CONSULTATION PAPER 1

nbn 2025 Replacement Module Application

November 2024

nbn acknowledges First Nations peoples and recognises their role as the traditional owners of the lands and waters across Australia. We are privileged to work across all corners of this vast country and pay our respects to all Elders past, present and emerging.

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Disclaimer

nbn is required to submit to the Australian Competition and Consumer Commission (ACCC) by 2 July 2025 a Replacement Module Application for the Regulatory Cycle commencing 1 July 2026, pursuant to nbn's Special Access Undertaking. The information in this document is provided solely for the purpose of consulting on nbn's upcoming Replacement Module Application and should not be relied upon for any other purpose. The forecasts and indicative estimates in this document are based on assumptions, are inherently uncertain and are subject to a range of risks such that actual performance may differ materially from those forecasts or indicative estimates. Any financial values relating to the period from FY29 onwards are indicative estimates / Management 'projections' only – they do not reflect an operational forecast and do not include the full potential capex requirements (or account for specific operational timing) to meet future customer demand and network lifecycle requirements over time.

nbn is a wholesaler. References to speeds or bandwidth profiles in this document are not to end customer speeds; they are wholesale layer 2 peak information rate (PIR) bandwidth provided to retail providers unless stated otherwise. An end customer's experience, including the speeds actually achieved over the nbn® network, depends on the nbn® network technology and configuration over which services are delivered to their premises, whether they are using the internet during the busy period, and some factors outside of nbn's control (like the end customer's equipment quality, software, chosen broadband plan, signal reception, or how their provider designs its network). Refer to nbn's website and the Wholesale Broadband Agreement for further information.

Environment

nbn asks that you consider the environment before printing this document.

Contents

Glossary

nbn is committed to minimising the use of technical terms during this engagement. The table below provides some terms nbn use and their definitions.

Term	Definition
Benchmark Service Standards	A set of regulated service levels and performance objectives for nbn's key layer 2 wholesale broadband service, and any rebates payable by nbn and/or corrective action required by nbn where it does not meet those service levels and performance objectives. The SAU requires nbn to include in its standard form wholesale supply contract with RSPs (known as its Standard Form of Access Agreement) an obligation to meet or exceed service standards that are no less favourable to RSPs than the applicable Benchmark Service Standards.
Customers	People in Australian homes and businesses using services on the nbn® network.
Consumer advocacy group or consumer advocates	Organisations or entities who advocate for Australian customers of telecommunication products and services.
Enterprise Ethernet	nbn product with dedicated fibre from the business premises to nbn's Fibre Access Node.
Entry level Offer	The speed tier on each of nbn's fixed-line and fixed wireless networks that is subject to a stricter individual price control under the SAU. Under this price control, prices may only increase each year by up to CPI. As part of its RMA, nbn must propose the speed tier which will be the 'Entry Level Offer' for the next Regulatory Cycle. Among other requirements, it must be a speed tier that nbn reasonably considers to be its 'entry level service' and have a download speed that is lower than nbn's most popular speed tier.
Financial Year	12-month period from July 1 to June 30 of the following year
Fixed Wireless	A nbn Fixed Wireless connection uses data transmitted over radio signals to connect a premises to the nbn® network. For more information see https://www.nbnco.com.au/learn/network-technology/fixed-wireless-explained

Term	Definition
FTTB	A Fibre to the Building (FTTB) connection is generally used when we are connecting an apartment block or similar types of buildings to the nbn® network. In this scenario we run a fibre optic line to the fibre node in the building's communications room, and then we use the existing technology in the building to connect to each apartment. For more information see https://www.nbnco.com.au/learn/network-technology/fibre-to-the-building-explained-fttb
FTTC	Fibre to the Curb (FTTC) uses a fibre connection to a Distribution Point Unit (DPU) near a customer's premises. From here, the existing copper network is connected to the fibre network to connect the customer's premises to the nbn® network. For more information see https://www.nbnco.com.au/learn/network-technology/fibre-to-the-curb-explained-fttc
FTTN	Fibre to the Node (FTTN) uses a fibre optic line to connect the nbn® network to a node (street cabinet) nearby a customer's premises. The node then uses the existing copper network to make the final part of the network connection to the customer's premises. For more information see https://www.nbnco.com.au/learn/network-technology/fibre-to-the-node-explained-fttn
FTTP	Fibre to the Premises (FTTP) connects a fibre optic line from the nearest available node on the street to a customer's premises, connecting them to the nbn® network. This uses a fibre optic line for the whole connection. For more information see https://www.nbnco.com.au/learn/network-technology/fibre-to-the-premises-explained-fttp
HFC	nbn Hybrid Fibre Coaxial (HFC) connection uses a combination of optical fibre and coaxial cables to reach a customer's premises. The HFC line will be run from the nearest available fibre node to the customer's premises. For more information see https://www.nbnco.com.au/learn/network-technology/hybrid-fibre-coaxial-explained-hfc-3
Replacement Module Application or RMA	The proposal that nbn will submit to the Australian Competition and Customer Commission by 2 July 2025 setting out nbn's proposals for the Regulatory Cycle commencing 1 July 2026, including in respect of

Term	Definition
	expenditure, service standards, the entry level offer and length of the Regulatory Cycle.
Retail Service Provider or RSP	Retail Service Providers acquire wholesale broadband services from nbn and supply broadband service solutions to customers using services on the nbn® network. In this document, references to Retail Service Providers also include access seekers – a service provider who makes, or proposes to make, a request to take supply of a regulated telecommunication service supplied by nbn, including so the provider can be a wholesaler or retailer of nbn services.
Sky Muster® Satellite	The Sky Muster Satellite service delivers the nbn® network to homes and businesses in regional and remote Australia, via two geosynchronous satellites. Satellites communicate between the customer's premises and ground stations, with beams set to cover all of the Australian mainland and surrounding islands.
Special Access Undertaking or SAU	The Special Access Undertaking given by nbn to the Australian Competition and Consumer Commission, as varied and approved by the ACCC on 17 October 2023. The Special Access Undertaking is a key part of the regulatory framework that governs the prices and certain non-price terms on which nbn – as the operator of a wholesale, open access telecommunications network – supplies services to Retail Service Providers.
Stakeholder	Individuals, a group of individuals, organisations or a political entity with a specific stake in the outcome of a decision to the impact of a policy, project or proposition.
Transit Network	Refers to the connection between Points of Interconnect (PoIs) in the Aggregation Nodes where the retail service providers connect to nbn and the Fibre Access Nodes.
WBA	Wholesale Broadband Agreement. The WBA is the contractual vehicle nbn uses to supply products and services to Retail Service Providers.

Executive Summary

Under nbn's Special Access Undertaking (SAU), the current Regulatory Cycle is for three years, from 1 July 2023 to 30 June 2026. Prior to the end of the cycle, nbn must submit to the ACCC a 'Replacement Module Application' (RMA) setting out nbn's proposals for the next Regulatory Cycle, including in respect of expenditure, Benchmark Service Standards, entry level offers and the length of the Regulatory Cycle. The SAU then provides for the ACCC to consider nbn's proposals and make a determination about those matters for the next Regulatory Cycle commencing on 1 July 2026.

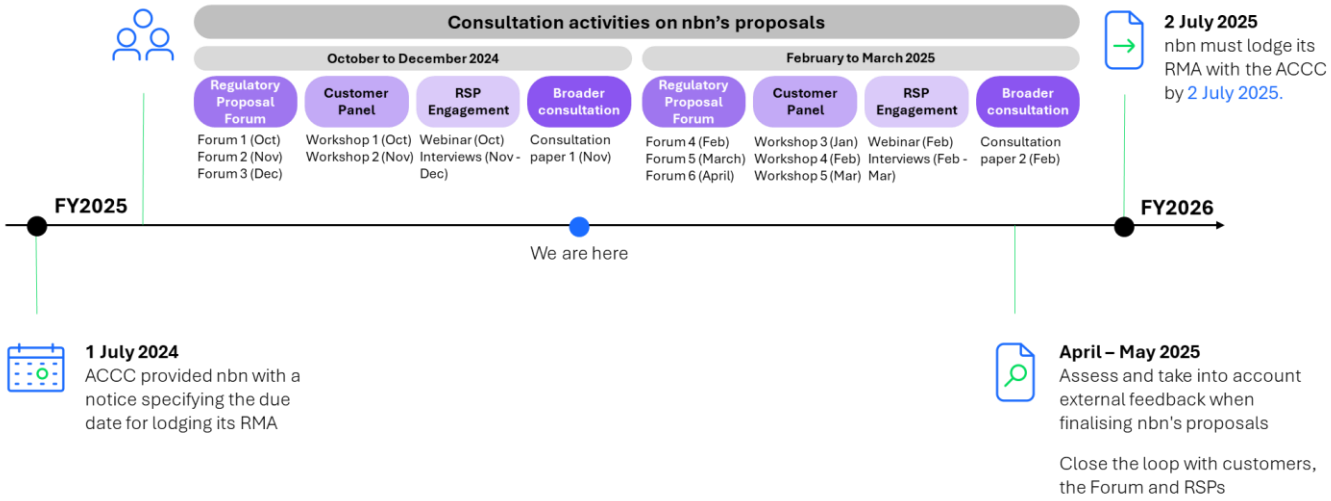
The ACCC notified nbn on 1 July 2024 that the RMA for the next Regulatory Cycle must be provided by 2 July 2025.

nbn's recently published RMA Stakeholder Engagement Strategy sets out nbn's approach to consulting with a range of stakeholders from October 2024 to March 2025 to inform what nbn proposes in the RMA. This consultation process with Retail Service Providers, consumer advocacy groups, and customers is summarised in Figure 1 on the next page.

This document (Consultation Paper 1) complements nbn's engagement with these stakeholders and is the first of two planned consultation papers to invite nbn's stakeholders to provide input into the proposals for the upcoming RMA. As stated by nbn's Interim CEO, Philip Knox, "*We would like to start a conversation with you on our proposals. We will listen to your views and will take into account your input to help set our priorities for future capital investment on network infrastructure and service standards for the next Regulatory Cycle*."[1]

[1] **nbn** Replacement Module Application Stakeholder Engagement Strategy, October 2024, p.3. https://www.**nbn**co.com.au/content/dam/**nbn**/documents/sell/sau/stakeholder-engagement-strategy-**nbn**-replacement-module-application.pdf.coredownload.pdf.

Figure 1: RMA Engagement process



This paper outlines nbn's current expenditure plan for the next Regulatory Cycle to achieve the Company's strategic objectives together with current thinking on which services should be the 'Entry Level Offers' for SAU price control purposes. While some elements of nbn's expenditure are to a degree discretionary, allowing it the flexibility to invest in areas that enhance nbn's service offerings, other elements are mandatory, driven by regulatory requirements and essential operational needs. Through this paper, nbn is seeking stakeholder feedback on nbn's overall expenditure plans.

nbn has also identified some specific topics for feedback – these topics are important, are aligned with our strategic pillars (outlined in section 2.1), and there is scope for the feedback received to have some influence over nbn's future expenditure. nbn's climate transition plan reflects a broader societal interest in sustainability and environmental responsibility and ensures that nbn aligns with the Government's commitment to net-zero. Similarly, the resilience framework is critical for managing service delivery amidst challenges such as natural disasters or cyber threats. The investment to enable speeds greater than 2 Gbps addresses the growing demand for higher connectivity. Additionally, the entry level offer, a proposal nbn must submit to the ACCC, requires careful consideration to ensure it meets regulatory standards and stakeholder expectations. Through the RMA stakeholder engagement program, nbn seeks to refine these plans with valuable input, ensuring they take into account the evolving needs and expectations of all stakeholders.

Given this, Consultation Paper 1 addresses and, where relevant, seeks views on:

- nbn's strategic direction and regulatory context;
- high level expenditure priorities;
- specific expenditure topics that were selected with reference to nbn's strategic pillars, interest areas of stakeholders, and ability for a greater level of influence. These include investments required to enable greater than 2 Gbps speeds, resilience planning and nbn's climate transition plan; and

- entry level offers.

Consultation Paper 2, to be released in early 2025, will pick up on the feedback received on Consultation Paper 1 and seek views on two further topics: migration under nbn's fibre upgrade program; and Benchmark Service Standards.

This engagement will build on current and previous engagements with nbn's stakeholders, including the current engagement with RSPs on Benchmark Service Standards.

nbn's plan for the next Regulatory Cycle

nbn operates as a national wholesale service provider with a multi-technology mix across mainland Australia and Tasmania, and remote islands such as Norfolk Island, Christmas Island, Lord Howe Island and the Cocos (Keeling) Islands. With nine offices and 18 depots nationwide, nbn's workforce included about 4,300 employees as at 30 June 2024.

For the next Regulatory Cycle commencing 1 July 2026, nbn is planning to continue to make investments that enable nbn to deliver on its purpose, meeting demand while continuing the Company's focus on delivering a secure, resilient, sustainable and affordable service for nbn's customers.

nbn's investment plan is being developed in an environment of continually increasing demand for broadband services as the internet continues to transform how we live and work. Changing consumer behaviour means that customers are demanding higher speeds and using their broadband services more intensively.

nbn's investment for the next Regulatory Cycle (proposed to be FY27 to FY29) is focused on delivering the following outcomes:

- **Deliver high quality services** through enhanced RSP and customer experiences, reflected in improved customer satisfaction outcomes.
- **Meet demand for new connections** by expanding the network and connecting new premises to the nbn® network.
- **Meet demand for higher speed services and need for higher capacity**, with the proportion of nbn customers on wholesale download speeds of 100Mbps or higher expected to increase to 65% by the end of FY29
- **Provide secure and resilient services** by ensuring that nbn's network and operations are resilient to climate changes and cyber threats, and continuing to focus on developing a safe, inclusive and engaged workforce.
- **Work towards a sustainable network** through a reduction of Scope 1, 2 and 3 emissions and delivering on nbn's commitment to 100% renewable energy purchases.

- **Deliver affordable services** through efficiency improvements, organisational transformation and other initiatives.

The expenditure plan set out in this consultation paper will be further refined and extended in the lead up to the submission of the RMA to the ACCC on 2 July 2025 to account for stakeholder feedback on nbn's plans, and incorporate updated demand forecasts and proposed changes in Benchmark Service Standards. In particular, nbn is seeking input from stakeholders to inform its plans on matters such as enabling greater than 2 Gbps speeds, resilience planning and nbn's climate transition plan (through this consultation paper), as well as the pace of service upgrades through nbn's Fibre Connect program and Benchmark Service Standards (through the next consultation paper).

How to navigate this document

Section	Purpose	What is nbn seeking feedback on?
nbn's strategic direction and regulatory context	Summarises nbn's purpose, how it plans to deliver on its purpose and how nbn's regulatory framework impacts its pricing.	This information is provided for background only.
Expenditure	Presents an overview of nbn's proposed expenditure for the next Regulatory Cycle, with reference to how this compares to previous Regulatory Cycles. Explains the drivers of nbn's expenditure and the key outcomes nbn is delivering to customers.	1. How does the reduction in forecast overall expenditure by 18.2% for FY27-29 compared with FY24-26 align with your expectations? 2. What are your thoughts on the forecast expenditure being sufficient to meet the needs of nbn's customers? 3. If you could reprioritise nbn's forecast capital expenditure, what would you suggest? 4. If you could reprioritise nbn's forecast operating expenditure, what would you suggest? 5. What trade-offs between expenditure and outcomes would you like nbn to consider?
Climate Transition Plan	Summarises the key activities under nbn's climate transition plan and suggested focus areas for the next Regulatory Cycle, that nbn is seeking feedback on.	6. What are your views on the cost/complexity and benefit assessment of initiatives to contribute to nbn's net-zero goal? Has nbn got the balance right?

		7. Are there other activities could nbn undertake that would produce greater benefits and/or at lower costs? 8. How can nbn address energy consumption associated with broadband use in customer premises? What challenges and opportunities does it create? 9. How through nbn's shared investments and supply chains can it collaborate to reduce emissions? What barriers do you foresee?
Resilience	Presents the increasing focus on resilience and risk management as new threats and risks emerge, ensuring an appropriate balance between proactive risk mitigation and response and recovery capabilities.	10. To what extent do you think nbn has struck the right balance between proactive risk management measures and reactive response and recovery measures? If not, what should nbn prioritise differently? 11. Considering the current and future activities nbn is undertaking: i. What aspects of nbn's proactive risk mitigation should it focus more on? ii. What else should nbn do to respond during major emergencies? What could nbn do more of or differently in relation to expedited recovery after an event?
Investment in FTTP and HFC to enable speeds above 2 Gbps	Presents nbn's plans and timing to transition the network to enable greater than 2 Gbps speeds for FTTP and HFC connections.	12. How important is increasing internet speed to customers? 13. How important is it for Australia to offer services comparable with other developed countries worldwide? Why? 14. What are your views about expected consumer demand for >2 Gbps speeds in the medium-term? 15. What would RSPs require as part of a minimum viable product to productise a new speed tier above 2 Gbps? 16. What would be required for consumers to require and/or take-up a new speed tier above 2 Gbps?

