or 230,000 premises estimated in the Corporate Plan, and that NBN Co should prepare to connect between 440,000 and 620,000 premises in the non-fixed line footprint.⁵ The FWS Review estimated that while the planned fixed wireless rollout could accommodate some of this higher demand, some 200,000 premises could not be served with the currently-forecast infrastructure.

3.6 In relation to satellite, the FWS Review assessed that 'all technology choices have been made and the technical system is generally well designed' to meet the NBN's originally specified needs, and that the Long Term Satellite Service (LTSS) would offer an advanced satellite service by global standards, while remaining subject

1 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, p. 1.

2 NBN Co Limited, answer to question on notice (Question 7) following the 11 July 2014 public hearing.

3 For example, NBN Co Limited, *Corporate Plan 2013-16* (Version 13), p. 100.

4 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, p. 9.

5 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, p. 9

to constraints of latency and capacity common to all satellite services, that needed to be carefully managed.⁶

3.7 The FWS Review identified, however, eight risks of delay in the launch of the LTSS beyond the project's contingency planning, cumulatively creating a likelihood that its launch would slip from the planned 2015 timing to sometime in 2016. The Review recommended 14 specific actions and two timeline changes to mitigate these risks,⁷ but even with mitigation, believed it most likely that the LTSS would commence in early 2016.

3.8 The FWS Review explored four possible scenarios for the fixed wireless and satellite rollout to address the coverage and capacity deficiencies identified:

- Scenario 1: an increase in fixed wireless base stations to the number necessary to provide a wireless service to all premises not covered by the present fixed line footprint or the two planned satellites;
- Scenario 2: extending the FTTN footprint where practically and economically feasible, to reduce the extra demand on the satellite and fixed wireless rollout;
- Scenario 3: the construction by NBN Co of a third satellite for launch in 2020. Not all of the capacity of a third satellite would be needed for the NBN; NBN Co could then seek to commercialise the spare capacity to offset costs; or
- Scenario 4: NBN enters a partnership to access the capacity it needs on a third satellite through arrangements with a commercial partner, rather than building and owning the third satellite itself.⁸

3.9 Weighing the costs and benefits of each, the FWS Review concluded that Scenario 2 was likely to be the best option, considering both financial and broadband quality issues.⁹

3.10 Implementing scenario 2 would involve an extension of the FTTN footprint to cover three per cent of the premises presently in the non-fixed line footprint. Of the

6 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, pp 34, 43. In particular, the FWS Review noted that the capacity and coverage of each of the satellites' 101 beams had been fixed during the design process, and could not later be altered or redirected between beams. This meant that if usage patterns varied significantly from those anticipated once the service was live, some beams may experience congestion while others would have spare capacity. In addition, where take-up on the satellite service was high, it would not be possible to upgrade the service or the throughput per user on this technology: p.39.

7 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, pp 39–40. The timeline recommendations included that the second satellite be launched 12, rather than six, months after the first.

8 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, p. 11. The Review noted that in relation to Scenario 4, there was very limited capacity on existing satellites operating over Australia to support a residential broadband service, so this would likely require the construction and launch of a new satellite in partnership with a commercial entity.

9 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, pp 14–15.

remaining premises, fixed wireless would service 57 per cent, necessitating an increase in the number of fixed wireless base stations from 1400 to 2700. Satellite broadband would cover 40 per cent.

3.11 The FWS Review estimated that with the assumed increase in take-up, revenue would increase to around \$1 billion by 2021, but the fixed wireless and satellite programs would inevitably continue to be loss-making, with implementation of Scenario 2 costing \$5.2 billion by 2021 (\$1.2 billion more than envisaged in the 2012 corporate plan). The Review advised that these cost estimates were consistent with those reached for non-fixed line services in the Strategic Review, and as such, an increase in NBN Co's peak funding requirements was not anticipated to be required under this approach.¹⁰

3.12 Scenario 4 was the FWS Review's second-preference option, requiring \$200 to \$300 million less capital expenditure than Scenario 2, but placing some 70,000 more premises on the satellite service, with trade-offs for broadband quality given the latency and capacity constraints of satellite. Under this scenario, satellite would cover 47 per cent of the current non-fixed line footprint. The Review also estimated that Scenario 4 would take two years longer to complete than Scenario 2.¹¹

3.13 The FWS Review recommended that NBN Co make a decision within six months about whether to proceed with Scenario 2 or 4. At the time of the report's public release, NBN Co's Chief Executive Officer, Mr Bill Morrow, indicated that the company would extend the FTTN rollout, rather than pursuing a third satellite.¹²

3.14 The FWS Review further observed that the interim satellite service (ISS) was oversubscribed due to high demand. This was degrading services to end-users and creating issues for NBN Co in managing satellite capacity.

