

7 February 2019

Inquiry into the Business Case for the National Broadband Network (NBN)

Further to your email request of 18 December, I provide some 2019 updates to my 2018 Submission (Appendix 1) based on:

- the NBN Corporate Plan issued in August 2018 (NBN 2018)
- the NBN Financial Statements for the year ended June 2018 (NBN 2018a)
- looking at the transcripts of the Inquiry hearings (Parliament of Australia 2019) since my last submission.

My approach was to graph the changes in planned and reported NBN rollout activity (Figure 1) between 2018 and 2019, and I summarise my findings from this analysis and how it impacts the previously presented model of NBN valuation (Ferrers 2018, Appendix 1). My biography also appears in Appendix 1.

NBN Corporate Plan	2018-21	2019-22
Expected cashflow positive	2021	2022
Total Debt 2021	\$19.2B	\$21.4B
Cashflow 2021	\$0.1B	(\$2.2B)
Cashflow 2022	n/a	\$0.1B
Revenue post build	\$5.4B	\$5.6B
Expenses post build	\$2.9B	\$2.7B
Profit (EBITDA) post build	\$2.5B	\$2.9B
Subscriber payments	\$nil	\$0.4B
Profit (EBITDA) post Subs	\$2.5B	\$2.5B

Table 1. Summary of changes in NBN plans since last year (2019 vs 2018).

The 2019 plan basically slows the pace of the rollout to complete at the same time as the 2018 plan, but with a slower pace of CAPEX and some delay in revenue, activated users and debt (Ferrers 2019). Ongoing revenue and expenses are slightly inflated (11-15%) but with a net nil impact on profit. Hence this will have a nil impact on the valuation model (Ferrers 2018). See Figure 1 for a graphical depiction of the rollout slowdown impact on the NBN Financials.

However, the latest 2018 actuals were substantially different from 2018 plan (see Table 2, Figure 1). Cash spent for 2018 fell from the predicted \$11B to an actual \$7.6B; a significant 30% drop due to delay in expenditure, probably largely due to the HFC rollout pause. This shows that current rollout continues to throw up the unexpected, even with now only less than 18 months until completion of the rollout.

Thus, while the expected post-rollout financials are unchanged on a yearly basis, though there is a \$2B increase in the debt level acquired by the end of the rollout (a smallish 5% increase), the variation in 2018 actuals from plan makes me think that surprises are still possible between now and the end of the rollout, let alone the 20-40 years after that for running and earning from and installed network. Thus while the value of NBN is nominally unchanged (except by \$2B extra debt) getting to the predicted \$2.5B profit once the network is fully up and running is the next major hurdle to achieve, following the rollout completion.

	2018 Plan	2018 Actual
CAPEX	\$7.0B	\$5.7B
Cash Outflows 2018	\$11.0B	\$7.6B
Debt 2018	\$9.0B	\$5.5B

Table 2. Significant variations between NBN plan financials and actual result in 2018 (Ferrers 2019) from NBN Corporate Plans 2018, 2019.

Visualising the Value of the NBN

Also of interest to the Inquiry is a data visualisation of the 2018 valuation model (see Appendix 2). The numbers would change \$2B (total debt 2021) from the information in the NBN 2019 plan (from extra spending to date), but I would not change the post-2021 figures, since there were only minor changes in EBITDA (ie around 10%). The data visualisation (see data, calculations, code of Heatmap in Ferrers 2018c, including high resolution images) showing the range of valuations from the data model, I submitted to the Inquiry in 2018, for a range of inputs. I ran over 200 scenarios, based on:

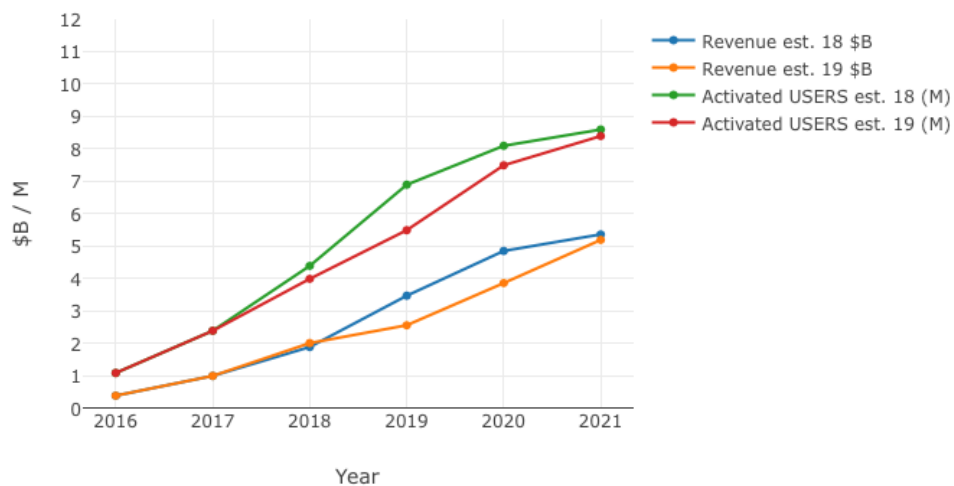
1. % of households using NBN (0 - 100% in 20% increments),
2. % of homes taking up gigabit speeds (0 - 100% in 20% increments),
3. levels of customer satisfaction (0 - 100% in 20% increments),
4. % of FTTN households who abandon FTTN at end of life (0 - 100% in 20% increments).

I re-ran those scenarios, assuming 20% of EBITDA was invested in upgrading FTTN households, and 40% of households took up gigabit internet, producing another 100 scenarios. The visualisation is attached in Appendix 2.

The colours indicate the various valuation outcomes at Yr20 (that is 2041) post-build, and range from accumulated losses of over \$40B (shown in dark red) to cash generated after repaying \$20B debt of over \$80B (shown in dark blue). Less extreme outcomes are colour code in \$20B intervals.

I found that in the first row of graphs (Appendix 2); household take-up is much more impactful on NBN value than gigabit take-up (so the value pattern is vertical). In the second row of graphs, NBN value is significantly affected when customer satisfaction is low (as the colour bands turn horizontal). In the third row of graphs, colour bands are mainly vertical indicating household take-up of NBN is more impactful on the NBN's value than level of FTTN households who abandon FTTN at end of life.

Overall there are a lot of scenarios where NBN loses money, particularly if consumer satisfaction is poor, or adoption is less than 70% of households. Business adop-



NBN Financials 2016-2021, update 2019

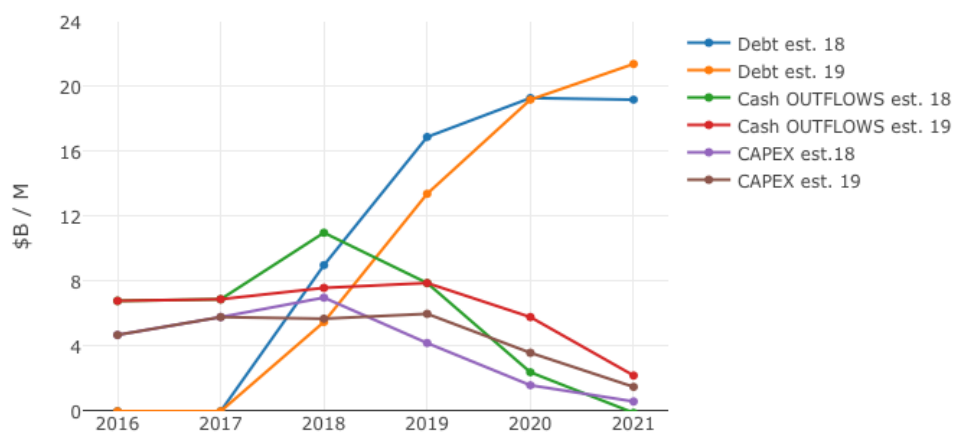


FIGURE 1. CHANGES IN NBN FINANCIALS - 2018 VS 2019 CORPORATE PLANS

tion is not included in these valuations, since those projected revenue numbers are not made public. Previously I indicated that a loss of 1% of households equates to a \$1B loss of revenue, so naturally less than 70% household adoption would be problematic for NBN finances.

Thank you for the opportunity to update my NBN analyses. I am happy to answer any questions that you might have.