		17. What action should nbn be taking now to deliver higher speeds in the future? When responding to this question, please consider: • nbn's current investment plan is to progressively update the FTTP and HFC networks when it makes sense to do so, with the rollout of the technology that enables speeds >2 Gbps across the FTTP and HFC networks expected to be complete at the end of the next decade. Expenditure for a progressive upgrade of the FTTP and HFC networks is included in the capex plans shown in section 3.4.1. • An accelerated delivery approach would be to update the network more quickly to enable speeds >2 Gbps across the entire network earlier by bringing forward capital expenditure. For example, accelerating the timeframe to complete network upgrades to the end of FY35 would bring forward capital expenditure in the order of $0.6 billion. Accelerating the timeframe to complete the network upgrades to the end of FY32 would bring forward capital expenditure of around $1.2 billion.
Entry Level Offers	Presents the criteria for selection of the Entry Level Offer for SAU price control purposes, and nbn's current view for the Entry Level Offer in the next Regulatory Cycle.	18. To what extent is the 25/5 Mbps speed tier the appropriate Entry Level Offer which would be subject to stricter price controls under the SAU?

Make a submission

Across this document, nbn invites stakeholders to provide their input on targeted areas where their feedback will be reviewed and considered as nbn finalises its plans for the next Regulatory Cycle. nbn is committed to listening to and reflecting on stakeholders' views and priorities in its proposals for the next Regulatory Cycle. nbn's RMA will be accompanied by a report on the feedback it has received, and how that feedback has informed its RMA.

As part of this consultation, nbn welcomes the opportunity to meet with PDF and non-PDF participants to discuss the content and questions in more detail and obtain feedback. PDF Participants please contact your nbn Account Executive or email pdf@nbnco.com.au to request a meeting. Non-PDF participants, please email RMAengagement@nbnco.com.au to request a meeting or to provide written feedback.

Submissions from interested parties are required by 5pm 22 January 2025.

nbn may elect to extend the closing date for submissions. If so, this will be noted on nbn's website.

nbn may choose to publish submissions, subject to any claims of confidentiality. Please note whether information in your submission should be treated as confidential when providing it to nbn.

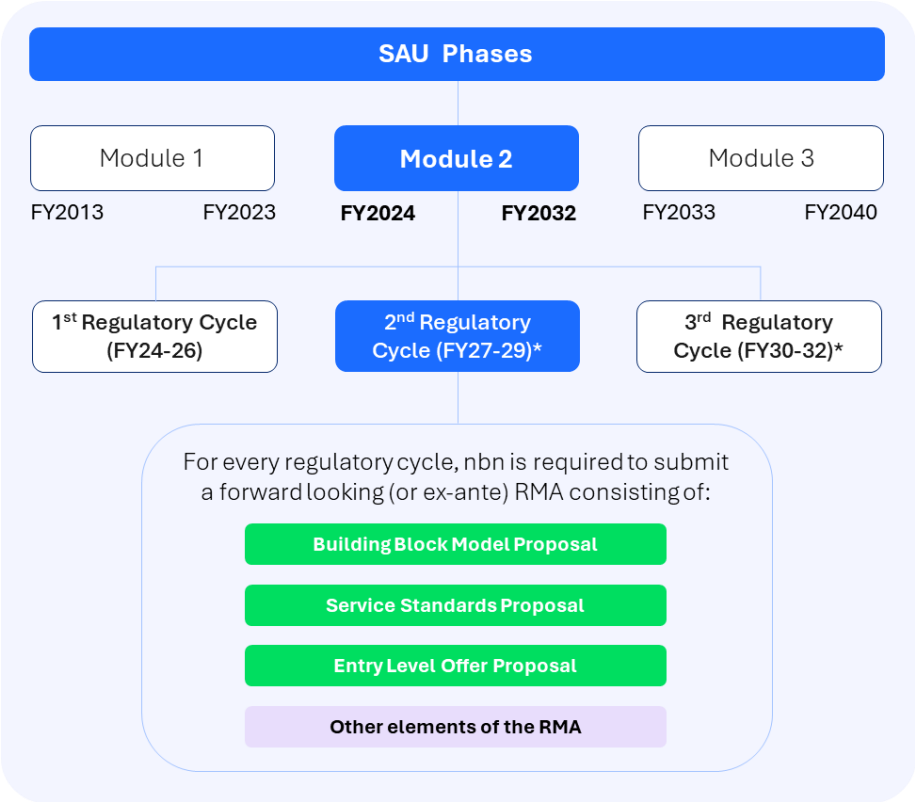
1 Introduction

The SAU requires nbn to periodically set out its proposals on certain matters for the coming years in a Replacement Module Application (RMA). Earlier this year (2024), the ACCC formally notified nbn of the required timing for the RMA for the next Regulatory Cycle.

Accordingly, on 2 July 2025 nbn will submit its RMA to the ACCC for the next Regulatory Cycle that begins on 1 July 2026. nbn will develop the RMA in accordance with the provisions in the SAU (see 2 on the next page), and will include proposals for the upcoming Regulatory Cycle on:

- expenditure (as part of the Building Block Model Proposal);
- Benchmark Service Standards (the Service Standards Proposal);
- the entry level offers, which will be subject to an individual price control of CPI in addition to being included in the weighted average price control (the Entry Level Offers Proposal); and
- length of the Regulatory Cycle, for which nbn is proposing a three-year Regulatory Cycle. nbn is not seeking views on this proposal as part of the consultation paper.

Figure 2: SAU phases



**nbn is proposing a three-year Second Regulatory Cycle as part of the RMA. The SAU provides for the ACCC to determine the length of the Second Regulatory Cycle in the Replacement Module Determination (RMD).*

The RMA will be informed and shaped by a wide range of factors, including feedback from consumer advocacy groups, RSPs and customers of broadband services supplied over the nbn network.

The ACCC will review the RMA and can conduct its own consultation process during Financial Year 2026 and make a Replacement Module Determination (RMD) on nbn's proposals.

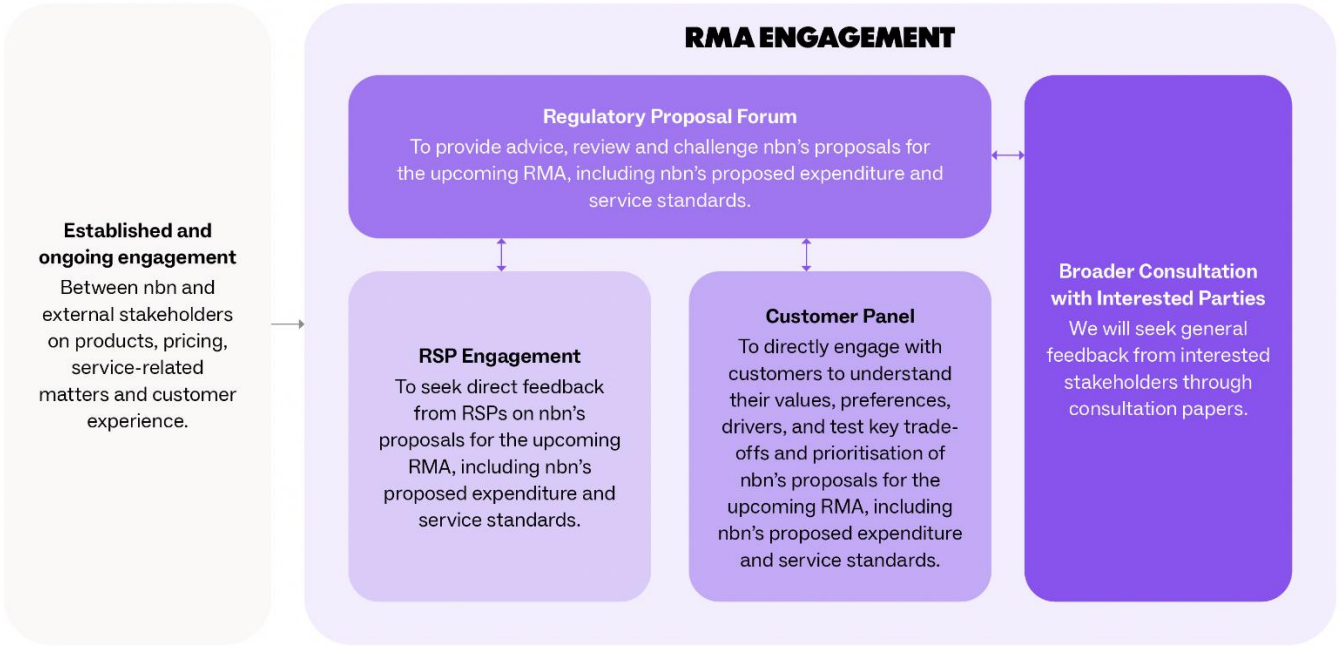
nbn's recently published RMA Stakeholder Engagement Strategy[2] sets out the company's approach to consulting with a range of stakeholders from October 2024 to inform what nbn proposes in the RMA. Drawing on good practice from similarly regulated entities in the energy and water sectors, the strategy details:

[2] **nbn** Replacement Module Application Stakeholder Engagement Strategy, October 2024, p.3. https://www.nbnco.com.au/content/dam/nbn/documents/sell/sau/stakeholder-engagement-strategy-nbn-replacement-module-application.pdf.coredownload.pdf.

- why engagement is needed;
- nbn's approach to engagement with RSPs, consumer advocacy groups, other industry stakeholders and customers;
- when engagement will occur; and
- how feedback from engagement will inform nbn's proposals.

This document (Consultation Paper 1) is the first of two planned consultation papers to invite nbn's stakeholders to provide input into the RMA engagement process. As set out in nbn's engagement strategy (see Figure 3 below), the consultation papers complement the activities being undertaken in the three separate stakeholder engagement streams.

Figure 3: Engagement activities



Consultation Paper 1 addresses and, where relevant, seeks views on:

- nbn's strategic direction and regulatory context – section 2;
- high level expenditure priorities – section 3;
- specific expenditure topics that were selected with reference to key focus areas for nbn, interest areas of stakeholders, and ability for a greater level of influence. These include:
  - climate transition plan – section 4.1;
  - Resilience – section 4.2; and
  - investments required to enable greater than 2Gbps speeds – section 4.3;
- entry level offers – section 5.

Consultation Paper 2, to be released in early 2025, will (subject to timing) pick up on the feedback received on Consultation Paper 1 and seek views on two further topics: migration under nbn's fibre upgrade program; and Benchmark Service Standards.

This engagement will build on current and previous engagements with nbn's stakeholders, including the current engagement with RSPs on service standards.

2 nbn's strategic direction and regulatory context

2.1 nbn's strategic direction

nbn was established in 2009 as a Government Business Enterprise (GBE), wholly owned by the Commonwealth Government. The principal responsibility of the Company is to operate and continue to build and upgrade the national broadband network (nbn® network) in accordance with the Government's Statement of Expectations (SoE) issued to nbn by its Shareholder Ministers (issued 19 December 2022).[3]

nbn operates as a wholesale-only national broadband network provider, providing access to retail phone and internet companies (Retail Service Providers or RSPs) who, in turn, can supply broadband services to residential and business customers across Australia.

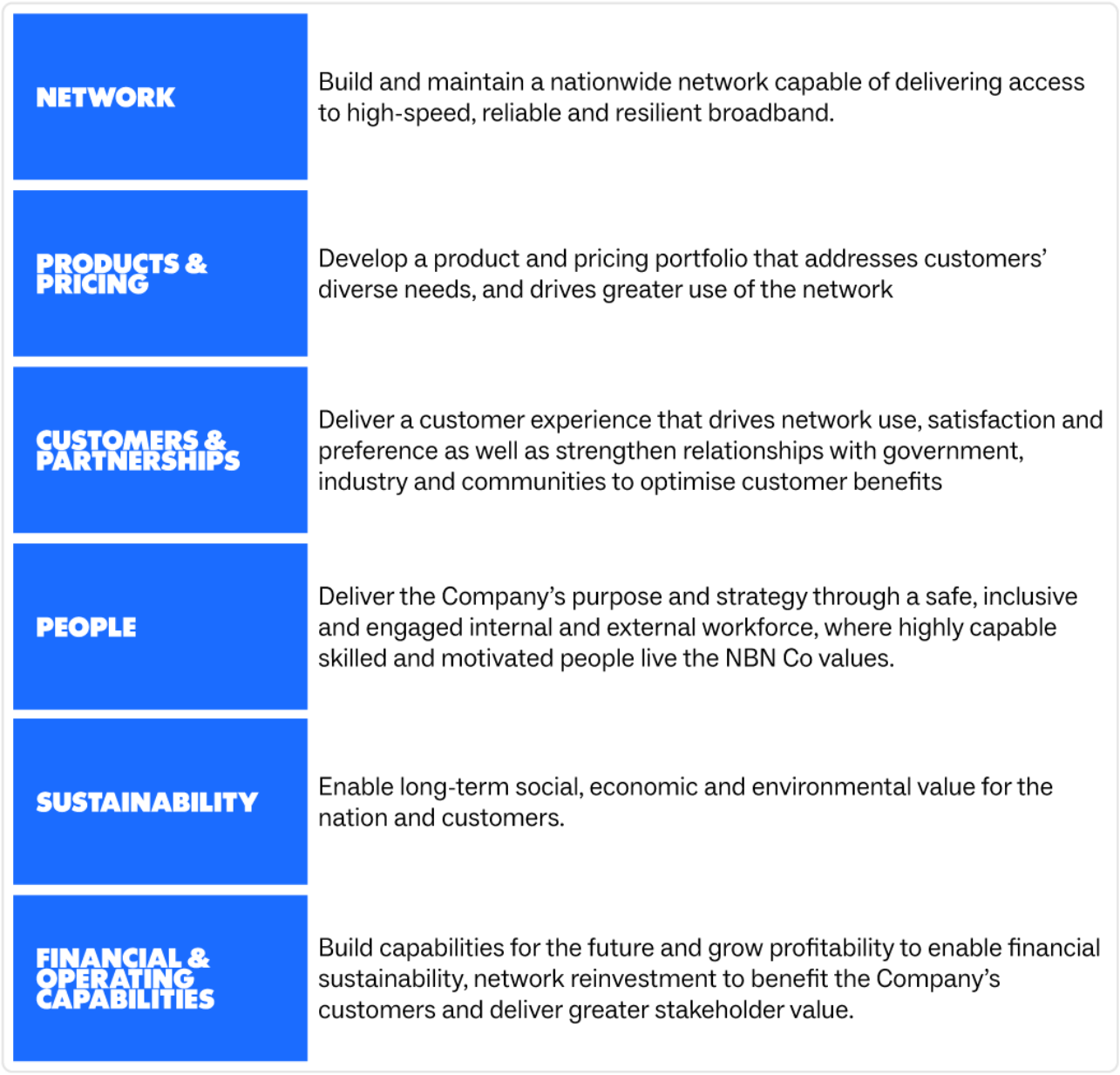
nbn's purpose is to lift the digital capability of Australia, consistent with the Statement of Expectations. nbn aims to achieve its purpose by providing fast, reliable and affordable connectivity via wholesale broadband services which meet the current and future needs of Australian households, communities and businesses.

nbn operates on a commercial basis and must be commercially sustainable to support its ongoing prudent and efficient investment in the network, to service and repay its debt obligations, and to achieve and maintain a standalone investment grade credit grade rating.

nbn aims to deliver upon its purpose by progressing the following strategic pillars presented in Figure 4.

[3] NBN Co Limited, Statement of Expectations, 19 December 2022, https://www.**nbn**co.com.au/content/dam/**nbn**/documents/about-**nbn**/policies/statement-of-expectations-2022.pdf.coredownload.pdf

Figure 4: nbn's strategic pillars



Further information on how nbn creates value and the Company's operating environment is provided in nbn's *Statement of Corporate Intent 2025*.[4]

2.2 Regulatory context

In considering nbn's proposals as part of the RMA, it is important to understand that:

- in addition to the SAU, there are a range of other regulatory arrangements in place to ensure that all Australians have access to telecommunications services, regardless of their location; and
- nbn does not currently earn sufficient revenue from its prices to recover its annual building block costs as calculated for the purposes of the SAU.

These are discussed further below.