3.15 The FWS Review recommended six changes to NBN Co's wholesale product offerings for the LTSS to address this issue.¹³ These included specific capacity allocations and tools to monitor and control usage. The Review proposed that a standard product be issued based upon current performance efforts and speed and capacity assessments, possibly offering a standard 20 gigabytes per month at speeds of 12/1 megabits per second (Mbps), at a universal national wholesale price comparable with fixed line services, and with potential upgrade options offered within the fixed capacity of the satellite beams.¹⁴ The Review also recommended that a specific

10 NBN Co Limited, 'Broadband connections in the bush to triple, says NBN report', Media Release, 7 May 2014, p. 2.

11 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, p. 90.

12 'NBN Co rules out third rural satellite', news.com.au, 7 May 2014, at <http://www.news.com.au/national/breaking-news/nbn-co-rules-out-third-rural-satellite/story-e6frku9-1226909264082>

13 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, Chapter 5. The Review also recommended analogous product changes for fixed wireless, as it is also a capacity constrained technology: see Chapter 10.

14 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, pp 45–46.

product be created to ensure an appropriate level of service for public interest premises in the satellite footprint, such as schools.¹⁵

3.16 The FWS Review also offered some critique and recommendations relating to NBN Co's corporate management, noting a need to improve decision-making processes, and communication both internally and with industry partners. Some suggestions arising from discussions with industry partners were also canvassed, such as more active pursuit of arrangements between NBN Co and other providers for sharing wireless towers, to support improved mobile coverage in rural and regional Australia.¹⁶

Issues arising from the Review

Wireless and satellite take-up

3.17 The FWS Review explained that there were three factors behind the 200,000 premises shortfall it identified in the non-fixed line footprint:

- the 'spectrum gap' presently preventing fixed wireless service to approximately 80,000 premises;
- experience to date (including in the ISS rollout) indicating levels of demand likely two to three times higher than projected in the 2012 Corporate Plan; and
- the existing fixed line footprint having reduced since the satellite service was designed.¹⁷

3.18 In relation to expected demand, the FWS Review's forecast was a dramatic increase on the more conservative estimate of 24 per cent take up (230,000 of 974,000 premises) in the 2012 NBN Co corporate plan,¹⁸ and a similar projection of 24 per cent of one million premises in the draft 'Version 13' corporate plan prepared in 2013 but not adopted by the NBN Co Board.¹⁹

3.19 The FWS Review acknowledged that the premises data it used for its projections were more up to date than those available for earlier projections, and showed a steady growth in the number of relevant premises in the non-fixed line area. However, population growth was not the primary driver of increased demand:

the number of premises in the non-fixed line footprint is also driven by potential variations in the boundary of the fixed line footprint. Since the commencement of the rollout of the fixed line network, more detailed planning has been completed on an area-by-area basis and more

15 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, p. 93.

16 See NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, Chapter 12.

17 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, p. 84.

18 NBN Co Limited, *Corporate Plan 2012-15*, 6 August 2012, p. 75.

19 NBN Co Limited, *Corporate Plan 2013-16 - Working Draft*, at <http://www.docdroid.net/lfy9/nbn-co-corporate-plan-2013-2016-v13.pdf.html>, pp 100, 108.

information about the local conditions is gradually discovered. As a result the geographic boundaries that define which specific premises receive a fixed line service as opposed to a non-fixed service (fixed wireless or satellite), may change due to technical, practical or economic reasons. NBN Co has historically varied these boundaries substantially, and the net effect of this thus far has been to add a substantial number of premises into the non-fixed line footprint. As the detailed planning and construction of the fixed line proceeds, there is a risk that more premises may be moved into non-fixed line areas without careful consideration of the consequences, especially on satellite capacity by beam.²⁰