NB: The project at Monash University that I work at is, after a merger, now called, the Australian Research Data Commons (ardc.edu.au), and previously the Australian National Data Service (ands.org.au).

Appendix 1 - Summary of Previous (2018) Submission

This is a personal submission, I hope of relevance to the Joint Standing Committee on the NBN. I am an innovation researcher, and research data analyst, who works at Monash University, on a major innovation project (ANDS.org.au) developing Australia's research infrastructure, with the aim to exploit Australia's data advantage. My PhD ([Ferrers 2012](#)) was on adoption of new technology, specifically relating to 3G broadband, but included analysis of NBN documents (such as [McKinsey 2010](#)). My publications relevant to this Inquiry include an analysis of the value of NBN, comparing FTTN and FTTP approaches ([Ferrers 2016](#)). See more about me at: https://telsoc.org/journal/authors/richard_ferrers. For terms (such as FTTN and FTTP), see the glossary at the foot of this document.

This submission introduces an online model which describes financial scenarios of NBN's business over the next 20 years; including replacing FTTN with FTTC/FTTP, repaying debt, upgrading to gigabit services and the potential fallout of not replacing FTTN, to calculate NBN's financial value under these different possible futures.

Terms of the Inquiry into the NBN Business Case

The Terms of Inquiry into the NBN Business Case, asks for submissions into NBN's overall long term financial outlook for NBN Co and forecasts in relation to: revenue generation; key financial indicators in the Corporate Plan; competitive risks facing the multi-technology mix; impact of alternative pricing structure; and other relevant matters.

Conclusion 2018: The model ([Ferrers 2018a](#)) and its more documented version ([Ferrers 2018b](#)) that I have outlined in this submission allows interested users (the Committee, their advisors, the public and other stakeholders) to consider the many possible futures of the NBN, taking into account the impact of multiple levers that impact on the NBN business. The projected position for NBN in 2021 looks strong but the path forward from there, especially over the next 20 to 40 years, has many possible progressions.

Looking closely at the NBN numbers using the model, from a Base Case NBN value of \$31B, I found that there is a lot of cause for optimism about the future of NBN. There is money to repay debt, and replace FTTN, but NBN will have to take care to keep customers satisfied (or risk a range of up to \$50B impact on NBN value), and not lose ground to mobile or other competitive alternatives (at a cost of \$1B per 1% customer loss).

NBN has an opportunity to upgrade customers to gigabit services (with potential up to \$19B gains of NBN value) with existing technologies (FTTP, FTTC, HFC). At the same time, NBN needs over the next 20 years to upgrade FTTN (costing \$12B for FTTC; \$18B for FTTP), to avoid FTTN loss of revenue (up to \$15B loss of NBN value), from customers abandoning, FTTN near the end of its useful life. But the model sug-

gests, the FTTN upgrade can only increase NBN value, if NBN can convince 30% of NBN customers to upgrade to gigabit services - quite a challenge.