2.2.1 Other relevant regulatory arrangements

There are a range of regulatory arrangements in place to ensure that all Australians have access to telecommunications services, regardless of their location. These arrangements include the Statutory Infrastructure Provider regime and the Regional Broadband Scheme (which primarily covers how essential broadband services in regional, rural and remote Australia are funded).

The Statutory Infrastructure Provider regime

The Statutory Infrastructure Provider, or SIP, regime came into effect on 1 July 2020 through amendments to the Telecommunications Act 1997 (Cth) and provides a framework to ensure that premises in Australia can be connected to, and supplied with, superfast broadband internet services (i.e. peak download and upload speeds of at least 25/5 Mbps). Under the SIP regime, the Australian Parliament intends that nbn should take reasonable steps to ensure that its fixed-line network is capable of being connected to at least 92% of premises in Australia. In the majority of Australia, nbn is the default SIP and is required to connect and supply services upon reasonable request from a carriage service provider on behalf of an end user. Where carriers other than nbn are contracted to provide services for new developments (or had existing superfast network infrastructure in place at the time the SIP legislation passed), those carriers are the SIPs for those particular locations. In total, there are 33 registered SIPs, including nbn.

In locations where nbn is the SIP, it is required (subject to certain limited exceptions) to connect end user premises to the nbn® network and supply wholesale services at the reasonable request of the carriage service provider on behalf of an end user. The Australian Communications and Media Authority maintains a register that includes the name of each SIP.

[4] https://www.**nbn**co.com.au/content/dam/**nbn**/documents/about-**nbn**/reports/corporate-plan/**nbn**-co-statement-of-corporate-intent-2025.pdf.coredownload.inline.pdf

The SIP regime includes broad powers for the Minister to make legislative standards, benchmarks and rules which must be complied with by SIPs relating to any matter concerning the connection, supply, or proposed connection or supply, of an eligible service to a carriage service provider. The regime includes broad inconsistency provisions, which in effect mean SIP standards, rules and benchmarks will override other regulatory instruments (such as Access Determinations, Binding Rules of Conduct or the SAU). There are currently no standards, rules and benchmarks in place.

The SIP legislation was amended in June 2024, with key changes including bringing private networks in new developments into the SIP regime and providing stricter rules for the exit of SIPs from a service area.

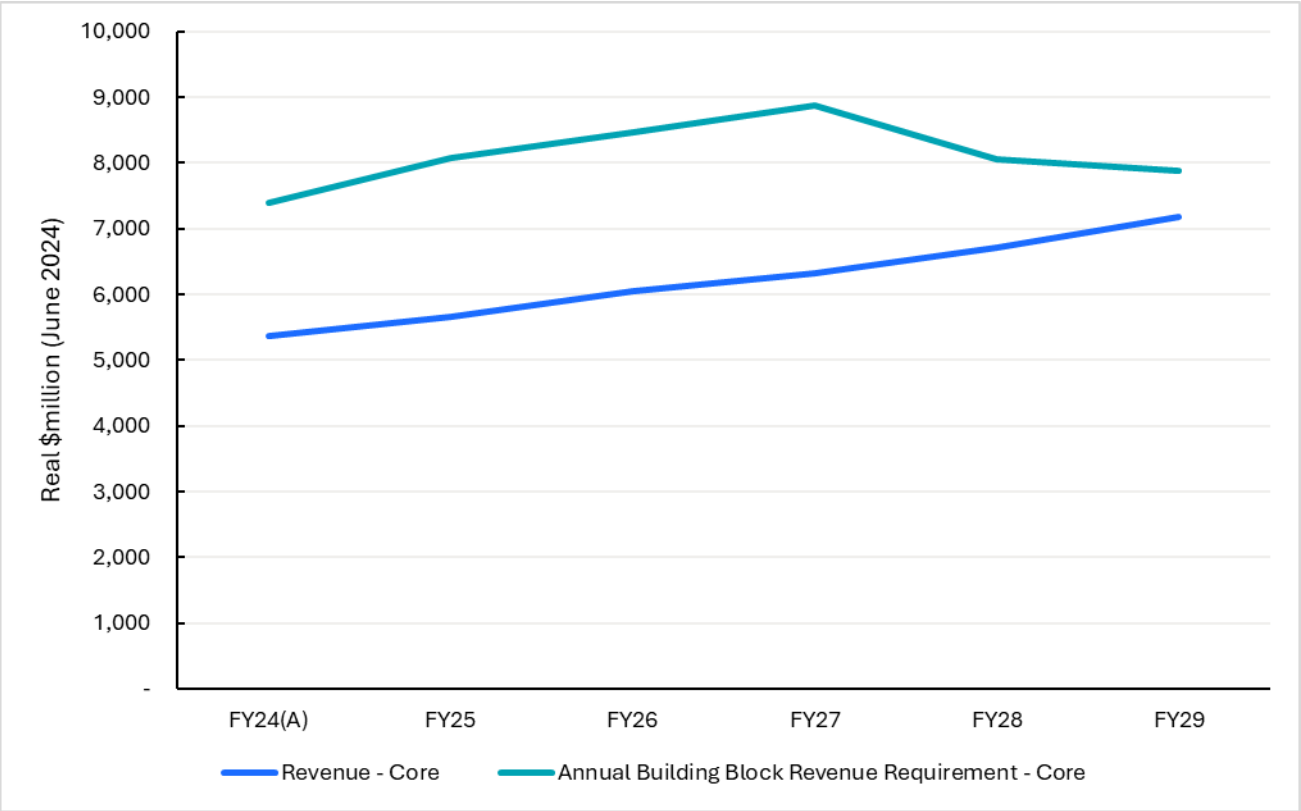
Regional Broadband Scheme

On 1 January 2021, the Regional Broadband Scheme, or RBS, came into operation. The objective of the RBS is to ensure transparent and sustainable funding for essential broadband services in regional, rural and remote Australia. The RBS established a charge (i.e. tax) payable by liable carriers (including nbn). nbn and other liable carriers are also required to comply with reporting obligations, such as to assess the number of chargeable premises that should be charged, and annually publish certain financial and operational metrics related to nbn's fixed wireless and satellite networks on its website. While nbn contributes the vast majority of funds to the RBS, nbn is a net recipient of funds from the scheme. The funding nbn receives via the RBS is accounted for within the SAU's building block framework.

2.2.2 Pathway to cost recovery under the SAU and its implications

nbn does not currently earn sufficient revenue from its prices to recover its annual building block costs as calculated for the purposes of the SAU (see Figure 5 on the next page).

Figure 5: nbn's forecast path to cost recovery[5]



In this context, the SAU regulates nbn's price path as it moves towards a point of cost recovery through the use of a Weighted Average Price Control (WAPC), which allows nbn to increase its prices on most services on average up to CPI each year.

While facing competition from high speed wireless broadband services, Low Earth Orbit (LEO) satellite services, and alternative fixed line broadband networks, nbn is currently forecast to be on track for its annual revenues to recover its annual building block costs by around financial year 2031. This reflects the combined effects of forecast ongoing growth in take-up and usage, the price increases allowed under the SAU, and continued focus on prudent and efficient investment decisions.

After that initial transition period, which is forecast to be outside the next Regulatory Cycle, the SAU will regulate nbn's prices by reference to its annual building block costs and an annual drawdown of its

[5] Revenue and costs relate to **nbn**'s Core Regulated Services, which exclude only Enterprise Ethernet, Business Satellite Service and Satellite Mobility for Large Commercial Passenger Aircrafts

historical unrecovered costs (as recorded in the Initial Cost Recovery Account or ICRA) that the ACCC will determine in accordance with the SAU framework.

In the meantime, there are two key differences in nbn's regulatory context from typical regulated entities in sectors such as energy and water.

- First, nbn's forecast expenditure for the next Regulatory Cycle will not impact on prices for that cycle. However, expenditure in this Regulatory Cycle will influence:
    - services being provided in the next and subsequent Regulatory Cycles; and
    - future nbn wholesale prices, once they are based on nbn's costs (after around FY31).
- Second, any proposals to increase total forecast expenditure would need to be funded without relying on price increases.

Referring back to Figure 5 on the previous page, the expenditure decisions nbn makes through the RMA process will be important for the trajectory of both the blue (revenue) and green (cost) lines, noting that future revenues (and the products and service standards on which they are based) are dependent on current and upcoming investments.

3 Expenditure

Summary

- nbn is forecasting total expenditure of $14.5 billion (real June 2024 dollars) for FY27 to FY29.
- This is a significant reduction of 18% from nbn's expected expenditure in the current Regulatory Cycle (FY24 – FY26). This reflects a shift from 'build' to 'operate', including the expected completion of the build of the local fibre network as part of the FTTN to FTTP upgrade program in December 2025.
- nbn's forecast expenditure is intended to enable nbn to deliver on its purpose, and meet the demand for new connections, higher speeds and higher capacity services, while continuing nbn's focus on delivering a safer, resilient, sustainable and affordable service for its customers.
- nbn will continue to work closely with RSPs to improve RSP and end user experience outcomes through a range of initiatives.
- nbn is keen to hear your views on whether its forecast expenditure aligns with your expectation and whether it will enable nbn to meet customers' needs.

3.1 Development and governance of nbn's forecast expenditure

The expenditure forecasts presented in this consultation paper are based on nbn's current Integrated Operating Plan (IOP25) for the years FY25 to FY28. The IOP is developed annually to support nbn's budgeting and planning, and is based on detailed bottom-up operational and financial plans. Development of the IOP is subject to a rigorous governance process, including a multi-step review and endorsement process. More information on nbn's governance framework is provided in nbn's Statement of Corporate Intent 2025.

The RMA submitted to the ACCC in July 2025 will be based on nbn's next Integrated Operating Plan, IOP26, covering the years FY26 to FY29. Consistent with the current plan, IOP26 will continue the strong focus on driving efficiency improvements and on the prudency of all planned expenditure. It will also reflect updated demand forecasts and incorporate both the outcomes of the RMA engagement program and the impact of proposed changes to the Benchmark Services Standards.

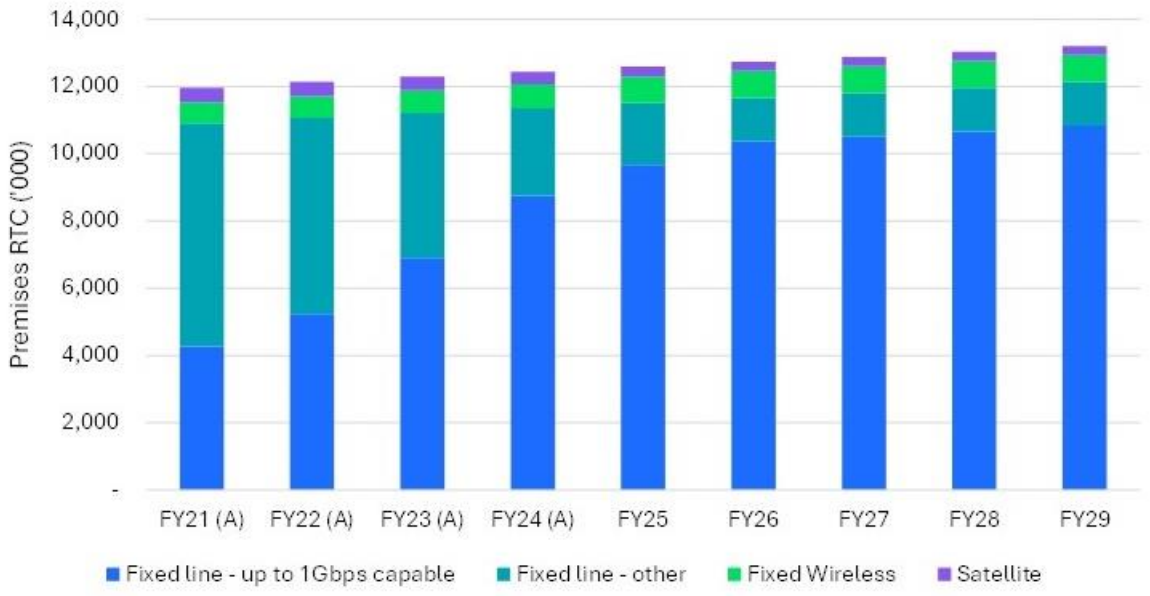
3.2 Demand

Consistent with the expenditure objectives set out in the SAU and nbn's commitment to the initiatives set out in the Annual Service Improvement Plan (ASIP), the forecast expenditure reflects the level of investment

needed to meet the expected demand for nbn's products and services and continue to improve the RSP and end user experience.

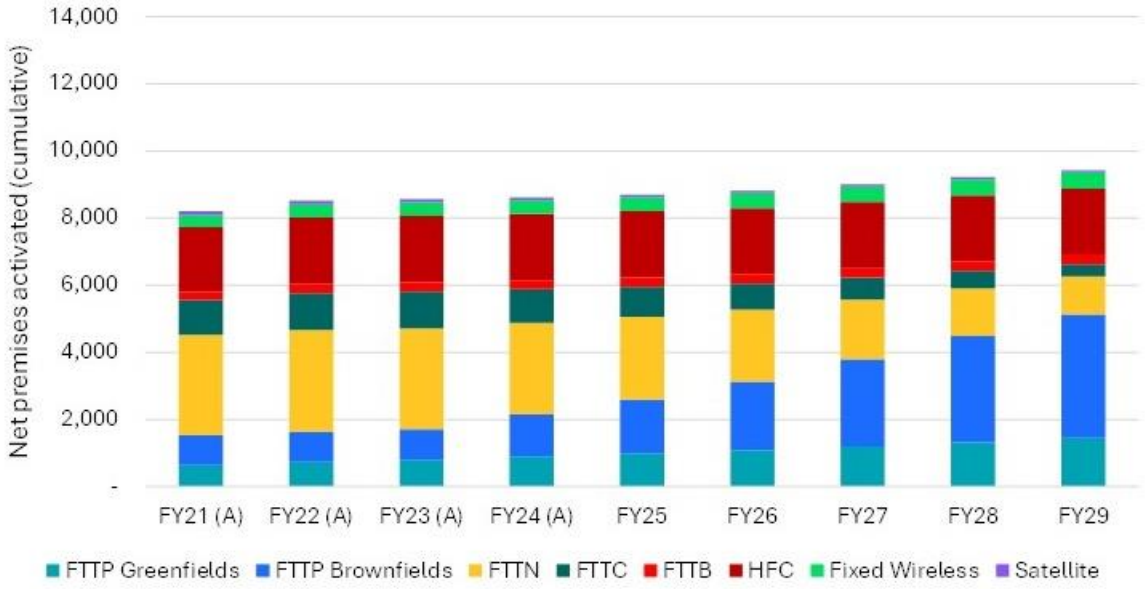
The reach of the nbn® network continues to grow and the number of premises ready to connect to the network is expanding annually. Furthermore, the composition of the network is also changing, with Fixed Line more than three-quarters of the nbn® network capable of achieving wholesale download speeds of up to 1 Gbps, as shown in the following chart.

