



Economic effects of ICRA

7 December 2022

Copyright Castalia Limited. All rights reserved. Castalia is not liable for any loss caused by reliance on this document. Castalia is a part of the worldwide Castalia Advisory Group.

Table of contents

1	Introduction	4
2	Justifications for ICRA Adjustment	5
2.1	Stakeholder concerns with the existing ICRA mechanism	5
2.2	Analysis of the Arguments	6
2.3	Realistic Market Expectation	10
3	Calculation of ICRA adjustment	11
3.1	Benchmark method	12
3.1.1	Methodology	12
3.1.2	Calculation	14
3.2	Credit score method	15
3.2.1	Methodology	15
3.2.2	Calculation	17
3.3	Comparing the two methods	19
3.4	Results	20

Tables

Table 3.1: Comparison of benchmark and actual financing of nbn FY2021-22 (\$ billion)	15
Table 3.2: ICRA calculation example	19
Table 3.3: Benchmark method ICRA values under different efficient capital structure assumptions	20
Table 3.4: Credit score method ICRA values under different debt cost and WACC assumptions	21

Definitions

ABBRR	Annual Building Block Revenue Requirement
ACCC	Australian Competition and Consumer Commission
ARTC	Australian Rail Track Corporation
BBM	Building Block Model
CAPEX	Capital Expenditure
GBE	Government Business Enterprise
HRNAU	Hunter Valley Rail Network Undertaking
ICRA	Initial Cost Recovery Account
OPEX	Operating expenditure
RAB	Regulatory Asset Base
RSP	Retail Service Provider
SAU	Special Access Undertaking
Investment-grade rating	Stand-alone Investment-Grade Credit Rating with a Stable Outlook

1 Introduction

Background

nbn's first SAU,¹ accepted in 2013, included an arrangement for an initial cost recovery account ('ICRA') to capitalise the difference between nbn's actual revenue and the annual revenue requirement.² It was expected that during nbn's build phase, commercial factors would constrain it from recovering a smaller portion of its total efficient costs each year than the annual revenue requirement.

By the end of FY2022-23, nbn's ICRA is expected to be valued at around \$44 billion. nbn is expected to continue to under-recover compared to the ABBRR until FY2029-30, from which point it will be able to start recovering ICRA.

In response to the March 2022 SAU variation proposal and during recent industry discussions, RSPs and the ACCC have voiced concerns about the appropriateness of the existing ICRA arrangement.

In response, nbn is proposing to adjust the closing ICRA amount as of 30 June 2023 and to change the way the opening ICRA for the FY2029-30 to FY2039-40 period is calculated and recovered.

This report considers the economic justification for adjusting the ICRA and the basis for calculating the required ICRA.

Overall, we conclude that from an economic point of view, there is no public policy justification for adjusting the ICRA (absent any small potential *ex post* cost efficiency adjustments). The mismatch in timing between the expenses incurred during the initial investment and development period and the revenues earned in future periods is a common feature of long-lived infrastructure. The credibility of Australian regulators' promises to infrastructure investors about the future recovery of initial losses is an essential consideration in enabling significant infrastructure investments. The unusually large size and the length of the period of this mismatch in the case of nbn are not in themselves a justification for a different approach.

However, as a matter of practical reality, if there is no reasonable expectation of recovering the full ICRA, there is public benefit to explicitly recognising that reality in the regulatory mechanism. Determining an ICRA amount that is broadly consistent both with the forward-looking legitimate financial objectives of the infrastructure owner and with the practical market constraints will improve the transparency of the regulatory regime and will enable more predictable pricing.

Given the stated objectives of nbn's Government shareholders, the Commonwealth Government Business Enterprise (GBE) guidelines, and the expectation that nbn should operate in a competitively neutral manner, it is economically efficient to set the realistically recoverable ICRA by reference to the objective of achieving and maintaining a stand-alone investment-grade credit

¹ NBN Co, "NBN Co Special Access Undertaking," 18 December 2012, varied on 18 November 2013. Accepted by the ACCC on

² We note that at the time of signing, the first SAU referred to the revenue regulation as the Long Term Revenue Constraint Methodology, which later became the ABBRR.

rating with a stable outlook ('investment-grade rating'). An investment-grade rating confirms the financial stability and sustainability of nbn as a competitively neutral going concern rather than as an organisation relying on indefinite government support. Since the recovery of ICRA would involve annual revenue over and above nbn's regulated revenue allowance (termed ABBRR in the SAU), an ICRA consistent with an investment-grade rating would essentially be an estimate of the present value of the future revenues, which are both consistent with nbn's financing requirements and with the realistic future revenue expectations.

Given the practical market reality, rather than asking "what are nbn's accumulated losses?" it is likely to be more economically efficient to ask, "what does nbn need given its current position and legitimate interests?"

Castalia also finds that nbn's proposal of retaining \$12.5 billion in ICRA (as of FY2022-23, to be adjusted by inflation) is reasonable and entirely consistent with the results from applicable calculation methodologies.

2 Justifications for ICRA Adjustment

In this section, we consider the arguments that have been advanced to justify a regulatory intervention to adjust the ICRA through the prism of economics theory and good public policy practice.