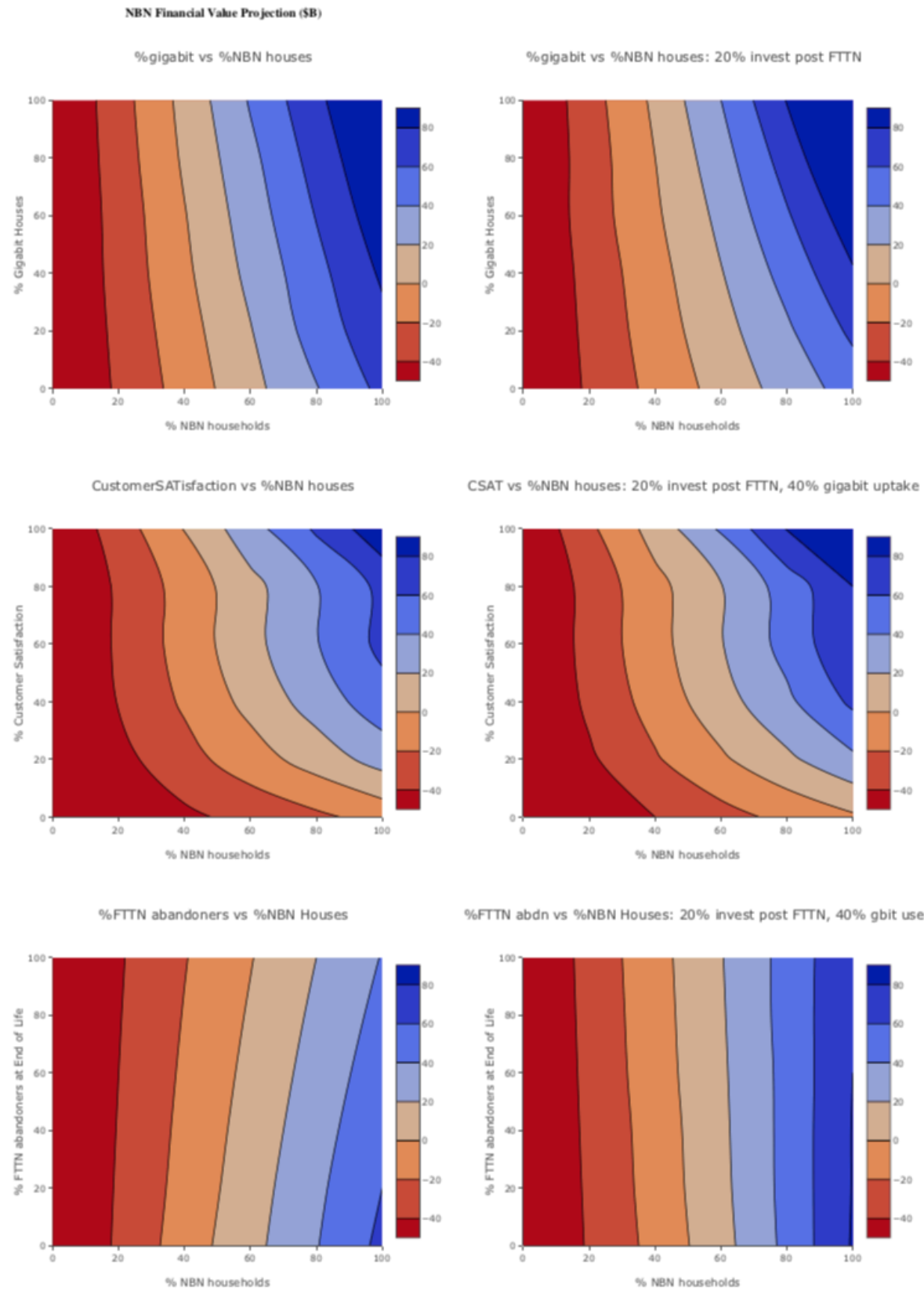
The model doesn't show the likely value of NBN, only the NBN value given the setting of a number of levers. Your choice of moving the levers indicates NBN value in that scenario. The model does show which levers affect the NBN value more and which levers affect the NBN value less.

Disclaimer:

The model does not account for interest paid or earned, taxation, price rises or inflation, so is a model of 'real' prices. Discounting future cashflows is assumed to offset equal interest earned and NBN price rises, leaving the NBN value as a real un-inflated value. Adding an annual interest payable component would be a useful next step to the model, to add costs to delaying action. See further in Disclaimer comment in V5 of the model (Ferrers 2018c) on this topic. NB: Repaying NBN Debt has no impact on the value of NBN, since the debt and cash are considered part of the NBN value.

In the brief time to create the model, some things have been left out (such as inflation, taxation), customer satisfaction by technology type, upgrading FTTC and HFC to FTTP. These enhancement can be added if the Committee needs it. More details summarising impact of each model variable on NBN value can be found at: Figshare Ferrers (2018c) NBN Submission V2.

Appendix 2 - Data Visualisation (Heatmap) of 2018 NBN value



SOURCE: FERRERS(2018C) - HEATMAP OF NBN VALUE UNDER DIFFERENT ASSUMPTIONS. DARK RED \$40B NBN VALUE LOSS. DARK BLUE \$80B VALUE GAIN, INCLUDING DEBT REPAYD.

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Glossary

EBITDA - Earnings before Interest, Tax, Depreciation and Amortisation
FTTN - Fibre to the Node
FTTP - Fibre to the Premises
FTTC - Fibre to the Curb
GDP - Gross Domestic Product
HFC - Hybrid Fibre Coax network