Figure 6: Premises ready to connect (RTC) by Technology



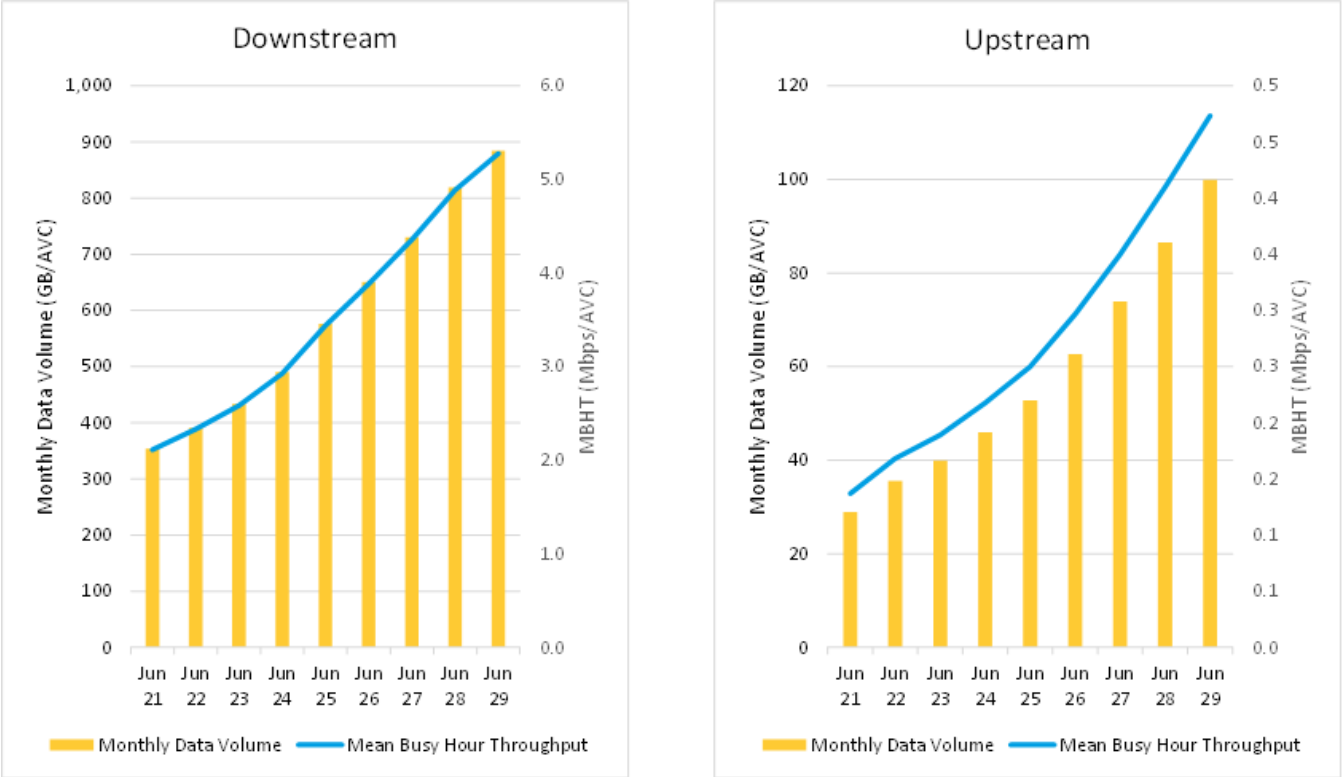
Similarly, the net premises activated (cumulative) continues to grow due to new developments and pricing/product innovations, offset by churn due to competition from alternatives including wireless networks and satellites. The composition of customers by technology type is also changing, with an increasing proportion of end use customers with fibre to the premises (FTTP) connections forecast over the next Regulatory Cycle, as shown in the following chart.

Figure 7: Net premises activated (cumulative) by technology



As shown below, downstream and upstream traffic on nbn's network are forecast to continue to increase – both in terms of monthly data volumes and peak demand (i.e., mean busy hour throughput).

Figure 8: Forecast Downstream and Upstream Data Volumes and Demand



Furthermore, the increase in downstream and upstream traffic, as well as the increasing importance of broadband services for all Australians drive demand for higher speed and more reliable services, and the need for nbn to augment capacity, upgrade network capability and ensure reliability over time.

3.3 Expenditure summary

Forecast expenditure for FY27-FY29 is $14.5 billion (real June 2024 dollars), including capex of $6.5 billion and opex of $8.0 billion. The breakdown of this expenditure by category is depicted in Figures 9 and 10 (with explanations of the expenditure categories in Table 1). Forecast expenditure is 18.2% lower for FY27-FY29 compared to FY24-FY26 (of $17.8 billion), reflecting realisation of benefits as nbn transitions from a 'build' to an 'operate' business, completion of the local fibre network build for the FTTN to FTTP upgrade program in December 2025, and implementation of cost reduction initiatives.

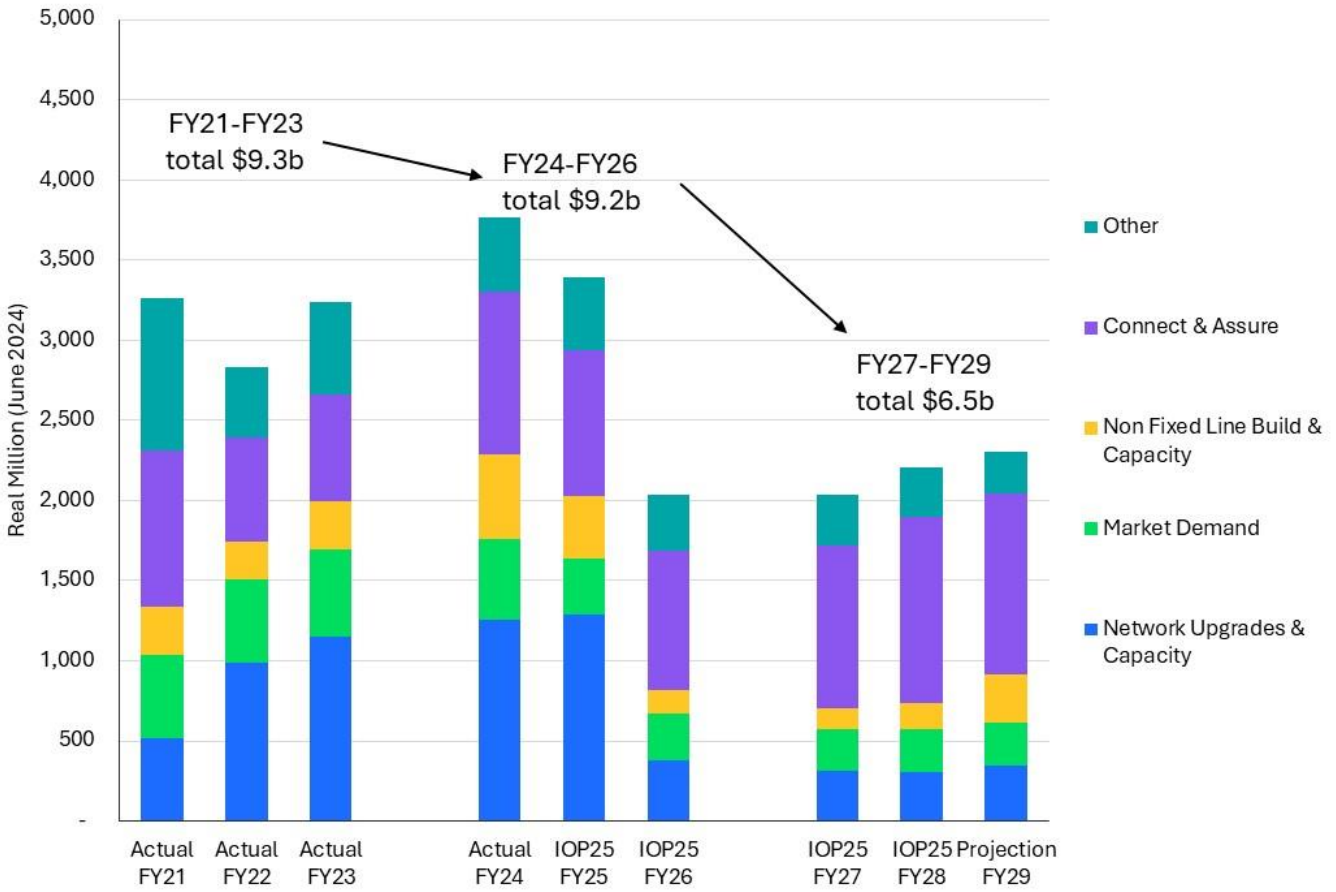
The initial build of the nbn® network was completed in 2020; however, capital expenditure to connect premises to the network has continued, including as nbn connects new developments and as part of nbn's fibre upgrade program, under which nbn is enabling an additional 3.5 million FTTN premises and 1.5 million FTTC premises to upgrade to a FTTP service. Although the upgrade of the network serving 3.5 million FTTN

premises is expected to be complete by December 2025, the work to connect individual premises to the FTTP network (both in that footprint and for the further 1.5 million premises in the FTTC footprint) will continue for some years.

In an environment of evolving competition from high-speed wireless broadband services, Low Earth Orbit (LEO) satellite services, and alternative fixed line broadband networks, forecast expenditure for FY27-FY29 reflects:

- ongoing growth in demand (new developments, fibre upgrades, data traffic and speed tier mix)
- ongoing cost reduction programs and progressive realisation of benefits from upgrade programs
- just-in-time capacity upgrades to HFC and transit networks

Figure 9: Capex by Category



***Note**: capex is presented on an 'as-incurred' basis rather than being split into 'as-commissioned' and 'construction in progress' for use in the calculation of building block costs.*

As described above, IOP25 includes the currently committed network upgrades but does not include potential future investments in: upgrade of the parts of the fixed line network outside of current programs;

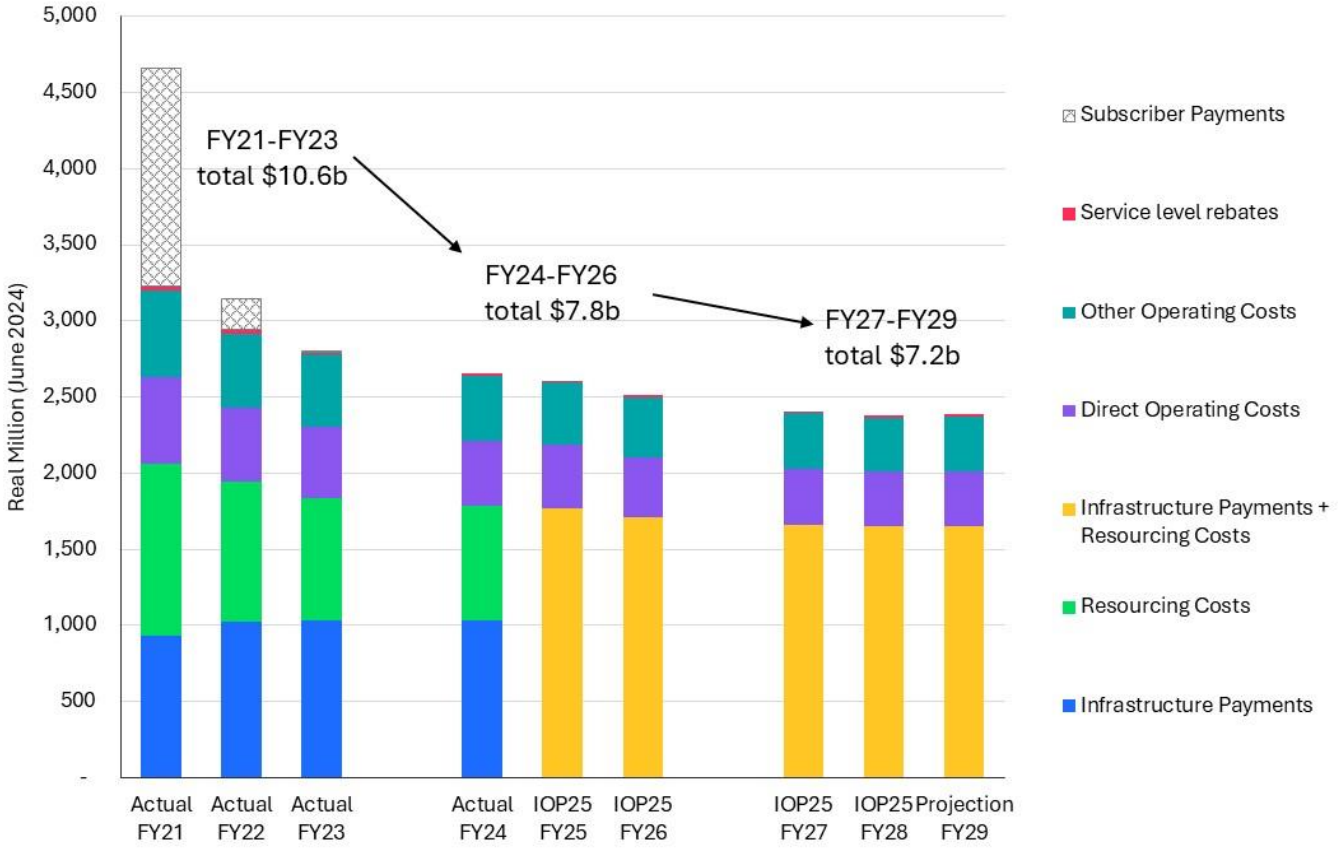
nbn's potential role under a revised universal service obligation; and potential changes to benchmark service standards.

Table 1: Expenditure categories

Capex category	Description
Network Upgrades & Capacity	Includes FTTN to P build capex (excluding connections), upgrades to the capacity of fixed line and transit networks, and capex to remediate underperforming FTTN lines
Market Demand	Includes network build in New Developments (excluding connections), business upgrades (Enterprise Ethernet), and commercial works
Non Fixed Line Build & Capacity	Includes the Fixed Wireless and Satellite Upgrade Program, ongoing Fixed Wireless capacity upgrades, and lifecycle capex
Connect & Assure	Includes capex for first time connects to the network (e.g., in New Developments), reconnections, upgrade connections for FTTN/C to P, and customer service and assurance (to keep the network operating as intended)
Other	Includes regional co-investment, other network capex (e.g., network engineering, network operations and field services), software engineering, facilities and other

Opex category	Description
Infrastructure payments	Use (under Telstra Arrangements) of ducts, exchanges and dark fibre that form part of the nbn® network
Resourcing Costs	Activities undertaken by nbn's internal workforce (including the internal field workforce) plus outsourced services associated with the build and operations of the nbn® network. Net of the amount capitalised
Direct Operating Costs	Includes network operating costs (e.g., rack power, network power, spectrum licences), service assurance, network assurance, network maintenance, and other network costs (e.g., freight distribution and supply chain)
Other Operating Costs	Includes advisory and corporate costs, IT and software, marketing and product costs, facilities costs, TUSMA levy, insurance, and other internal expenses
Subscriber payments	Payments for disconnections from legacy networks under the Telstra Arrangements and migrations from legacy networks under the Optus Arrangements

Figure 10: Opex by Category



***Note**: Subscriber payments are payment for disconnection from legacy networks under the legacy networks under the Telstra Arrangements and migrations from the Optus Arrangements. These payments are no longer required following completion of the initial network build and migration of customers onto the nbn® network. Individual forecasts of Infrastructure Payments and Resourcing Costs are masked for commercial confidentiality reasons, consist with the approach adopted in the recent SAU variation process.*

nbn's forecast expenditure is intended to enable it to continue to deliver its purpose and the outputs and priorities set out in nbn's Statement of Corporate Intent 2025, including a continued focus (with some Government financial support) on community safety and digital inclusion (including for First Nations peoples), and deliver the following outcomes for nbn's customers in FY27-FY29:

- **Meet demand for new connections** by expanding the network and connecting new premises to the nbn® network.

- **Meet demand for higher speed services and need for higher capacity**, with the proportion of nbn customers on wholesale download speeds of 100 Mbps or higher expected to increase to 65% by the end of FY29.
- **Deliver higher quality services** through enhanced RSP and customer experiences, reflected in improved customer satisfaction outcomes.
- **Provide secure and resilient services** by ensuring that the Company's network and operations are resilient to climate changes and cyber threats, and continuing to focus on developing a safe, inclusive and engaged workforce.
- **Work towards a sustainable network** through a reduction of Scope 1, 2 and 3 emissions and delivering on its commitment to 100% renewable energy purchases.
- **Deliver affordable services over time** through efficiency improvements, organisational transformation and other initiatives.