2.1 Stakeholder concerns with the existing ICRA mechanism

The ACCC has noted several concerns with the ICRA mechanism in the current SAU. Its main concerns are set out in the comments below:

- The ABBRR would "fail to act as a binding constraint on [nbn] or provide any basis for setting prices" if the ICRA was high enough to override the ABBRR over the remainder of the SAU period.³
- "Customers [would] be better able to afford to use the [network and] realise potential benefits" if the ICRA balance was reduced.⁴
- "Once [nbn] can reach the point at which it can earn its [ABBRR], it will have sufficient revenue" to finance investments, operate the network, and provide a shareholder return. If nbn is allowed to earn revenues that "significantly exceed this amount, [this] is likely to lead to less efficient use of the [network]."⁵
- The period over which nbn could recover ICRA was a risk, especially with the "uncertainty about the residual balance of the ICRA in 2040."⁶

³ ACCC, "NBN Co Special Access Undertaking: Summary of Industry Working Group Outcomes," December 2021, p. 6.

⁴ Ibid., p. 17.

⁵ Ibid., p. 6.

⁶ ACCC, "Proposed Variation to the NBN Co Special Access Undertaking – Consultation Paper," May 2022, p. 21.

RSPs have also submitted several concerns with the existing ICRA system:

- Telstra submitted that ICRA embodied nbn’s “historical inefficient costs” and suggested that nbn should be required to exclude these sunk costs.⁷ Optus suggested that ICRA should only be recovered to the extent that its recovery leads to “dynamic efficiency and ongoing competition and consumer benefit.”⁸
- RSPs jointly submitted that the inclusion of ICRA will remove any “contemporaneous link between [nbn]’s prices and its [ABBRR].”⁹
- Furthermore, “some [RSPs] argued that opening values for the ICRA [...] should reflect a value representing the costs of an efficient commercial network operator.” They recommended “removing or significantly reducing the ICRA balance to achieve this.”¹⁰

We synthesise these comments into four arguments. The first three relate to why ICRA should be adjusted or removed altogether:

- **Argument 1**—It would lower the prices for customers, which is in the LTIE.
- **Argument 2**—It would remove the inefficient and sunk costs contained in ICRA.
- **Argument 3**—It would reduce the risk of prices becoming decoupled from costs.

Considering the ACCC’s stated concerns about the value of ICRA at the end of the SAU, we also anticipate a further argument about the timing of recovery:

- **Argument 4**—Ensuring that ICRA can only be recovered during the SAU would increase future pricing certainty.

2.2 Analysis of the Arguments

The above arguments are not supported by economics theory or good public policy practice.

Argument 1: Adjusting/removing ICRA would lower customer prices in the LTIE.

A key tenet of economics theory and good regulatory practice is that regulated businesses should be able to recover all of their reasonably efficient costs. No economic theory says such costs should only be recovered in the year they are incurred, or that there should be only a short window of opportunity to recover costs. If investors cannot expect to recover all their costs, they will not invest. In that sense, lowering pricing to below the cost recovery level is not in the LTIE. The experience of many countries in Asia, Africa and South America suggests that when prices for infrastructure services are regulated to below-cost-recovery levels, customers do not get the level of service they need and expect.

⁷ Telstra, “Response to the Proposed Variation to the NBN Co Special Access undertaking,” 20 July 2022.

⁸ Optus, “Submission in Response to ACCC Consultation Paper: Proposed Variation to the NBN Co Special Access Undertaking,” July 2022.

⁹ Ibid., p. 17.

¹⁰ ACCC, “NBN Co Special Access Undertaking: Summary of Industry Working Group Outcomes,” December 2021, p. 5.

In the case of nbn, we understand that the perception is that it is possible to avoid recovering the full costs of investment from customers is rooted in the fact that nbn is a government-owned entity. If the Government were willing to use taxpayer funds to subsidise nbn, then it would be possible to lower prices for consumers without loss of service or service quality by transferring the costs to the taxpayers. However, the Commonwealth Government invested in nbn as a GBE because this investment would be commercially justified over the long term. The fact that nbn has accumulated losses during its early years and that the recovery of those losses will only be possible in the future does not provide any economically rational basis for transferring a part of the lifetime cost of nbn from its users to taxpayers.

Argument 2: Adjusting/removing ICRA would remove inefficient and sunk costs.

For the purposes of this report, we have no basis for expressing an opinion on the efficiency of nbn costs. However, we note that nbn is subject to the regulated revenue ceiling (ABBRR) and that in setting this ceiling, the ACCC has an opportunity to ensure—as is the case in all regulated industries—that the ceiling reflects the recovery of reasonably efficient costs. The under-recovery represented by the ICRA is best understood as the sum of the annual gap between the regulated revenue and the actual revenue obtained in the market (under the approach in the 2013 SAU, no ICRA would be accumulated once the actual revenue reaches ABBRR). As long as there is sufficient comfort that the ABBRR represents efficient costs, there is no basis for thinking that adjusting ICRA would address any perceived inefficiencies.

More importantly, from an economic point of view, there is no basis for arguing that ICRA represents sunk costs. Past costs are considered ‘sunk’ when their removal would not change the outcome of any present or future decisions or options. Mainstream economic theory is unambiguous in that it is inefficient to consider sunk costs while making decisions about the future. However, ICRA does have a material impact on future decision-making because the ability to recover ICRA is directly linked to nbn’s access to capital and the cost of that capital. While the costs relevant to ICRA have already been incurred, ICRA represents a future claim on additional revenue. The financial market will assess nbn in line with the potential for nbn to earn this future revenue.

As we discuss later in the report, the assessment of the realistic potential for earning the additional revenue, rather than any removal of sunk costs, is the only economically efficient basis for adjusting ICRA.

Argument 3: Adjusting/removing ICRA would reduce the risk that prices become decoupled from costs.