3.20 NBN Co advised the committee that:

During the two years since the release of Corporate Plan 2012–15, NBN Co has acquired sufficient data on actual take-up rates for the Fixed Wireless network and the Interim Satellite Service to provide support for much higher take-up expectations for both Fixed Wireless and Satellite networks including real world data from the ISS and the availability of fixed wireless in many areas. The take-up rates estimated by the Fixed Wireless and Satellite Review are based on the latest available broadband usage and service take-up data, including recent information on the decline in numbers of voice-only premises and on the usage of competing mobile broadband services in regional and rural areas.²¹

3.21 As noted, NBN Co's previous Corporate Plans took a conservative estimate of NBN take-up in non-fixed line areas to allow for the potential of competition from fixed line broadband provided by over Telstra's copper network in the fixed wireless and satellite footprint.²²

3.22 Acknowledging the difficulty and fluidity of satellite demand estimates, the FWS Review proposed that, in the event take-up did turn out to be lower than predicted, NBN could use the two satellites to cover a higher number of premises and reduce rollout costs accordingly by deferring building the least-economic fixed wireless base stations.²³

Fixed wireless towers

3.23 In September 2014 Mr Morrow described the NBN fixed wireless rollout as 'a standout performer', with construction on schedule and 'high end-user satisfaction'.²⁴

3.24 Implementation of the FWS Review would require a significant increase in the fixed wireless rollout, including in the number of towers to be constructed. NBN needs more towers than mobile networks do, because fixed wireless broadband

20 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, p. 25.

21 NBN Co Limited, answer to question on notice (Question 61) following the committee's public hearing on 11 July 2014.

22 NBN Co Limited, *Corporate Plan 2013-16 - Working Draft*, p. 100

23 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, p. 91.

24 Mr Bill Morrow, *Committee Hansard*, 26 September 2014, p. 2.

requires line of sight, and on average each tower can only cover 20 per cent of the area within its 14km radius. For this reason, placement is also critical and small changes in location can make a significant difference to coverage.²⁵

3.25 Mr Greg Adcock, Chief Operating Officer of NBN Co, advised the committee that tower placement was a complex issue and could be a challenge:

We look at a number of physical locations because each of them has its pluses and minuses...with some you can get easy access to power but you do not get line of sight to your customer base; with others you get line of sight to your customer base but there is a huge issue in getting power.²⁶

3.26 The committee has been made aware of concerns within some communities about the placement of NBN fixed wireless towers. The committee received several submissions from residents of the shire of Bridgetown-Greenbushes in south west Western Australia,²⁷ and has also been contacted by telephone and e-mail by residents in other areas, expressing aesthetic, environmental or health concerns about the placement of towers in their communities, and criticising NBN Co and its subcontractors for inadequate community consultation.

3.27 In relation to tower placement, NBN Co advised the committee that:

Every situation is a case-by-case basis. Clearly we uphold the law and the regulation, and then if there are issues we sit down and try and consult and engage—try and find solutions. I have been in the industry for a long time and not everybody is always happy...

We do our very best to make sure that the industry consultation is appropriate and fulsome and to take on board complaints and look at alternatives.²⁸

3.28 Nevertheless, in general NBN Co's advice to the committee was that fixed wireless was 'being extremely well received as we roll it out',²⁹ and that community complaints about tower placement had declined to a very small number.³⁰ The FWS Review also noted that around 35 per cent of the fixed wireless rollout involved the co-location of NBN equipment on pre-existing towers built by third parties such as mobile telephone companies.³¹

25 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, pp 9, 27–28.

26 Mr Greg Adcock, *Committee Hansard*, 26 September 2014, p. 19.

27 Mr Nick Maxfield, *Submission 72*, Ms Carolyn Armstrong, *Submission 73*, Mr Dagmar Dixon, *Submission 74*, Mr Michael Lansley, *Submission 75*, Ms Jacqueline Brody, *Submission 76*, Ms Virginia Bidwell, *Submission 85*.

28 Mr Greg Adcock, *Committee Hansard*, 26 September 2014, pp 19–20.

29 Mr Greg Adcock, *Committee Hansard*, 26 September 2014, p. 18.

30 *Committee Hansard*, 26 September 2014, p. 20.