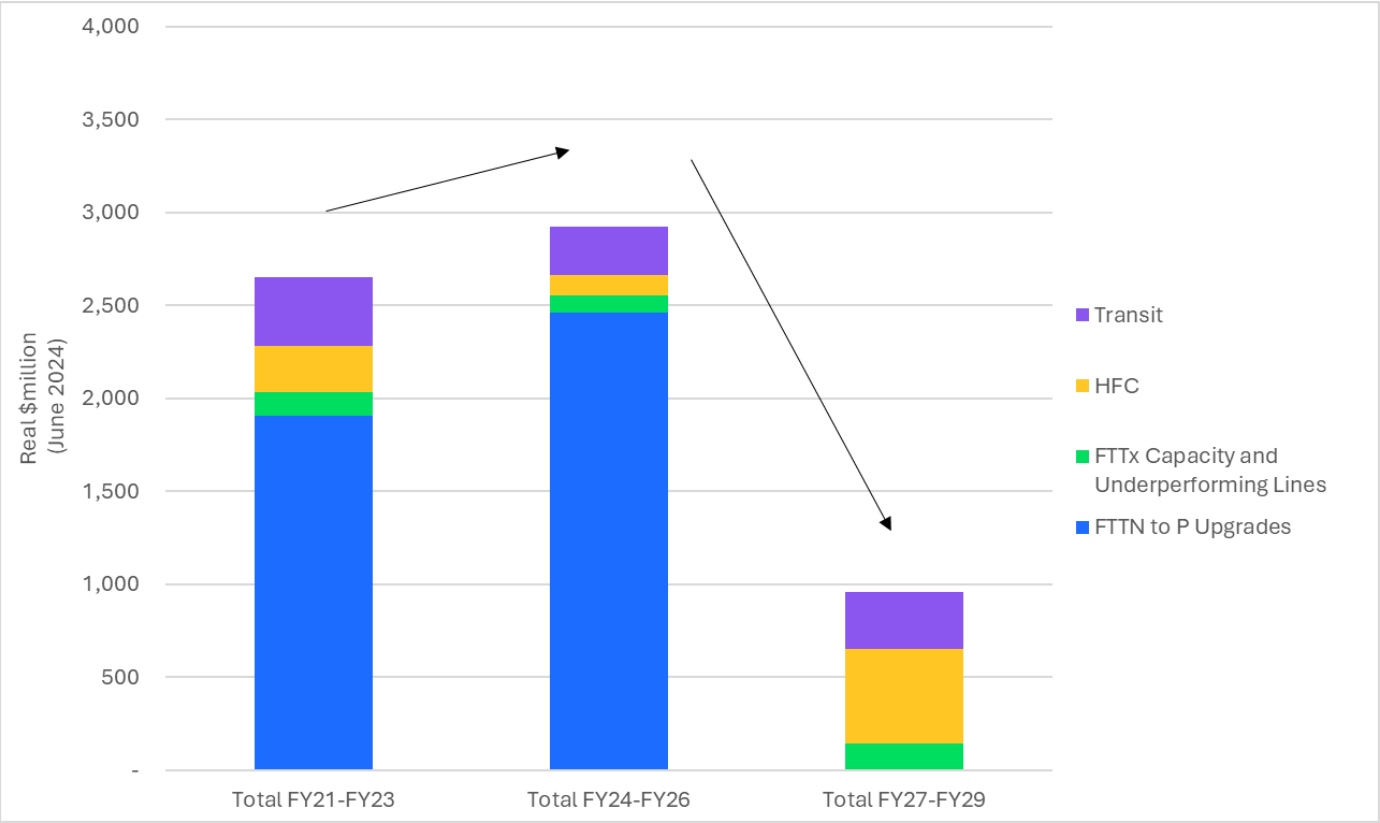
The following sections detail the forecast capex and opex programs that are intended to enable nbn to deliver these outcomes. To a large degree, the forecast expenditure (being what is required to meet forecast demand and current service levels) is non-discretionary. The expenditure covered by the focus topics in the subsequent section are more discretionary in nature, with some greater opportunity for plans to be refined in response to stakeholder feedback.

3.4 Capex forecasts

3.4.1 Network Upgrades and Capacity

The 'Network Upgrades and Capacity' category includes capex dedicated to upgrading nbn's fixed line network and increasing the network's capacity to handle higher volumes of data. It is forecast to be $1.0 billion over the period FY27 to FY29, which is 15% of the total forecast capex for that period. The Network Upgrades and Capacity' capex for FY27 to FY29 is forecast to fall of 67% on the forecast expenditure for the current Regulatory Cycle from FY24 to FY26 of $3.0 billion, as illustrated in the following chart.

Figure 11: Network Upgrades & Capacity capex (actual and forecast)



The reduction in forecast capex for the FY27-FY29 period is due to the completion of the build of the local fibre network as part of the FTTN to FTTP upgrade program, which is scheduled to be completed in December 2025 and thus has no forecast expenditure for the FY27 to FY29 period. The reduction is partially offset by forecast increases in capex across the other programs within this category. The forecast capex for FY27 – FY29 comprises:

- HFC ($0.5 billion): Capacity upgrades across the HFC network to cater for growing customer demand for data and bandwidth and to improve network stability, including the Plant Modernisation Program and deployment of Distributed Access Architecture, which involves replacing current analogue technology with digital architecture. This will enable more customers to access ultrafast network speeds and provide a more reliable service. The nature, extent and timing of this expenditure reflects the upgrade path for HFC as a technology, which is somewhat different to FTTP;
- Transit networks ($0.3 billion): Ongoing investment to upgrade transit network architecture to cater for growing customer demand for data and bandwidth, including Aggregation Evolution upgrades at nbn's Points of Interconnect and Transport Evolution upgrades utilising DWDM technology; and

- FTTX Capacity and Underperforming Lines ($0.1 billion): Capex in support of ongoing FTTN, FTTB and FTTC network replacement and equipment and network upgrades linked to customer led incidents associated with underperforming copper lines that are not capable of achieving peak download and upload speeds of 25/5 Mbps (being the minimum performance expectation under the Statutory Infrastructure Provider (SIP) framework).

The forecast Network Upgrades and Capacity capex for the period FY27 to FY29 is intended to enable nbn to continue to improve the performance and increase the throughput capability of the fixed line network to meet customer demand for data and bandwidth and keep pace with growing utilisation of broadband services. Over the period of the proposed next Regulatory Cycle, average monthly downloads for (end) customers on the nbn® network are forecast to grow from 649 MB to 882 MB while downstream mean busy hour throughput is forecast to grow from 3.9 Mbps to 5.3 Mbps.

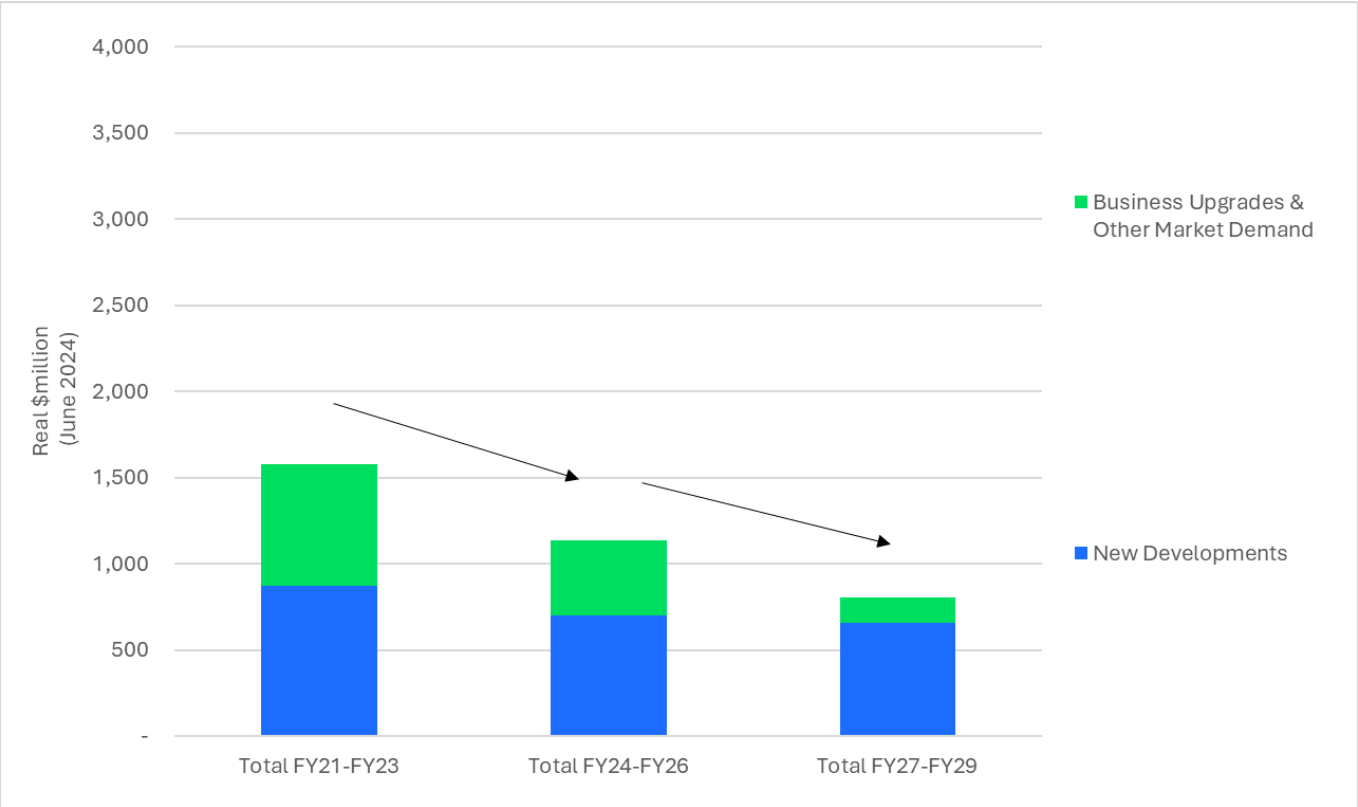
3.4.2 Market Demand

The 'Market Demand' category includes capex dedicated to expanding nbn's network to new developments, deploying dedicated end-to-end fibre connections for Enterprise Ethernet customers, responding to demand for other nbn products such as Smart Places, meeting nbn's obligations under the Statutory Infrastructure Provider (SIP)[6] and commercial works activities such as the relocation or modification of existing nbn infrastructure. It does not include capex for connections to individual premises, which is included under the Connect and Assure category (see below).

Market Demand capex is forecast to be $0.8 billion over the period FY27 to FY29, which is 12% of total capital expenditure over that period. Forecast Market Demand capex for FY27 to FY29 is expected to fall by 29.3% on the forecast expenditure for the period FY24 to FY26 of $1.1 billion, as illustrated in the following chart.

[6] The SIP provides a framework to ensure that premises in Australia can be connected to, and supplied with, high-speed broadband internet services.

Figure 12: Market Demand capex (actual and forecast)



The reduction in forecast capex for the period FY27 to FY29 period is due primarily to a reduction in forecast capex for Enterprise Ethernet build costs due to the increasing availability of business-grade products offered over the FTTP and HFC networks which nbn targets at small to medium sized businesses, where nbn has taken steps to enhance the value of those products while continuing to improve the value proposition of Enterprise Ethernet for enterprise and mid-market customers.

The Market Demand forecast capex for FY27 – FY29 comprises:

- New Developments ($0.7 billion): Capex to enable expansion of nbn's fixed line network to new developments, such as housing estates and new commercial precincts.
- Business Upgrades & Other Market Demand ($0.1 billion): Capex related to the build of end-to-end fibre connections for new Enterprise Ethernet customers and responding to demand for other nbn products such as Smart Places [7], and commercial works activities.

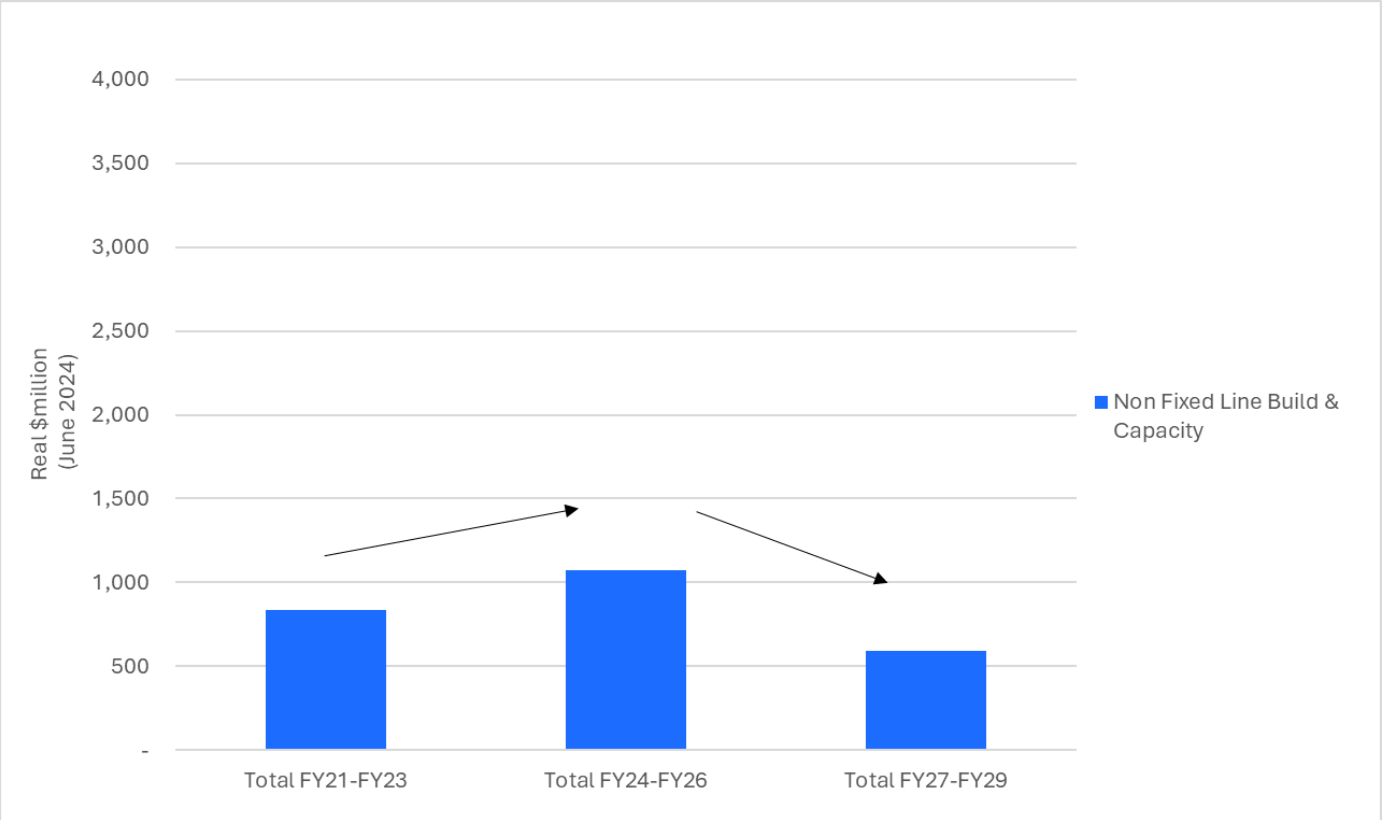
[7] Smart Places is a wholesale product that allows customers to connect to smart infrastructure and the Internet of Things (IoT) outside of buildings. It uses innovative new equipment including smaller, more robust, more energy efficient network connection devices, which enable the power of the NBN network to be delivered across outdoor locations that are not serviceable using standard equipment.

The forecast Market Demand capex for the period FY27 to FY29 is intended to enable the expansion of nbn's network to new developments, new Enterprise Ethernet customers, responding to demand for other nbn products and commercial works activities. Over the proposed next Regulatory Cycle, the nbn® network is forecast to be expanded to reach 0.5 million new residential and business premises.

3.4.3 Non-Fixed Line Build and Capacity

The 'Non-Fixed Line Build and Capacity' category includes the Fixed Wireless and Satellite Upgrade Program, ongoing Fixed Wireless capacity upgrades and Fixed Wireless and Satellite lifecycle capex. It is forecast to be $0.6 billion over the period FY27 to FY29, which is 9% of total forecast capital expenditure. Forecast Non-Fixed Line Build and Capacity capex for FY27 to FY29 is 45.0% lower than the forecast expenditure for the period FY24 to FY26 of $1.1 billion, as illustrated in the following chart.

Figure 13: Non-Fixed Line Build & Capacity capex (actual and forecast)



The forecast fall in capex for FY27-FY29 reflects completion of the Fixed Wireless and Satellite upgrade program in December 2024, which is partly funded by a $480 million grant from the Commonwealth Government.

The forecast Non-Fixed Line Build and Capacity capex is intended to enable ongoing investment to ensure that capacity on nbn's non-fixed line networks continues to meet customer demand for data and bandwidth and keep pace with growing utilisation of broadband services.