There is no economic basis for considering that ICRA would allow prices to become decoupled from costs. ICRA may indeed lead to prices becoming decoupled from a given year’s ABBRR. However, the ABBRR is simply a measure of the costs incurred in that year. As we have explained previously, no economic theory says the costs must be recovered contemporaneously to being incurred.

ICRA ensures that nbn’s prices over the long term are coupled with the lifetime costs. To maximise economic efficiency, nbn must be allowed to recover all its efficient costs over the life of the assets. As long as the present value of the recovery is equal to the present value of costs, the exact timing of the recovery is not important for economic efficiency. The BBM calculates one way to time the recovery of total costs: the ABBRR. As with many early-stage large infrastructure projects,

the commercial reality of building and promoting the adoption of a network is such that the recovery of the annual cost allowances in the initial years may not be possible. This does not negate the need to recover costs. Rather, it means that costs and prices need to be aligned over the life cycle of the project, rather than over each arbitrary time period.

Argument 4: Ensuring that ICRA can only be recovered during the SAU would increase future pricing certainty.

Again, the primary objective of economic regulation is to ensure that nbn recovers the total efficient costs over the network's life, regardless of arbitrary start and end dates for regulatory regimes. Future pricing certainty can be promoted instead by proposals such as fixing the recovery profile at the start of each regulatory cycle and allowing the ACCC to have oversight power over these recovery profiles. These can increase future price certainty without unnecessarily requiring the write-down of shareholder equity.

Key risk: A forced adjustment of ICRA would affect market perception

A regulatory intervention to adjust ICRA or, in some other way, restrict its recovery against the wishes of nbn would break the regulatory precedent and suggest that loss capitalisation mechanisms—which may be essential to enable efficient investment—may not be guaranteed to hold in the long term. While every individual regulatory decision can be explained away by reference to specific circumstances, a major reversal of the previously confirmed legitimate expectation will have an inevitable effect on market perception at the margin.

In addition to nbn's ICRA mechanism, the ACCC has two other precedents explicitly allowing a version of ICRA in the rail and water sectors:

- The ACCC has applied loss capitalisation principles to the Hunter Valley Rail Network Undertaking (HRNAU) by the Australian Rail Track Corporation (ARTC) since 2011. As the ACCC states in its position paper, loss capitalisation is appropriate when significant investment is required to extend the rail network, but the mining region will only be fully developed in the future.¹¹ In the case of the ARTC, there is no certainty over the timing of the recovery of capitalised losses as the recovery depends entirely on market conditions.
- In 2014, the ACCC allowed Water NSW to recover costs using loss capitalisation.¹² This allowed Water NSW to incur losses during the initial period of network expansion when the investment was highest, and there was substantial excess capacity.¹³

If the ACCC decides to enforce an adjustment of nbn's ICRA, it would need to explain how it fits with these precedents or why the circumstances of those publicly owned entities differ from those of nbn. In fact, if the arguments in favour of adjusting ICRA set out above were to be accepted, it

¹¹ "Decision in relation to Australian Rail Track Corporation's Hunter Valley Rail Network Undertaking," ACCC, accessed 14 July 2022, <https://www.accc.gov.au/system/files/ACCC%20Final%20Decision%20on%2023%20June%202011%20application.pdf>.

¹² "Attachments to ACCC Draft Decision on State Water Pricing Application: 2014–15, 2016–17," ACCC, accessed 14 July 2022, https://www.accc.gov.au/system/files/Attachments%20to%20ACCC%20Draft%20Decision%20on%20State%20Water%20Pricing%20Application%202014-15%20-%202016-17_2.pdf.

¹³ "Pray For Rain: ACCC's Loss Capitalisation Model," Frontier Economics, accessed 14 July 2020, <https://www.frontier-economics.com.au/publications/pray-for-rain-loss-capitalisation-model/>.

would be entirely reasonable for the Hunter Valley coal rail network users to request that the ARTC loss capitalisation be adjusted too. The ARTC, like nbn, is a Commonwealth GBE.

In our view, none of the characteristics of nbn's ICRA make it sufficiently different from other loss capitalisation precedents to justify different treatments:

- **Uncertainty regarding the timing of recovery**—Many infrastructure investments, including mine railways, such as is the case for HRNAU, face high levels of demand uncertainty. There is no regulatory reason why this necessitates a regulator-imposed cut to shareholder equity. Instead, the way regulators often contend with this issue is to bring forward depreciation. Indeed, the ACCC discussed the potential to front-load depreciation in the 2010 review of access pricing principles for fixed-line internet services, noting:

“There may be an argument for applying a depreciation schedule that allows more cost recovery in the earlier years of an asset’s life [when] future infrastructure-based competition might reduce the operator’s ability to recover costs later.”¹⁴

- **Size relative to RAB**—The relative size is not immediately relevant to whether the recovery of the accumulated losses is efficient. It is easy to imagine examples of other infrastructure assets where significant losses can be efficiently accumulated over a long period. Making decisions on the ‘acceptable’ relative levels of accumulated losses to the RAB is likely to be both arbitrary and inefficient and will be considered as such by the market.
- **Government ownership**—One of the long-standing principles of the Australian regulatory model (whether explicitly set out in the legislation or not) and of the Commonwealth business enterprise ownership is ‘competitive neutrality,’ which holds that commercial and regulatory principles should apply equally to private entities and publicly owned corporations. Both the ACCC and the Department of Finance endorse running public entities on a competitively neutral basis because:
 - Public corporations running on commercial principles are expected to promote effective governance and good decision-making as their boards are held accountable.
 - It creates incentives to act in an economically efficient way, such as promoting efficient capital structures.
 - Applying regulation to entities in a way that abstracts from their current ownership allows for efficient future ownership changes.