31 NBN Co Limited, *Fixed Wireless and Satellite Review*, Final Report, May 2014, p. 75.

The fixed wireless spectrum gap

3.29 On 26 September 2014, Mr Adcock advised the committee that:

I believe the issue we had...around the spectrum in the outer metro areas is being addressed. We are currently working with the ACMA on getting a solution to that problem, which will drive the program even harder.³²

3.30 Following a one-month public consultation process in August-September 2014, in October the Minister for Communications issued a Ministerial Direction to the Australian Communications and Media Authority (ACMA), the *Australian Communications and Media Authority (3.5 GHz frequency band) Direction 2014*. The government stated that the Direction would enable the NBN to be provided with the spectrum needed to remedy the 'spectrum gap' in areas surrounding major cities, and therefore to provide fixed wireless services to the 80,000 premises in those areas. NBN would pay a market rate for the spectrum.³³

3.31 The Direction requires ACMA to complete all steps necessary by 30 April 2015 to enable the issuance of the relevant spectrum licences to NBN Co.³⁴

Satellite rollout and fair use

3.32 NBN Co has consistently advised the committee and the Senate Environment and Communications Committee that the satellite rollout is in good shape. NBN Co advised the committee in mid-2014 that an initiative was underway to implement the review's recommendations on the LTSS deployment.³⁵ On 9 February 2015 NBN Co announced the completion of work on its ten satellite ground stations.

3.33 By late 2014, NBN Co maintained that it was on track to launch the LTSS in 'late 2015 or early 2016', and that the project remained within its budget.³⁶ NBN Co's Integrated Product Roadmap released in January 2015 indicated that the launch of commercial services over the LTSS would commence in the final quarter of 2015, with migration of ISS services to the LTSS to proceed during 2016.³⁷

3.34 In February 2015 it was reported that the launch of the first NBN satellite had been delayed by five months to October or November 2015 due to issues beyond NBN

32 Mr Greg Adcock, *Committee Hansard*, 26 September 2014, p. 18.

33 http://www.communications.gov.au/radio/radiofrequency_spectrum/national_broadband_network_spectrum

34 The Hon Malcolm Turnbull MP, Minister for Communications, 'NBN spectrum gap – Consultation on draft Direction', Media Release, 21 August 2014.

35 NBN Co Limited, answer to question on notice (Question 9) following the committee's public hearing on 11 July 2014, p. 2.

36 Mr Matt Dawson, Program Director NBN Co Limited, 'Enabling the digital economy and closing the digital divide', presentation to *The NBN Re-Booted* conference, Sydney, 18 November 2014, at <http://www.slideshare.net/CommsDay/nbn-rebooted-nbn-cos-matt-dawson>

37 NBN Co Limited, Integrated Product Roadmap, January 2015, at: <http://www.nbnco.com.au/content/dam/nbnco/documents/Integrated-Product-Roadmap.pdf>

Co's control, relating to a co-passenger on the proposed commercial launch flight. NBN Co was reportedly investigating 'a range of options' to avoid or minimise the delay.³⁸ The release of commercial services over the LTSS was postponed to 2016 in NBN Co's 26 February half-yearly results announcement.³⁹

3.35 Speaking to a Senate Estimates hearing on 24 February 2015, Mr Morrow said:

You will have heard about the launch delay of our first satellite. While all elements that the NBN team are responsible for are on track, the company that launches our satellites has informed us that our co-passenger satellite will not be ready in time. It is very common to share the cost of the launch with other satellites, and these risks are just a par for the course in the satellite industry. Fortunately, we built in a buffer to absorb most of the impact to our business plans. We now expect to launch the first satellite in the fourth quarter of this year, and we still expect to start offering services in the first half of 2016.⁴⁰

3.36 In addition to preparation for the LTSS launch, NBN Co also advised the committee in 2014 that it had released additional capacity to the 40,000 current users of the ISS.⁴¹

3.37 In November 2014 a senior NBN Co representative advised that new fair use rules had been agreed with RSPs for the ISS, along with new mechanisms to monitor and enforce them.⁴² It was reported in early 2015 that NBN had released a paper to RSPs, dated 30 January 2015, requiring RSPs that sold ISS access to restrict individuals' usage to no more than 50 gigabytes of download per four week rolling aggregate, and limiting average weekly download to 9.7 gigabytes. NBN Co warned that it would exercise its rights under the Wholesale Broadband Agreement to limit the service of users exceeding the policy, if necessary.⁴³