3.4.4 Connect and Assure

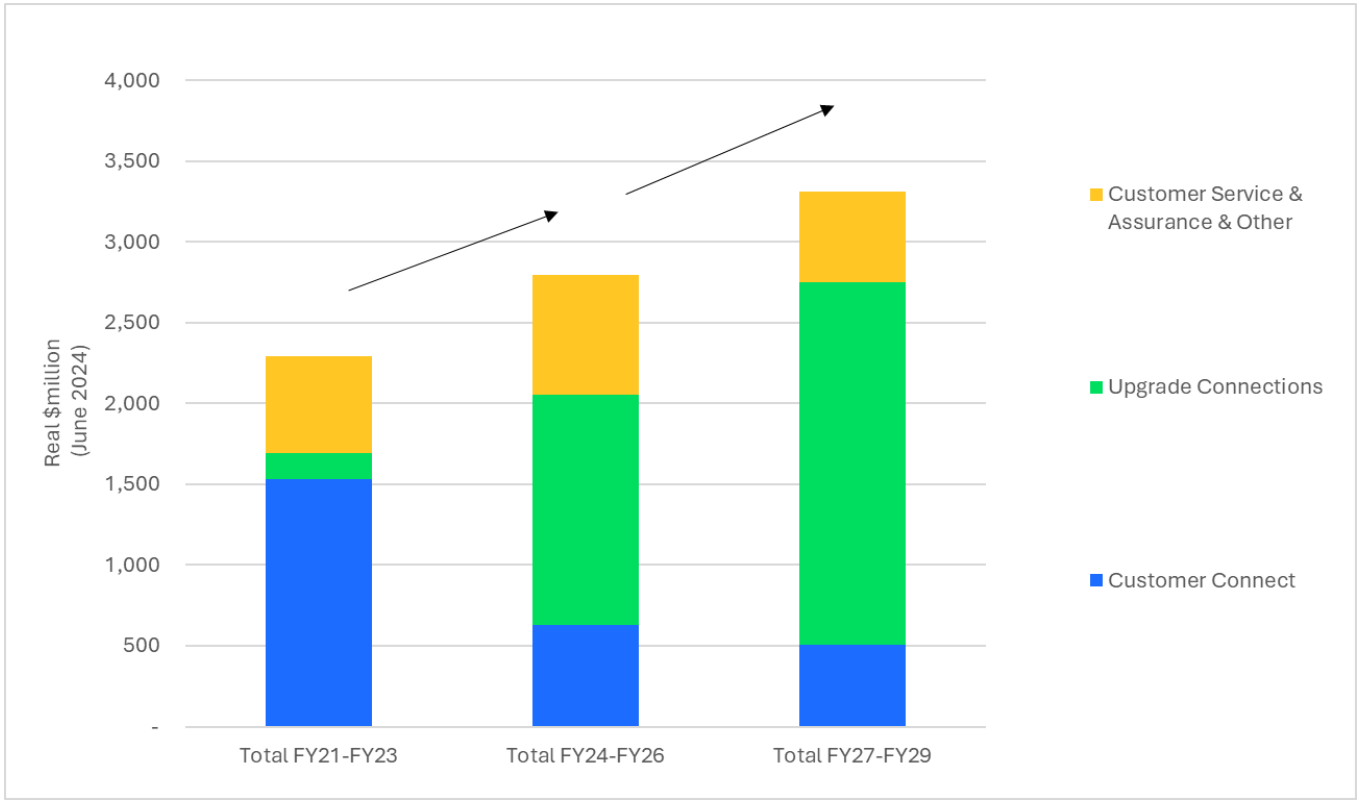
The 'Connect and Assure' category[8] includes capex for new customer connections to nbn's fixed-line and non-fixed line networks, including in new developments, customer reconnections to the nbn® network and upgraded connections[9] through the FTTN to FTTP and FTTC to FTTP upgrade programs, as well as capex elements of customer service and assurance[10] activities that keeps the nbn® network and nbn's services operating as intended. Connect and Assure capex is forecast to be $3.3 billion over the period FY27 to FY29, representing just over 50% of the total forecast capex for that period. The forecast Connect and Assure capex is an increase of 18.6% on the forecast capex for the period FY24 to FY26 of $2.8 billion, as illustrated in the following chart.

[8] As described in Table 1, capex for the connection between the **nbn** network and a premises is included in the Connect and Assure category, but capex for the building of the rest of the network is included as appropriate in the Network Upgrades and Capacity, Market Demand, or Non-Fixed Line Build and Capacity categories.

[9] This requires a fibre lead in to be constructed from the local network into the premises, including the installation of a network terminal device within the premises.

[10] Assurance incudes reactive investment to address performance or technical issues on the network. Maintenance is considered proactive investment as it acts to prevent network performance or technical issues.

Figure 14: Connect & Assure capex (actual and forecast)



The increase in forecast capex for the period FY27 to FY29 is due an increase in forecast capex for upgraded connections, partially offset by a fall in forecast capex for new customer connections and customer service and assurance activities. The forecast capex for FY27 – FY29 comprises:

- Customer Connect ($0.5 billion): Capex for new connections to the nbn® network, which may include the installation or remediation of lead-ins and the installation of premises connection devices, network termination devices, wireless network termination devices and satellite dishes.
- Upgrade Connections ($2.2 billion): Capex dedicated to the installation of fibre lead-ins and associated customer connection activities as part of the FTTN to FTTP and FTTC to FTTP upgrade programs. nbn will be undertaking further consultation on this during February 2025.
- Customer Service & Assurance & Other ($0.6 billion): Capex elements of customer service and assurance activities, including equipment and remediation and restoration activities as well as customer reconnections.

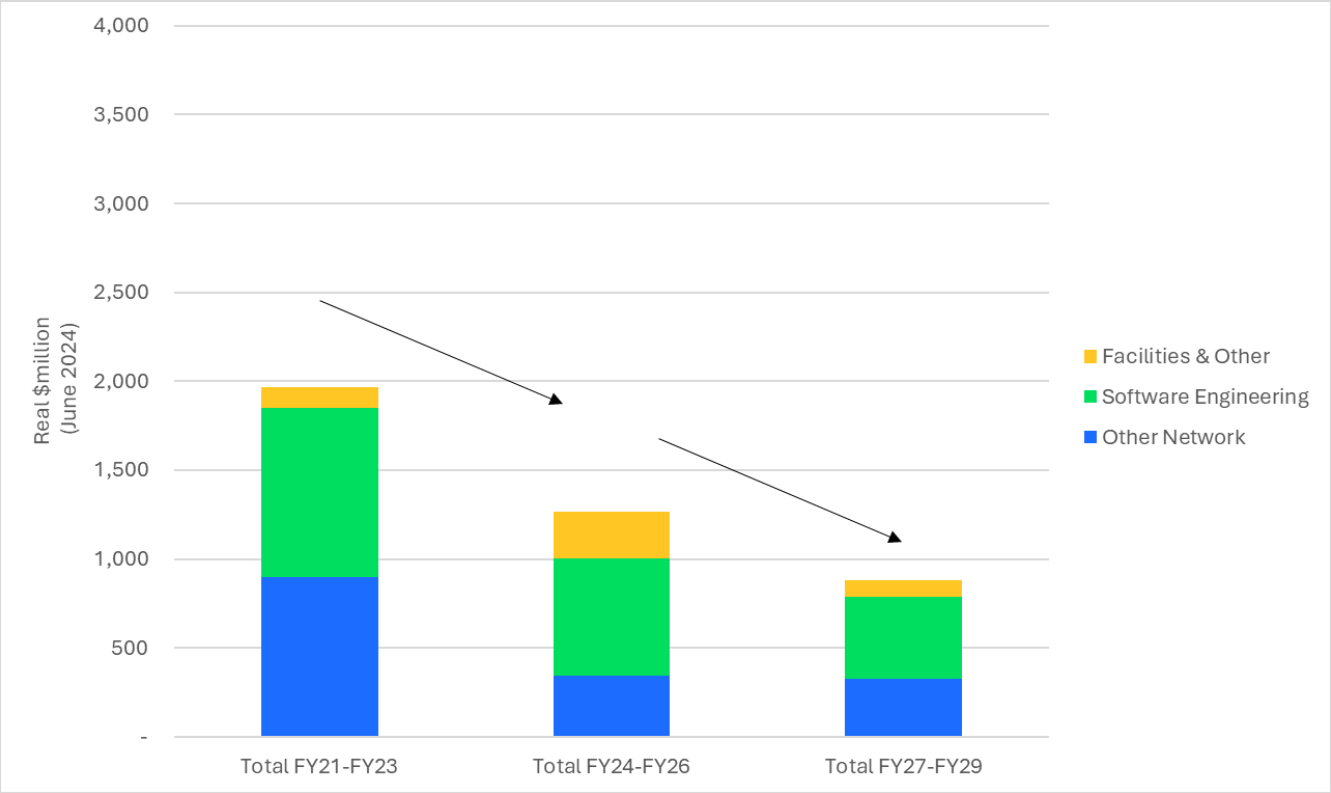
Connect and Assure capex is intended to enable nbn to meet demand for new connections, driven by first time customer connects in New Developments, and to meet demand for higher speeds and higher quality of services through Upgrade Connections. The average number of premises upgraded from FTTN and FTTC to FTTP is expected to increase from around 300k p.a. for the period FY24 to FY26 to over 500k p.a. for the period FY27 to FY29, as shown in Figure 14 above.

nbn is focused on providing improved connect and assure customer journeys under its continuous improvement program to enhance customer service delivery.

3.4.5 Other Capex

The 'Other Capex' category includes all other capex not captured elsewhere, including network engineering, network operations and field services, software engineering, facilities and regional co-investment[11]. It is forecast to be $0.9 billion over the period FY27 to FY29, which is 30.5% lower than the forecast expenditure for the period FY24 to FY26 of $1.3 billion, as illustrated in the following chart.

Figure 15: Other Capex (actual and forecast)



The forecast Other Capex for FY27-FY29 comprises:

- Other Network ($0.3 billion), which includes stable ongoing real capex in areas such as network engineering, network operations and field services. It is expected to fall by 5.1% in the period FY27 to FY29 compared to the period FY24 to FY26.

[11] Regional co-investment refers to **nbn** investment in technology upgrades in regional, rural, and remote Australia, in conjunction with investments from the Federal, State and Local governments.

- Software Engineering ($0.5 billion), which relates to business-as-usual IT capex necessary to maintain and adapt IT systems over time to support service delivery. It is forecast to fall by 29.9% in the period FY27 to FY29 compared to the period FY24 to FY26 due to ongoing efficiencies nbn's tech capex program.
- Facilities & Other ($0.1 billion), which includes capitalised labour costs for business unit subject matter experts for time required to support various initiatives and nbn's share of regional co-investment. It is expected to fall by 64.9% in the period FY27 to FY29 compared to the period FY24 to FY26, due to a forecast reduction in facilities capex and expected decline in regional co-investment activity.

3.5 Opex forecasts

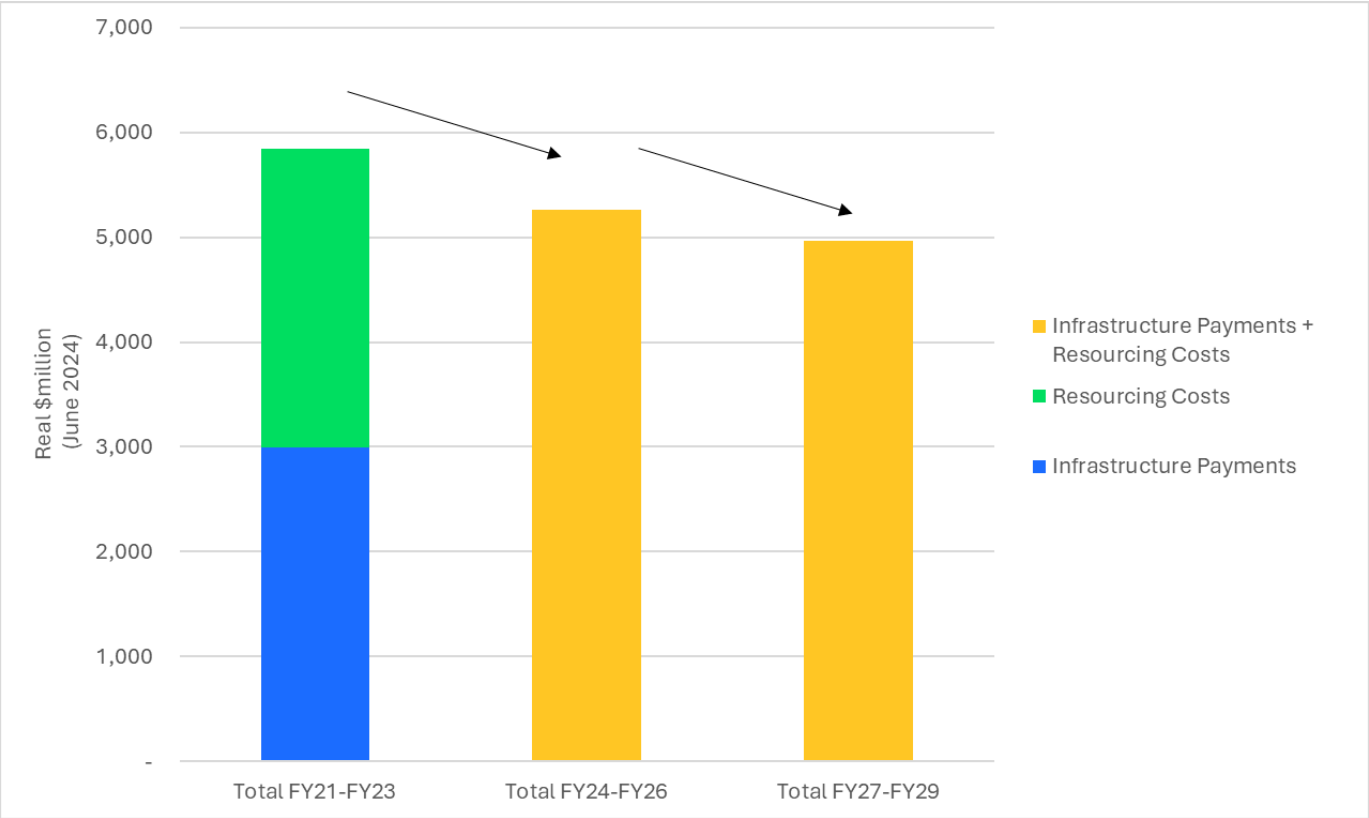
3.5.1 Resourcing and Infrastructure Payments

Resourcing costs[12] and Infrastructure Payments are forecast to be $5.0 billion over the period FY27 to FY29, which is 62% of total forecast opex over this period. Forecast resourcing and infrastructure payments are expected to fall by 5.6% on the forecast expenditure for FY24 to FY26 of $5.3 billion, as illustrated in the following chart.

Individual forecasts of Infrastructure Payments and Resourcing Costs are masked for commercial-in-confidentiality reasons, consistent with the approach adopted in the recent SAU variation process.

[12] Resourcing costs relate to the opex required for **nbn**'s internal workforce across all operating units, including corporate services.

Figure 16: Resourcing and Infrastructure Payments Opex[13] (actual and forecast)



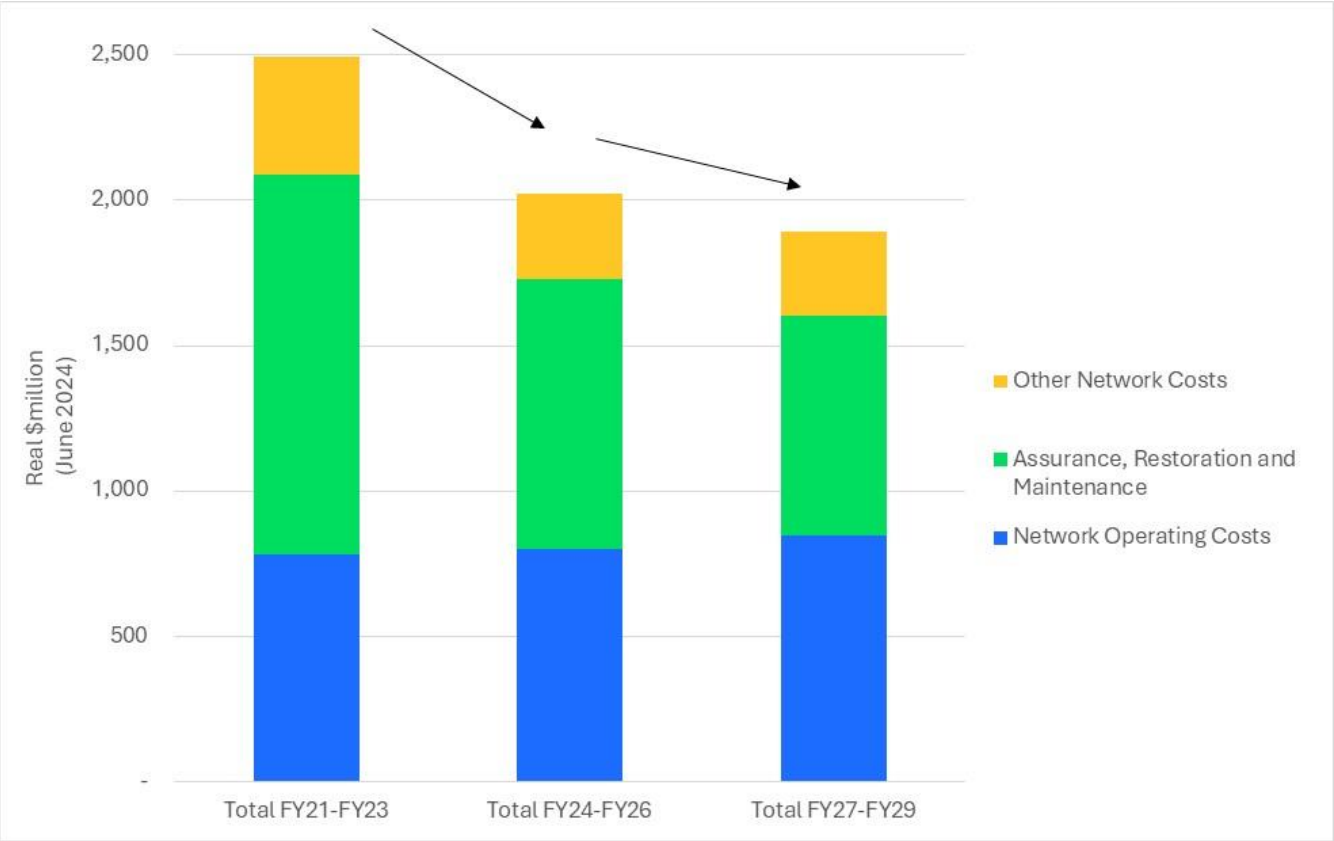
The decrease in forecast Resourcing and Infrastructure opex is due to a decrease in resourcing costs following the completion of the workforce transformation and other ongoing efficiencies. Infrastructure Payments are amounts paid to Telstra for the use of its infrastructure to support the delivery of nbn services. These amounts are based on the type of infrastructure used, which is driven by the nbn services provided, and are inflation-indexed.