A reliance on Government funding support as a justification for a forced retroactive change in the regulatory model undermines the principle of competitive neutrality.

¹⁴ ACCC, “Review of 1997 Guide to Telecommunications Access Pricing Principles for Fixed Line Services: Discussion Paper,” December 2009.

2.3 Realistic Market Expectation

While the arguments for adjusting ICRA set out above have no basis in economics, it is both appropriate and efficient for the investors in infrastructure to form realistic expectations about their ability to recover costs in the future. Historical under-recovery of reasonable costs incurred during the initial stages of a project do not inform what is possible and needed in the future.

In their July 2022 letter to nbn,¹⁵ the Minister for Communications and the Minister for Finance jointly instructed nbn to “develop a proposal that reflects a reset in the process and looks forward to the necessary and appropriate returns to support the business.” To achieve this, the Ministers noted that they would consider allowing “historical concepts such as [ICRA to] be changed.”

To achieve the required returns to support itself, nbn must achieve financial stability and sustainability as a stand-alone business. It is unreasonable to expect the shareholders to continue adding unremunerated equity. Given this, it is clearly in the LTIE to allow nbn to fund itself—if it were not able to do so, customers would suffer poor operational performance and no technology improvements.

To achieve financial stability and sustainability as a stand-alone business, nbn must be able to borrow from the commercial debt market. To do so, nbn must:

- **Be allowed to achieve an investment-grade credit rating**—If nbn were to achieve an investment-grade rating, it would have access to liquid debt markets and reasonable interest rates. This goal maximises economic efficiency and is consistent with precedents in Australian regulation. For example, in 2018, IPART concluded that for regulated entities, “the increase in the debt margin [associated with falling below investment grade] would likely more than offset the reduction in equity costs.”¹⁶

The most common credit rating associated with this goal amongst Australian Regulators is a BBB-neutral credit rating (equivalent to a Baa2 credit rating under Moody’s system).¹⁷ A notable exception is AER, which uses a BBB+/Baa1 credit rating when calculating the benchmark cost of debt.¹⁸

- **Maintain sufficient overall cashflows to access debt markets**—Lenders require borrowers to have sufficient equity to de-risk their lending. Any undue constraint on future credible recovery of ICRA will affect the overall cashflows to both debt and equity, and hence the lenders’ willingness to lend relative to the company’s equity. In other words, any decision to adjust ICRA must be made considering the implications for the equity nbn can use to de-risk its borrowing and achieve an investment-grade rating. We also note that nbn is bound

¹⁵ The Hon. Michelle Rowland MP (Minister for Communications) and the Hon. Katy Gallagher MP (Minister for Finance) to Ms. Kate McKenzie (Chair of NBN Co Limited). Available at: <https://www.infrastructure.gov.au/department/media/publications/nbn-cos-special-access-undertaking-variation-ministerial-correspondence>

¹⁶ IPART, “Review of our WACC method: Final report,” February 2018, p. 46.

¹⁷ *Frontier Economics*, “Return on Capital, Inflation and Financeability,” 11 March 2022, p. 40-1.

¹⁸ Henryk Smyczynski; Igor Popovic, “Estimating the Cost of Debt,” *AER*, April 2013.

by the GBE Guidelines, which require GBEs to increase shareholder value by at least the GBE's WACC.¹⁹

On 25 October 2022, the Minister for Communications announced that the Government would inject \$2.4 billion into nbn over four years to boost fiber access.²⁰ However, considering the Ministers' objectives of having nbn be self-financing, the expectation must be that no other unremunerated equity will be injected into nbn.

3 Calculation of ICRA adjustment

This section sets out a practical approach to calculate the amount of ICRA consistent with achieving the shareholders' objectives—that is, setting ICRA on a forward-looking basis to be consistent with:

- The reasonable expectation of future revenues that can be earned given the competitive constraints in the telecommunications markets, and
- The future revenues needed to achieve and maintain an investment-grade rating.

We note that there are many possible calculation methodologies that can be devised, sets of assumptions that can be made, and data that can be used when implementing these methodologies. Considering this, a very wide range of possible values for the required ICRA can be calculated. We consider the following principles to be key in deciding on appropriate sets of methodologies and assumptions:

- **Internal logical consistency**—All methodologies must be logically consistent in arriving at a value of the required ICRA. All calculation inputs must be applicable and consistent with the calculation methodology.
- **Consistency with the rest of the SAU**—All data, forecasts, and assumptions must be consistent with other parts of the SAU, where relevant. For example, the WACC forecasts used in the calculation of nbn's ABBRR must be the same as any WACC forecasts used in the calculation of ICRA. Failure to do so would mean interrelated concepts would not aggregate correctly, resulting in inaccurate revenue regulation.
- **Consistency with regulatory principles applicable to nbn**—Calculations must be consistent with applicable regulatory principles such as competitive neutrality and full cost recovery. For example, competitive neutrality requires regulators to act no differently for government-owned and private entities, meaning government entities should be regulated on the basis that they incur commercial costs of debt.

¹⁹ Department of Finance, "Commonwealth Government Business Enterprises – Governance and Oversight Guidelines: Resource Management Guide No. 126," January 2018.

²⁰ The Hon Michelle Rowland MP (Minister for Communications), "Media Release: Albanese Government to Better Connect, Infor and Empower Australians," 25 October 2022.

Castalia has developed two methods of calculating the required ICRA: the ‘benchmark method’ and the ‘credit score method.’