38 Mitchell Bingemann, 'A case of watch this space as NBN satellite launch hit by delay', *The Australian Business Review*, 2 February 2015, at <http://www.theaustralian.com.au/business/technology/a-case-of-watch-this-space-as-nbn-satellite-launch-hit-by-delay/story-e6frgaxk-1227204294279>

39 NBN Co Limited, *Half Year Results Presentation*, 26 February 2015, at <http://www.nbnco.com.au/corporate-information/media-centre/media-releases/nbn-co-tracks-towards-full-year-targets-as-network-transitions-to-new-rollout-model.html>

40 Mr Bill Morrow, Senate Environment and Communications Legislation Committee, *Committee Hansard*, Additional Budget Estimates hearings, 24 February 2015, p. 104.

41 See for example Mr Bill Morrow, Senate Environment and Communications Committee *Committee Hansard*, 20 November 2014, p. 8.

42 Mr Matt Dawson, Program Director NBN Co Limited, 'Enabling the digital economy and closing the digital divide', presentation to *The NBN Re-Booted* conference, Sydney, 18 November 2014, at <http://www.slideshare.net/CommsDay/nbn-rebooted-nbn-cos-matt-dawson>

43 Rohan Pearce, 'NBN Co clamps down on satellite usage', *Computerworld*, 9 February 2015, <http://www.computerworld.com.au/article/565806/nbn-co-clamps-down-satellite-usage/>; Josh Taylor, 'NBN Co clamps down on interim satellite service usage', *ZDNet*, 9 February 2015, <http://www.zdnet.com/article/nbn-co-clamps-down-on-interim-satellite-service/>.

Committee view

3.38 The committee notes that in February 2012, the former Labor Government announced that it would build two state of the art broadband satellites to provide high speed broadband to regional and remote Australia by 2015. The committee notes that the Liberal National Party opposed these satellites. In 2012, then shadow Communications Minister, the Hon Malcolm Turnbull MP, condemned the satellite program as a 'Rolls Royce' solution, saying:

There is enough capacity on private satellites already in orbit or scheduled for launch for the NBN to deliver broadband to the 200,000 or so premises in remote Australia without building its own.⁴⁴

3.39 The committee notes the ongoing demand for high quality broadband in rural and regional Australia, which led to the very high demand for the ISS. The committee also notes that there is clearly not enough existing private satellite capacity to serve regional and rural Australia, which explains why the government has directed NBN Co to introduce data caps on the ISS.

3.40 The committee notes that former management took a conservative view of demand in the fixed wireless and satellite footprints due to potential fixed line broadband competition over the copper network in the last seven per cent. Once again, the committee notes the ongoing demand for high quality broadband in rural and regional Australia, but notes that the demand projections in the fixed wireless and satellite footprints are more bullish. The committee acknowledges that NBN Co had more data on take up in the last seven per cent than NBN Co had when the initial demand projections were included in NBN Co's 2011-13 and 2012-15 corporate plans.

3.41 The committee notes that the launch of the first NBN satellite had been delayed by five months to October or November 2015 due to issues with the co-passenger on the proposed commercial launch flight with Arianespace. The committee encourages NBN Co to monitor this issue closely to minimise this delay.

3.42 The committee's first interim report drew attention to the inclusion of plans for a third satellite in the government's Strategic Review, without any explanation for this initiative or the proposed 2021 timing. The committee recognised the reality of the need for additional bandwidth outside the fixed line footprint while querying the distortion of the Strategic Review's capital expenditure assumptions by the arbitrary addition of the costs of a third satellite.⁴⁵

44 <http://www.malcolmturnbull.com.au/homepage-issues/satellite-deal-%E2%80%93-more-wasteful-nbn-spending>

45 Senate Select Committee on the National Broadband Network, *Interim Report*, March 2014, pp 51–53.

3.43 The committee observed with concern the comments of the Vertigan Panel in its market and regulatory review, discussed further in chapter 4, suggesting that the provision of fixed wireless and satellite broadband in remote and regional Australia should be reconsidered and universal wholesale pricing should be axed. The committee considers that the NBN should be available to all Australians at the same wholesale price, no matter where they live or do business.