3.5.2 Direct Operating Costs

Direct Operating Costs include network operating costs (such as power costs, pole rental and spectrum licences), assurance, restoration and maintenance activities and other network costs (such as fleet vehicles, vendor support and security) required to physically operate and maintain the nbn® network. Direct Operating Costs are forecast to be $1.9 billion over the period FY27 to FY29, which is 23.7% of total forecast opex and a decrease of 6.4% on the expected expenditure for the period FY24 to FY26 of $2.0 billion, as illustrated in the following chart.

[13] Individual forecasts of Infrastructure Payments and Resourcing Costs are masked for commercial-in-confidentiality reasons, consistent with the approach adopted in the recent SAU variation process.

Figure 17: Direct Operating Costs (actual and forecast)



The decrease in forecast Direct Operating Costs is due to a forecast reduction in assurance, restoration and maintenance opex resulting from the upgrade of services from FTTN and FTTC to FTTP, which has a lower frequency of network and service incidents, and the continuation of efficiencies achieved through nbn's truck roll reduction program.

Being able to complete the activities covered by the Direct Operating Costs quickly and accurately is essential to delivering a strong RSP and customer experience, meeting expected service standards and delivering affordable services over time.

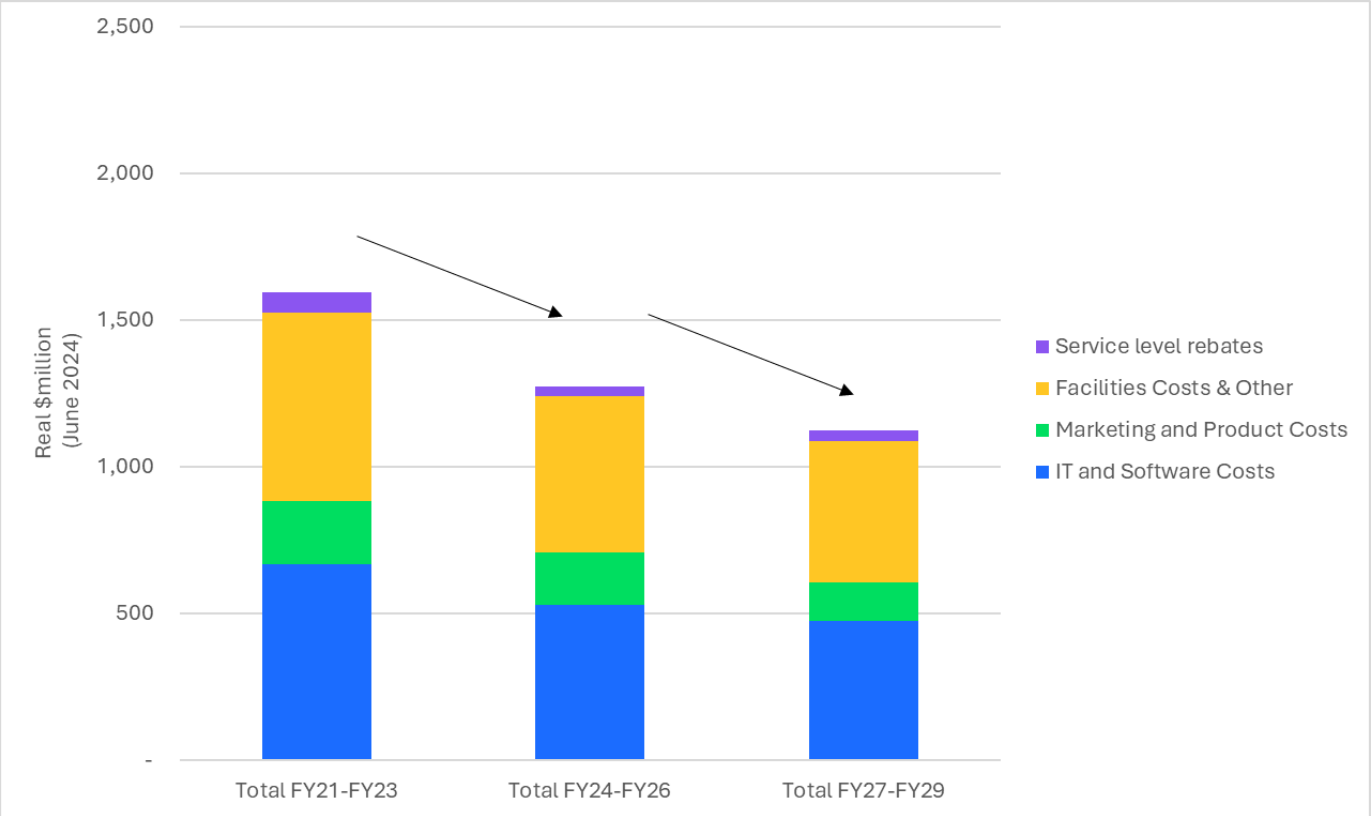
3.5.3 Other Operating Costs and Service Level Rebates

Other Operating Costs and Service level rebates[14] includes opex relating to advisory and corporate, IT and software licencing, marketing, facilities costs, the Telecommunications Industry Levy, insurance and other internal expenses. They are forecast to be $1.1 billion over the period FY27 to FY29, representing 14.0% of

[14] Service level rebates are forecast, pending the outcome of the RMA/RMD process, on a continuation of current arrangements.

total forecast opex over this period, and a decrease of 12.0% on the expected expenditure for the period FY24 to FY26 of $1.3 billion, as illustrated in the following chart.

Figure 18: Other Opex (actual and forecast)



The reduction in Other Operating Costs is due primarily to reductions in the IT and Software costs, which is forecast to be 5.9% lower following completion of cost efficiency programs, and a reduction in Facilities Costs & Other, which is forecast to be 6.0% lower in FY27-FY29.

The reductions in spend will enable nbn to deliver more affordable service over time, while the initiatives under the continuous improvement program are targeted at improving RSP and customer experience through simplified platforms, easier access and faster service provisioning.

3.6 Consultation questions

1. How does the reduction in forecast overall expenditure by 18.2% for FY27-29 compared with FY24-26 align with your expectations?
2. What are your thoughts on the forecast expenditure being sufficient to meet the needs of nbn's customers?

3. If you could reprioritise nbn's forecast capital expenditure, what would you suggest?
4. If you could reprioritise nbn's forecast operating expenditure, what would you suggest?
5. What trade-offs between expenditure and outcomes would you like nbn to consider?

4 Expenditure – Focus Topics

In this paper (Consultation Paper 1), nbn addresses three focus topics – these topics are important, are aligned with our strategic pillars (outlined in section 2.1), and there is scope for the feedback received to have some influence over nbn's future expenditure:

- nbn's climate transition plan reflects a broader societal interest in sustainability and environmental responsibility and ensures that nbn aligns with the Government's commitment to net-zero;
- the resilience framework is critical for managing service delivery amidst challenges such as natural disasters or cyber threats; and
- the investment to enable speeds greater than 2 Gbps addresses the growing demand for higher connectivity.

Consultation Paper 2, to be released in early 2025, will pick up on the feedback received on Consultation Paper 1 and seek views on two further topics: migration under nbn's Fibre Connect upgrade program; and Benchmark Service Standards.

These public consultation papers will complement the activities being undertaken in the three stakeholder engagement streams (which focus on Retail Service Providers (RSPs), consumer advocacy groups, and customers respectively – see Figure 1). Through the RMA stakeholder engagement program, nbn seeks to refine its plans with valuable input, ensuring they take into account the evolving needs and expectations of all stakeholders.

4.1 Climate Transition Plan

Summary

- Being environmentally responsible, managing potential impacts and helping to minimise climate change is an integral part of being a sustainable business. The Company aims to create and protect value by building a more resource-efficient, climate-resilient network and business while also protecting and restoring the environment and helping the Company's customers address their own environmental challenges by leveraging the digital connectivity of the nbn® network.
- nbn has created a Climate Transition Plan with a continued focus on activities to support its reduced impact on the environment. This section summarises the current key activities and suggested focus areas for this Regulatory Cycle.
- For this Regulatory Cycle, nbn's has proposed some areas of additional focus and is seeking stakeholder input on nbn's balance and priorities for the Climate Transition Plan.

As the nation's digital backbone, the nbn® network touches everyday life in communities right across Australia. The construction, operation and maintenance of the nbn® network is dependent on the use of natural resources and has the potential to adversely impact natural environments and areas of cultural heritage significance.

Being environmentally responsible, managing potential impacts and helping to minimise climate change is an integral part of being a sustainable business. The Company aims to create and protect value by building a more resource-efficient, climate-resilient network and business while also protecting and restoring the environment and helping the Company's customers address their own environmental challenges by leveraging the digital connectivity of the nbn® network. This ambition is outlined in the Company's Environment Policy[15], which was updated in FY24, and is supported by nbn's approach to sustainability. For further details, refer to the Sustainability section of the FY24 Annual Report.

nbn's Statement of Expectations outlines the Commonwealth Government's expectations for nbn on emissions: *"Net Zero emissions: NBN Co should deliver greenhouse gas emissions reductions consistent with meeting or exceeding the Government's commitment to Net Zero emissions by 2050"*[169]

As a critical infrastructure owner and operator, nbn acknowledges the inherent risks climate change poses to operations, network continuity and service obligations.

To understand the physical and transitional risks and opportunities that climate change presents, nbn completed its first company-wide climate change risk assessment in FY22, which is referred to in nbn's FY22 Annual Report.[17] The assessment supported nbn's ability to identify material climate-related risks and opportunities, and to respond to the expectations regarding climate risk disclosures from investors, insurers and regulators. The risk assessment found nbn is exposed to a number of potential material climate-related risks and opportunities.

The **material physical risks** identified include power dependency, extreme wind, forest fire, riverine flooding and surface water flooding. The **material transition risks** include the costs of transitioning to lower emissions technology, exposure to carbon pricing, electricity price risk and the cost of and access to debt. There were also two **material transition opportunities** identified, in the issuance of Green Bonds and supporting the energy transition through nbn's products and services (i.e., enabling markets through connectivity).

Relative to the transition risks, physical risks were found to pose a greater threat to nbn given factors such as the extensive physical footprint of the nbn® network and dependence on power network infrastructure. In

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[15] https://www.**nbn**co.com.au/content/dam/**nbn**/documents/about-**nbn**/policies/environment-policy-2024.pdf.coredownload.pdf

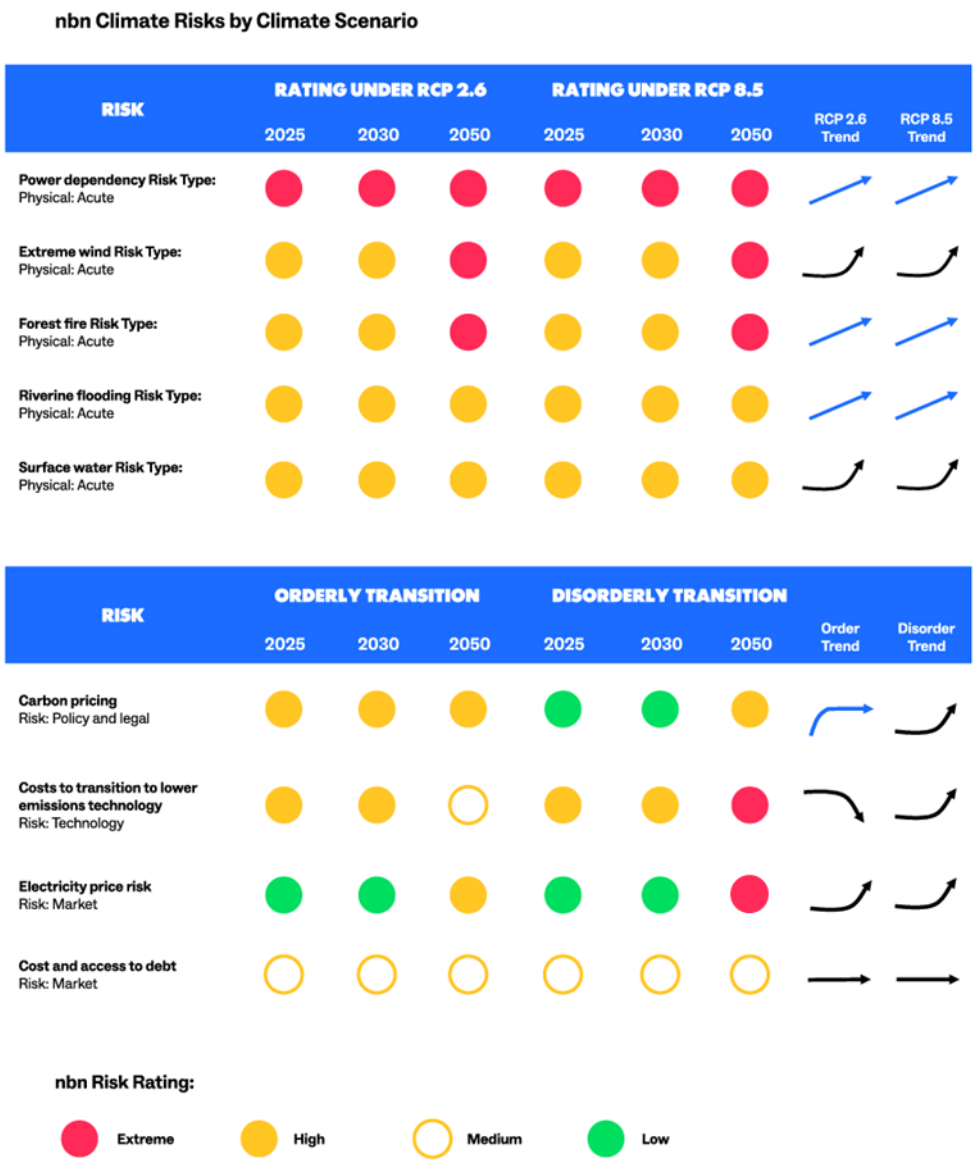
[16] NBN Co Limited, Statement of Expectations, 19 December 2022, https://www.**nbn**co.com.au/content/dam/**nbn**/documents/about-**nbn**/policies/statement-of-expectations-2022.pdf.coredownload.pdf

[17] For more information on how **nbn** defines and identifies these risks and opportunities, refer to the **nbn** 2022 Annual Report, pp. 47-55 https://www.**nbn**co.com.au/content/dam/**nbn**/documents/about-**nbn**/reports/financial-reports/**nbn**-co-annual-report-2022.pdf.coredownload.pdf

the near-term, the single biggest risk identified to the nbn network was power dependency. For more details on nbn's Climate Change Risk Assessment (CCRA), including the scenario analysis undertaken and methodology applied, see nbn's FY2022 Annual Report.[18]

[18] **nbn** 2022 Annual Report, pp. 47-55 https://www.**nbn**co.com.au/content/dam/**nbn**/documents/about-**nbn**/reports/financial-reports/**nbn**-co-annual-report-2022.pdf.coredownload.pdf

Figure 19: Climate risk scenarios



Results of the CCRA informed the development of the Climate Transition Plan (CTP), which sets out how nbn will address physical and transitional climate change risks and opportunities, the metrics and targets used monitor progress and governance arrangements.