3.1 Benchmark method

3.1.1 Methodology

The benchmark method targets an investment-grade rating for nbn by trying to change its capital structure. In the WACC calculation formula in the current SAU proposal, nbn has set the benchmark debt-to-RAB ratio at 36.7 percent, which it considers efficient and consistent with achieving a BBB credit rating. The benchmark method assumes that if nbn can use ICRA to reach this benchmark capital structure, it will be able to achieve an investment-grade rating.

Calculating excess debt

There are two approaches to calculating the debt in excess of the benchmark level:

- **Actuals approach**—Calculating the difference between the amount of the debt nbn is expected to hold at the end of FY2022-23 and the benchmark level of debt.
- **Simulation approach**—Simulating a benchmark amount of debt held at the end of FY2022-23 and calculating the difference between that amount and the benchmark level of debt.

While the actuals approach may be closer to the reality of nbn’s required ICRA, the benefit of the simulation approach is that it is indifferent to the shareholders’ previous capital structure decisions. The Government initially capitalised nbn with equity and provided it with debt at favorable rates. Considering it is arguable that the existing capital structure is arbitrary, simulating the debt avoids this problem.

The benchmark level of debt incurred is capitalised according to the efficient capital structure: each year, CAPEX will be funded by debt and equity according to the efficient ratio. Considering nbn’s revenue has not been sufficient to service its debt, we further assume that the principal and interest continue to compound without repayment until after FY2022-23. The interest rate for debt service is the historical benchmark cost of debt for a BBB-rated firm. We did not use nbn’s actual debt costs as this would not be consistent with the need to regulate nbn on a competitively neutral basis.

Our calculation also accounts for the fact that the shareholders are unlikely to contribute further equity after the \$2.4 billion already announced. For any given year, if more equity has been contributed under the benchmark calculations than the total equity the shareholders have contributed to nbn, including the upcoming \$2.4 billion, then CAPEX for that year will be fully funded through debt.

However, as the expected total contributed equity at the end of FY2022-23 exceeds the amount of equity required under our base assumptions, this mechanism does not add to the total value of ICRA. This mechanism only adds to the total value of ICRA if the assumed benchmark debt-to-RAB ratio falls below 33.3 percent.

This treatment of equity contribution may appear to be an anomaly as we otherwise assume that all equity contributions were aligned with the benchmark requirement. However, the purpose of

the conceptual model is not to ignore reality but rather to avoid arguing about the actual amounts of equity and debt, particularly given that the Government always had an option of injecting either equity or guaranteed debt in the past. In contrast, the fact that nbn must now seek all additional investment funding from commercial debt markets is not contingent on past capital structures and materially affects the amount of ICRA required. For this reason, it is critical to include this assumption in the calculation of ICRA.

The interest compounding and lack of debt repayment mean that although all CAPEX is funded at the efficient ratio, the firm will hold debt in excess of the 36.7 debt-to-RAB threshold.

Calculating ICRA from excess debt

Under both approaches, nbn must be allowed enough post-tax ICRA to pay off the excess debt, considering the repayment of debt principal is made post-tax.

We note that nbn would not be able to receive all of the ICRA in FY2022-23 to pay off the excess debt. However, in theory, the financial market is still willing to assess a firm with excess debt as investment-grade as long as the firm has a clear and credible way to pay back the excess debt within a period acceptable to the market. As ICRA provides an opportunity to earn revenue commensurate with the excess debt, this should allow nbn to achieve an investment-grade rating.

Retained equity under the benchmark method

Currently, ICRA includes the foregone return on and of benchmark debt, equity, and operating losses. However, strictly speaking, the recovery of the return on equity and operating losses encapsulated in ICRA is not necessary to ensure that nbn can attain and keep an investment-grade rating for its debt.

However, enough equity must be maintained to meet the efficient capital structure. Subject to minor adjustments for potential outperformance, the equity value equals the RAB minus debt. If nbn's debt exceeds the efficient amount, more future cash flows will have to be directed toward paying back the return on and of debt.

This creates a vicious cycle. The equity portion will necessarily have to fall if debt service is higher. With less equity, nbn's capital structure will become more leveraged, and the cost of debt will increase. This will increase debt service costs, continuing the cycle. Thus, for the rating agencies to provide an investment-grade rating, they must believe that an appropriate capital structure can be restored. This means that future allowed revenue must exceed the ABBRR by the amounts which, in present value terms, would cover the difference between the equity needed to achieve the benchmark capital structure and the amount available in present value terms after covering the return on and of the actual debt.

Treatment of lease liabilities

Our calculations exclude lease liabilities since the Telstra assets are not included in the RAB, and the lease expenditure is treated as OPEX for regulatory purposes. If the leased assets were included in the RAB, then the required benchmark debt and equity would have been correspondingly higher. However, excluding lease payments from OPEX would have also reduced the operating losses. Thus, the gap between the actual and benchmark financing would have been smaller, as more debt and equity would have been needed for the higher RAB, but there would be a corresponding decrease in the amount of equity required to cover actual operating losses.

3.1.2 Calculation

Inputs

The following inputs are relevant for the calculation of both approaches:

- The benchmark capital structure is 36.7 percent debt-to-RAB and 63.27 percent equity-to-RAB.
- nbn's RAB at the end of FY2022-23 is expected to be \$30.4 billion. Splitting this according to the benchmark capital structure returns:
 - A benchmark debt of \$11.2 billion.
 - A benchmark equity of \$19.3 billion.
- nbn's total debt at the end of FY2021-22 was \$24.5 billion and is expected to be \$26.3 billion at the end of FY2022-23.
- nbn's corporate tax rate is 30 percent. The excess debt to be repaid must be grossed up for tax since principal debt repayment (unlike the interest cost) is not tax deductible.

The following inputs are relevant only to the simulation approach:

- nbn's CAPEX between FY2007-08 and FY2022-23. This includes actual data up to FY2020-21 and forecasts after that.
- RBA yearly average of bond yields for non-financial corporate BBB-rated monthly-coupon 10-year bonds. This data is available for FY2021-22, and a simple trend is used to project this to FY2022-23.
- Total contributed equity to nbn in FY2022-23 was \$29.5 billion, as recorded in nbn's FY2021-22 annual report.²¹

Actuals approach

To calculate the excess debt under this approach we take the \$26.3 billion of expected actual debt and subtract the benchmark debt. This returns a value of \$15.1 billion.

To calculate ICRA, we gross this value by the 30% tax rate to arrive at a final ICRA value of \$21.6 billion.

Simulation approach

First, we simulate the amount of debt required to fund CAPEX for every year between FY2007-08 and FY2022-23. This is done by multiplying the amount of CAPEX for that year by the benchmark debt-to-RAB ratio.

Then, we grow the cumulative debt balance each year by the benchmark cost of debt. To calculate the interest cost, we take the average of each year's starting and ending balances, which provides an accurate calculation of interest cost timing. At the end of FY2022-23, the accumulated simulation debt will be \$19.7 billion.

²¹ nbn, "2022 Annual Report."

Each year, we check that the total benchmark invested equity does not exceed nbn’s total actual contributed equity. If it does exceed this amount, then all CAPEX must be funded through debt. Interest is calculated on this debt in the same way as described above. Assuming a benchmark debt-to-RAB ratio of 36.7 percent, no additional debt is accumulated.

We then subtract the benchmark debt of \$11.2 billion from the accumulated simulation debt of \$19.7 billion to arrive at an excess debt of \$8.5 billion. We gross this value for tax, resulting in a required ICRA of \$12.1 billion.

Difference between the two approaches

To explain the \$6.7 billion difference between the excess debt levels for the two approaches, we consider the difference between the actual and simulated financing. As shown in Table 3.1, in FY2021-22 actual financing exceeds the benchmark by \$11.2 billion. Two factors could explain this gap:

- The reported plant and equipment tangible assets in the nbn accounts for FY2021-22 were \$32.9 billion²² compared to the RAB of \$29.1 billion.
- The accumulated operating losses can explain the remainder of the gap. While the regulatory benchmark calculation assumes that capital would have been contributed to fund investments and that no return on and of capital has been possible, it does not consider the capital needed to cover the operating losses.

Table 3.1: Comparison of benchmark and actual financing of nbn FY2021-22 (\$ billion)

	Benchmark capital structure level	Simulated firm	nbn actual
Debt	10.7	17.5	24.5
Equity	18.4	25.2	29.5
Total financing	29.1	42.8	54.0

3.2 Credit score method

3.2.1 Methodology

Instead of focusing on the capital structure, the credit score method looks at how much ICRA is required for nbn to be assessed as investment-grade by a quantitative credit rating model.

Our credit assessment is based on Moody’s quantitative credit rating model. This model takes several inputs and a series of Moody’s proprietary weightings to calculate a credit score, which is then classified into a credit rating.²³ We note that the results of the quantitative credit rating

²² nbn, “2022 Annual Report.”

²³ A more detailed understanding of the Moody’s quantitative credit rating model for communications infrastructure can be found here: *Moody’s Investors Service, “Rating Methodology: Communications Infrastructure,”* 25 February 2022.

model are only one part of Moody's decision-making when providing credit ratings. Analysis of qualitative factors usually weighs heavily in decision-making. However, the quantitative model provides a transparent and replicable measure of creditworthiness and should be sufficient to indicate the required ICRA.

The calculation process starts with forecasting nbn's credit score without any ICRA. We input nbn's actual and forecast financial position, and the model outputs a credit rating. We then solve for the minimum amount of notional additional revenue ('NAR') needed in that year to close the gap between the actual credit rating and the target BBB rating. Finally, we calculate the present value of the NAR (discounted to FY2022-23), which is the required ICRA.

Cost of debt considerations

At present, nbn enjoys implicit Government support for its debt and hence has a reasonable cost of debt despite not having an investment-grade credit rating, and even appears to enjoy some advantage over the cost of debt of the benchmark firm. However, we believe that in line with the usual regulatory approach, it is appropriate to assume that from FY2023-24 all debt costs are for a stand-alone benchmark firm with a BBB credit rating. This assumption is consistent with the following factors:

- The shareholders' desire for nbn to have the ability to support itself.
- Avoiding any financeability gaps where nbn could fall below investment grade. nbn is required to fully repay the \$19.5 billion related party debt instrument owed to the Government by June 2024, meaning all of nbn's debt will be on a commercial basis. At the same time, commercial constraints will continue to reduce nbn's revenue relative to its ABBRR until FY2029-30. If nothing is made available to bridge these two events, nbn may have trouble seeking financing and may have to reduce efficient CAPEX or service levels.
- The need to regulate nbn on a stand-alone basis to remain consistent with competitive neutrality principles.

Under this assumption, we use the cost of debt forecast from nbn's WACC formula to maintain consistency with the rest of the SAU.

However, we have also calculated a variation of this method where nbn's cost of debt includes the assumption of implicit Government support to FY2028-29, and from FY2029-30, a stand-alone cost of debt is considered. While this variation is not consistent with the principles set out above, it is likely closer to nbn's actual cost of debt and thus merits consideration.

Treatment of additional equity injection

We assume the \$2.4 billion equity injection announced by the Minister for Communications can be used to pay down debt and thus will reduce the amount of required ICRA. While it was announced that the \$2.4 billion would be provided to nbn over the next four years, we do not have a good understanding of the exact timing of these cash flows. An equity injection enables the credit ratios to be achieved with lower ICRA inflows. Hence, we assume that the net effect is a reduction of ICRA of \$2.4 billion in FY2022-23 present value terms.

3.2.2 Calculation

The calculation of ICRA according to the present value method occurs in two stages:

1. Calculating nbn's projected credit score without ICRA using a quantitative credit rating model
2. Optimising a value of ICRA such that nbn's credit score each year reaches the SIG credit rating.

Quantitative credit rating model

The Moody's model has four financial metrics as inputs:

- **Free funds from operation ('FFO') margin**—FFO is calculated as EBITDA minus tax and interest. The FFO margin is FFO divided by revenue. Moody's weighting for this input is 40 percent
- **The ratio of EBITDA to interest**—Moody's weighting for this input is 30 percent
- **The ratio of free cash flow ('FCF') to debt**—Free cash flow is calculated as EBITDA minus interest and CAPEX. Moody's weighting for this input is 10 percent
- **The ratio of debt to EBITDA**—Moody's weighting for this input is 20 percent.

To calculate the financial metrics, we take the following directly from nbn's BBM to remain consistent with the rest of the SAU. All these factors are estimated for FY2020-21 and forecast from FY2021-22.

- **Revenue**—Both nbn's own commercial revenue projection and ABBRR revenue. The commercial revenue projection represents the commercial constraints on nbn's revenues (i.e. the constraints that force nbn to under-recover compared to the ABBRR in the initial years of the project).
- **CAPEX**
- **OPEX**
- **Regulatory asset base**
- **Regulatory depreciation**
- **WACC**
- **Tax inputs**—Including taxable profits, tax loss carried forward, tax rate, and the utilisation of imputation credits.
- **Interest rates**—As described in the Methodology section, our base-case interest rate is that of a stand-alone entity. We use the cost of debt forecast used in the calculation of WACC for this input. Our variation using nbn's actual cost of debt uses nbn's own interest rate forecast.

Throughout our analysis of nbn's interest costs, we make the simplifying assumption that all of nbn's commercial debt is at a variable rate. Setting out the individual cost of each fixed debt note would only add spurious accuracy at the cost of significantly increasing modelling complexity.

The remaining inputs are calculated or assumed from outside the BBM:

- **nbn's projected actual revenue**—We use nbn's commercial revenue projection until the end of FY2028-29 and ABBRR from FY2029-30 onwards.
- **Debt owed to the Government**—The \$19.5 billion debt facility from the Government must be fully repaid in FY2023-24. While the opening balance of the facility in FY2022-23 is \$6.4 billion, the agreement stipulates that nbn cannot further draw down from this facility. Thus, this facility's interest and principal repayment must be funded through new commercial debt.
- **Commercial debt**—The opening balance of commercial debt in FY2022-23 is expected to be \$18.1 billion. For each subsequent year, we add free cash flow from operations and subtract CAPEX to calculate the amount nbn will pay to service debt. Our free cash flow from operations is calculated as follows:

$$(ABBRR - OPEX - \text{under-recovery of ABBRR})$$

As described above, we also include any additional debt raised to service the Government debt facility. We then calculate an interest payment by multiplying the average commercial debt over the year by the applicable interest rate.

Given all these inputs, Moody's model will produce a credit score, which can be translated into a credit rating. Each credit rating consists of a range of credit scores.

Calculating the required ICRA

The next step is to increase nbn's revenue by some amount, the NAR, to achieve the target credit rating.

Each year, the NAR increases nbn's EBITDA and thus improves all four metrics related to earnings.

The NAR also improves the balance sheet factors used in these metrics. The NAR accumulates in a NAR account, which is used to offset debt in calculating the FCF to debt ratio and the EBITDA to debt ratio. The NAR is not used immediately to pay down actual debt because, as a representation of ICRA, it is an intangible asset. nbn's revenue is always bound by commercial constraints, so ICRA can only be converted to a cash asset to the extent that nbn's commercial revenue constraint exceeds the ABBRR. Cash is only drawn from the NAR account and used to pay down debt where ICRA would be available to do the same. As an intangible asset, we do not apply any interest or inflation changes to the NAR account.

We need to find the lowest amount of NAR needed for the credit rating model to assess nbn as an investment grade each year.

To calculate this, we run an optimisation program. This program will iteratively increase NAR until the credit score reaches the desired level for the year. Because of the complexity of Moody's model, there may be multiple values of NAR that allow nbn to reach the desired credit score. To account for this, we use an optimisation function that starts at zero and iterates upwards. This will make it more likely for the program to find the minimum value of NAR.

Consider the following simplified example in Table 3.2. Here, the first row shows nbn's credit scores each year before the addition of NAR. The following row shows what we have calculated as

the minimum NAR required for nbn to reach a credit score of 9.5—the lower bound of the BBB/Baa2 credit rating. In the last row, we can see that following the addition of ICRA, nbn’s credit score is indeed 9.5 each year.

Table 3.2: ICRA calculation example

	FY23-24	FY24-25	FY25-26	FY26-27	FY27-28	FY28-29	FY29-30
Credit score without ICRA	19.0	18.7	18.4	16.8	16.4	15.5	15.0
Additional notional revenue required to meet a Baa1 credit rating (\$ million)	2,403	2,392	2,439	2,040	1,974	1,763	1,989
Credit score with ICRA	9.5	9.5	9.5	9.5	9.5	9.5	9.5

Next, the NAR is discounted to find the present value of ICRA to be crystallised at the end of FY2022-23. The discount rate used to find the present value of ICRA is the real WACC. WACC is used as the discount rate because ICRA is an asset that must be funded at the opportunity cost of capital. We use the real WACC as opposed to the nominal WACC to avoid double counting the effect of inflation because the ICRA will be indexed by inflation.

3.3 Comparing the two methods

The benchmark and credit score methods have the same high-level logic. They are trying to find how much ICRA is required for nbn to achieve an investment-grade rating but do so with different points of emphasis.

The credit score method is cashflow focused and measures credit ratings according to a quantitative credit rating model that takes a variety of metrics as inputs. This differs from the benchmark method, which focuses on debt and RAB and measures creditworthiness according to capital structure.

These differences in emphasis also lead to different treatments of some key factors:

Capital structure

Both the credit score method and the actuals approach to the benchmark method assume nbn’s current actual capital structure. This assumption provides more accurate calculations in finding the amount of ICRA nbn requires. However, this does not address the criticism that nbn’s current capital structure reflects past arbitrary decisions by the shareholders.

The simulation approach to the benchmark method addresses this criticism by calculating a benchmark level of debt. However, this introduces the risk that the solution is insufficient for nbn to meet an investment-grade rating.

Treatment of the post-FY2022-23 period

While the credit score method considers the effects of cashflows throughout the SAU period, the benchmark method only considers the period between the start of nbn and the ICRA

crystallization date. As a result, the benchmark method has almost no forecasting risk, which is a significant risk to the credit score calculation. Importantly, some factors occurring after FY2022-23 impact the credit score method but not the benchmark method.

- **Under recovery**—Current forecasts expect nbn to be under-recover compared to the ABBRR until the start of FY2029-30. However, the benchmark method does not consider the under-recovery occurring after FY2022-23. This will likely mean that after crystallization, nbn will return to having a higher debt-to-RAB ratio than is efficient. On the other hand, the credit score method acknowledges this difference in its cash flow inputs and accounts for this.
- **Equity injection**—Under the benchmark approach, the Government’s equity injection is not considered as it occurs after the crystallization date. By contrast, the credit score approach accounts for this injection, which reduces the ICRA.

3.4 Results

The benchmark method calculates the value of the required ICRA as \$12,145 million for the simulation approach and \$21,749 million for the actuals approach. Table 3.3 also shows a range of values for ICRA if we shift the assumption of the efficient debt-to-RAB ratio away from what is consistent with the calculation of WACC.

Table 3.3: Benchmark method ICRA values under different efficient capital structure assumptions

	Debt-to-RAB ratio	ICRA value
Actuals approach	nbn actual: 87%	\$21,599 million
	30%	\$11,207 million
Simulation approach	Efficient debt-to-RAB ratio: 36.7%	\$12,145 million
	40%	\$13,227 million
	50%	\$16,533 million

The credit score method calculates the value of the required ICRA as \$16,035 million. Table 3.4 shows the values for ICRA if we shift the assumptions about nbn’s cost of debt.

Table 3.4: Credit score method ICRA values under different debt cost and WACC assumptions

Assumed debt cost	ICRA required
nbn's forecast actual cost of debt	\$13,229 million
<ul style="list-style-type: none">nbn's forecast actual cost of debt to FY2028-29; andBenchmark cost of debt from FY2029-30 to FY2039-40.	\$12,089 million
Base case: Benchmark cost of debt	\$16,035 million

As shown in the tables above, even when the assumptions deviate quite significantly from what is consistent with the rest of the SAU, the range of ICRA values calculated is between \$11,207 million and \$21,599 million. To avoid spurious accuracy, we may approximate this range as somewhere between \$10 billion and \$20 billion, with half of the values lying between \$12 billion and \$15 billion.

Castalia understands that nbn is proposing to retain an ICRA of \$12.5 billion. We consider this a reasonable value as it sits on the conservative side of the broader range of values while mitigating some of the risk to nbn that future economic factors prove to deviate significantly from their current forecast values. This amount also appears consistent (in present value terms) with the revenues that nbn can expect to earn given the competitive market constraints.



Castalia is a global strategic advisory firm. We design innovative solutions to the world's most complex infrastructure, resource, and policy problems. We are experts in the finance, economics, and policy of infrastructure, natural resources, and social service provision.

We apply our economic, financial, and regulatory expertise to the energy, water, transportation, telecommunications, natural resources, and social services sectors. We help governments and companies to transform sectors and enterprises, design markets and regulation, set utility tariffs and service standards, and appraise and finance projects. We deliver concrete measurable results applying our thinking to make a better world.

**Thinking
for a better
world.**

WASHINGTON, DC

1747 Pennsylvania Avenue NW, Suite 1200
Washington, DC 20006
United States of America
+1 (202) 466-6790

SYDNEY

Level 19, 227 Elizabeth Street
Sydney NSW 2000
Australia
+61 (2) 9231 6862

AUCKLAND

74D France Street, Newton South
Auckland 1010
New Zealand
+64 (4) 913 2800

WELLINGTON

Level 2, 88 The Terrace
Wellington 6011
New Zealand
+64 (4) 913 2800

PARIS

3B Rue Taylor
Paris 75481
France
+33 (0)1 84 60 02 00

BOGOTÁ

Calle 81 #11-08, Piso 5, Oficina 5-121
Bogotá
Colombia
+57 (1) 508 5794

enquiries@castalia-advisors.com
castalia-advisors.com