4.1.1 nbn's Climate Transition Plan

The CTP aims to align the Company's operations and planning, and capital expenditure, with its decarbonisation goals, whilst managing physical and transition climate risks to the nbn® network and business. The CTP supports internal strategic planning, action implementation and stakeholder engagement on climate mitigation and adaptation, and is designed to address three key areas of focus:

- Network
- Customer
- Communities and Partners.

An overview of the CTP's goals, commitments, and key actions across these three areas is outlined below.

Goals	
Climate Mitigation Net-Zero emissions across all scopes by 2050 (or sooner) in line with NBN Co's Statement of Expectations	**Climate Resilience** Continuously improve reliability to meet current and future demand of customers in line with NBN Co's Statement of Expectations
Interim Commitments to FY30	
• Reduce absolute scope 1 and 2 GHG emissions 95% by FY30 from a FY21 base year • Reduce scope 3 GHG emissions from use of sold products 60% per device within the same timeframe • 80% of NBN Co's suppliers by spend, covering purchased goods and services, capital goods, and downstream transportation and distribution will have science-based targets by FY27	• Enable full fibre upgrades, which will be available to an additional 5 million premises by 2025 • Undertake proactive network planning, assessing and improving unscheduled customer downtime • Develop, regularly maintain, and test disaster and crisis management plans in collaboration with Government and RSPs
Key Actions FY24 to FY27	
Network	• Implement 100% Renewable electricity and energy efficiency programs including fibre deployment from December 2025 • Implement NBN Co's Network Investment Plan • Deploy and maintain Temporary Network infrastructure
Customer	• Deploy energy efficient Network Termination Devices • Perform regular climate scenario analysis to inform network resilience decision making to improve customer experience
Communities and Partners	• Engage the supply chain on science-based targets and partner on data sharing and emission reductions • Develop and maintain climate and natural disaster crisis management plans with Governments and RSPs

4.1.2 Climate Mitigation

To support climate mitigation, nbn has set near-term science-based emission reduction targets validated by the Science Based Targets initiative[19] (SBTi). To work towards meeting these targets, nbn is implementing key initiatives across Scope 1, 2 and 3 greenhouse gas emissions. Figure 20 below summarises nbn's main sources of greenhouse gas emissions across electricity consumption, construction activities and devices in homes.

Figure 20: Sources of greenhouse gas emissions

4.1.3 Consultation questions

To contribute to mitigating climate change, nbn is aiming to achieve net-zero emissions by 2050 or sooner.

To achieve this there are a range of activities nbn could undertake (or accelerate). nbn is already undertaking some of these activities (as indicated in the table below). Any change to accelerate or prioritise these initiatives is outside nbn's current expenditure forecasts and may involve trade-offs and would need to be funded. nbn has provided a high-level indicative cost/complexity vs benefit assessment, as follows:

[19] About us - Science Based Targets Initiative

Figure 21: Potential Initiatives to start or continue/accelerate

POTENTIAL INITIATIVES TO CONTINUE OR ACCELERATE	New or existing	Cost/ complexity	Benefit
Install solar on nbn sites to increase renewable electricity	**1.** Existing, could do more	Low	Low
Implement energy efficient equipment in customer homes	**2.** Existing, could do more	Low	Medium
Work with retailers to reduce the number of nbn/RSP devices in the home (longer term)	**3.** New initiative (longer term)	Medium	High
Work with suppliers to reduce emissions	**4.** Existing, could do more	Medium	High
Deploy electric vehicles to reduce fuel use	**5.** New initiative	Low	Low
Accelerate energy efficient fibre to replace copper services	**6.** Existing, could do more	Feb 2025 consultation	

Cost/Complexity is based on potential impacts to capital/operational expenditures or level of change and engagement required across different stakeholders including RSPs.

Benefit considers both impacts on greenhouse gas emissions and benefits to customers. The table below details nbn's initial consideration for these initiatives.

Table 2: Initiatives to contribute to nbn's net-zero goal

	Initiative	Description	Cost / Complexity	Benefit
1	Install solar on nbn sites to increase renewable electricity	Further deployment of solar arrays across nbn facilities including at Fixed Wireless sites (supports renewable energy targets via direct generation).	nbn has a large, decentralised footprint of sites which may limit the suitability of solar at many sites	Solar can reduce energy costs, grid electricity consumption and associated emissions. Also supports site power resilience.
2	Implement energy efficient equipment in customer homes	Move to more energy efficient chip sets in Network Termination Devices (NTDs) used in customers premises (including rollout of new single port NTD2.0).	More efficient devices may come at an increased cost per device	Improved energy efficiency will reduce costs for end customers to power the device and reduce greenhouse emissions.
3	Work with retailers to reduce the number of nbn/RSP devices in the home in the longer term (note: nbn has received some feedback on such a longer-term idea through the RMID 1185 – Next Generation FTTP NTD consultation; however, further feedback is also welcome). nbn is also keen to seek views from consumer advocates and customers, including via the Regulatory Proposal Forum and the End User Forum.	Working in partnership with industry to reduce the number of nbn/RSP devices (NTDs / Routers) required by customers to access nbn services.	Requires changes to systems and processes for both nbn and retailers. Significant work is likely required for this longer-term concept. (nbn acknowledges previous RSP feedback on the challenges: including device sourcing, who bears the costs, the operational challenges and need to minimise customer issues and complexity. nbn considers this a potential longer-term opportunity which could provide power reduction benefits for RSPs, customers and nbn.	Reducing the number of nbn/RSP devices in customer premises has the potential to significantly reduce customer energy consumption, costs and associated greenhouse emissions.
4	Work with suppliers to reduce emissions	Work collaboratively as an industry with common supply chains on innovations and initiatives that reduce greenhouse gas emissions.	Innovation may require increased investment and changes to systems and process	Supply chain is a significant source of greenhouse gas emissions. Industry partnerships and collective action could reduce emissions for the industry.
5	Deploy electric vehicles to reduce fuel use	Adopt electric vehicles into commercial fleets to reduce demand for fossil fuels	Adoption of electric vehicles may increase lease costs in the short term until electric vehicles become costs competitive with internal combustion engines.	Electric vehicles consume less energy and produce less emissions, including zero tailpipe emissions.
6	Accelerate the migration to energy efficient fibre to	Accelerated deployment of fibre may bring forward	Increased capital required to migrate customers	Fibre optic technology allows for a far more

	Initiative	Description	Cost / Complexity	Benefit
	replace copper services. *Note: nbn will consult on this topic in nbn's RMA consultation paper 2 – released in early 2025*	capital investments and require incentives and proactive migration of customers from copper to fibre services.	proactively. May also require changes to systems and processes to enable proactive migrations.	efficient communication at high data rates requiring fewer active elements that consume energy. Full migration of customers will enable decommissioning of copper services and associated energy consumption.

6. What are your views on the cost/complexity and benefit assessment of initiatives to contribute to nbn's net-zero goal? Has nbn got the balance right?
7. Are there other activities that nbn could undertake that would produce greater benefits and/or at lower costs?
8. How can nbn address energy consumption associated with broadband use in customer premises? What challenges and opportunities does it create?
9. How through nbn's shared investments and supply chains can it collaborate to reduce emissions? What barriers do you foresee?

4.2 Resilience

Summary

- nbn has spent many years proactively investing in its network to mitigate and respond to a broad range of risks, including climate driven impacts.
- For this Regulatory Cycle, nbn has an increasing focus on resilience and risk management as new threats and risks emerge, ensuring an appropriate balance between proactive risk mitigation and response and recovery capabilities.
- This investment is designed to keep pace with emerging and evolving threats, and avoiding leaving vulnerabilities untreated.
- nbn is looking for your feedback on nbn's balance and priorities for the future of resilience expenditure.

nbn's Statement of Expectations outlines the Commonwealth Government's expectations for how nbn addresses resilience in the network: "*Network security and resilience: NBN Co should ensure security and resilience issues are integral parts of its decision making and demonstrate best practice in managing these*

issues. NBN Co should take an active role in supporting telecommunications sector security, as well as maintaining a productive and cooperative relationship with security and law enforcement agencies".[20]

nbn's approach to resilience is influenced not only by government expectations but also by customer expectations, an evolving regulatory and legislative environment, an evolving threat landscape, industry learnings, and international and Australian best practice frameworks. As a result, nbn's perspective of 'resilience' is quite broad and covers all aspects of its network, from the network that customers are most familiar with – that which runs down their residential street and services their neighbourhood – to the unseen beating heart of the network which carries millions of services at a national scale.

nbn has defined resilience as "*The ability to respond to short-term shocks and efficiently return to normal following challenges to operations, and the ability to transform in response to long-term challenges. It encompasses the ability to prepare for, absorb, adapt to, respond to, and recover from unspecific and potentially unforeseen disruptive events*". To achieve this nbn assesses risks and opportunities across all phases of disruption management, including how it prepares and absorbs (manage risk), adapts, responds, recovers (manage consequence), transforms and learns (manage learnings).

In line with regulatory obligations defined in the *Security of Critical Infrastructure Act 2018* and leading practice, nbn adopts an all-hazards approach to assessing threats which could impact the resilience of the network and supporting systems as well as opportunities for potential improvements. All-hazards in this context means minimising or eliminating risks and mitigating impacts arising from cyber and information security hazards, personnel hazards, supply chain hazards and physical and natural hazards.

4.2.1 Current resilience on the nbn network

The nbn® network is highly resilient by design, consistently achieving a network availability (uptime) of over 99.95% every month.[21] This resilience is made up of:

- **High degree of redundancy:** This ensures that if one part of the network fails, other parts can take over its functions, maintaining continuous service to customers.
- **Segmentation and diversity:** By segmenting the network and introducing diversity in its routes, nbn can minimize the impact of localised issues and ensure broader network stability.
- **Fibre upgrade program:** As nbn continues to upgrade copper infrastructure with fibre, it enhances the inherent resilience of the network as fibre withstands extreme weather and commercial power outages better than copper-based infrastructure and is more reliable.

[20] NBN Co Limited, Statement of Expectations, 19 December 2022, https://www.**nbn**co.com.au/content/dam/**nbn**/documents/about-**nbn**/policies/statement-of-expectations-2022.pdf.coredownload.pdf

[21] The calculation of Network Availability (as set out in **nbn**'s Benchmark Service Standards and the WBA) excludes interruptions to connectivity due to circumstances which do not reflect the reliability of the **nbn**® network (eg. planned outages and emergency outages, failures that occur due to factors outside of **nbn**'s control such as Force Majeure Events).

- **Virtual core networks:** Virtualisation allows for more flexible and efficient management of core network resources, contributing to the overall resilience by enabling quick adjustments and deployments.
- **Systems:** Robust systems are crucial for monitoring, detecting, and responding to potential threats, which helps maintain the integrity and performance of the nbn® network.
- **Processes:** Well-defined processes ensure that every aspect of network management, from routine maintenance to emergency response, is handled efficiently and effectively with continuous improvement loop built in.
- **Partnerships:** Collaborating with key partners, including emergency services and power companies, strengthens nbn's ability to respond to and recover from disruptions.
- **People:** Skilled and dedicated personnel are the backbone of any resilient network, ensuring that every aspect of the nbn network operates smoothly and can recover quickly from any adverse events.

Availability and reliability measures are good indicators of consistency of uptime on the network across millions of services. It is important to recognise, however, that resilience is not just about consistent uptime of individual customer services on the network but it also about how nbn prepares for and avoids rare but catastrophic events which can materially impact customers on a state or national scale. This is something nbn must continuously assess and move the needle on as the threat environment around us evolves, as cybercriminals and foreign states become more sophisticated in their attack methods, as the climate shifts and as new technologies emerge.

There are many threats to the nbn® network that it manages and for which it invests in mitigations. These threats include:

- cyber
- supply chain
- climate events
- power dependencies
- third party dependencies
- physical attacks
- third party damage
- system failure or malfunction
- hardware failure or malfunction
- inherent technology risks

To date, nbn has not experienced a threat event at a national scale nor an event of catastrophic failure to the entire network, and it continues to work hard to uphold this status.

nbn's approach and priorities are constantly shifting and adapting as risks emerge and threats evolve, and this informs a 'must do, should do, could do' approach to managing resilience investment. nbn has spent

many years proactively investing in additional network redundancy, new technologies, temporary moveable recovery equipment and power backup equipment like generators for absorbing and responding to climate driven impacts. nbn's current focus is on investment to combat emerging and evolving threats to the nbn® network, recovery planning and heightened security controls, ensuring an appropriate balance between proactive risk mitigation and response and recovery capabilities. Ongoing investment is necessary to keep pace with emerging and evolving threats, when it comes to resilience investment it is important for nbn to maintain the right level of resilience spend to appropriately manage risk and promote the security and integrity of the nbn® network.

nbn can respond to resilience risks by investing reactively (withstand and recover) and it can respond to resilience risks by investing proactively to prevent damage and disruption. Achieving the right combination of proactive and reactive investments to improve network resilience in a prudent way is an ongoing task for nbn. This is explored more below.

4.2.2 Proactive risk mitigation

Ensuring the resilience of nbn's network is core to safeguarding the delivery of services to customers. nbn continues to make improvements to the reliability of the nbn® network and explore measures aimed at improving the way it prepares for, responds to, and recovers from disruptive events.

The Company is focused on continuous improvement to identify how it can make the network and its systems more resilient. This is supported by an enterprise Resilience and Security Program which helps identify and treat risks and issues and informs decisions on where to invest in resilience across the enterprise. Part of this process includes how nbn prioritises capital investment across its vast asset base to proactively manage vulnerabilities and continuously uplift key controls. This means that nbn carefully evaluates which areas of its network and systems are most critical to maintain and improve, and allocates funds to those areas to ensure they are robust against potential threats. In this process, nbn balances the trade-off between risk and investment, ensuring that resources are used efficiently to maximise network reliability and security. This approach enhances nbn's ability to prevent disruptions, respond quickly to issues, and recover effectively from any incidents, thereby ensuring a reliable service for its customers.

In addition to this Resilience and Security Program, nbn also runs an emergency management campaign, which operates year-round and emphasises critical work in emergency preparedness, response and recovery related specifically to severe weather and climate emergency events. The goal is to increase awareness of nbn's contributions within communities before, during and after emergency situations. nbn uses these campaigns to explain how it secures the network against ever-increasing emergency threats, and how Emergency Management Liaison Officers (EMLOs) collaborate closely with government agencies, emergency services organisations and communities.

nbn teams also work closely with emergency services and power companies to prepare for potential disasters and ensure they can repair and restore the nbn® network as soon as it is safe to do so. Most outages on the nbn® network during emergencies are caused by power outages. During a power outage, any

equipment connected via services over the nbn® network will not work. While many parts of the nbn® network do have in-built power back up, major power outages may last longer than the battery life.

nbn's Emergency Management approach aligns with national and international best practice, and its committed to monitoring, reviewing and evolving the way it helps communities prepare, respond and recover from emergency events.

4.2.3 Network Resilience uplift

With an evolving technology landscape, nbn needs to make sure that the network remains resilient by design and in operations.

nbn is investing to ensure that nbn's critical network and IT system assets remain resilient against emerging threats. The company focuses on promoting appropriate network availability amidst current and future challenges.

Conducting post incident reviews with continuous improvement actions, conducting regular security and network outage drills and exercises and uplifting business continuity planning and readiness are some of the measures nbn has employed to assure the Company's processes and practices are ready for unplanned interruptions.

4.2.4 Expedited recovery after an event

nbn is investing time and resources in further developing and maturing its continuity and disaster plans to ensure they're ready and waiting should the need arise to respond quickly to a material unplanned failure within its network or supporting systems. The future is unpredictable, and threats emerge quickly in a digital world so nbn must plan for a very broad set of scenarios with varying degrees of impact, including for concurrent and cascading events.

nbn also invests in additional resilience measures including temporary network infrastructure to expedite network recovery and satellite network infrastructure to support communities affected by outages.

Where physical damage is caused by extreme weather events, nbn has assets that can be mobilised quickly to help restore nbn services. In this case, nbn's focus is on maintaining and restoring the services that communities rely on to stay safe and connected with each other and receive emergency services updates. The Company utilises Temporary Network Infrastructure (TNI) to quickly restore services to customers when a network site is badly damaged or destroyed. Furthermore, nbn deploys generators to network sites where the supply of commercial power has been lost due to unplanned power outages. Proactively, this equipment has been strategically placed in areas across the country so it can be deployed in the case of an emergency event as soon as it is safe to do so, to keep vital lines of communication operational for communities and first responders. These temporary solutions allow nbn to focus on a more permanent solution, which includes betterment.

As a rule of thumb, where there has been an outage, nbn will prioritise reconnecting:

- essential services, such as hospitals, fire, police and emergency services
- community infrastructure – including traffic management, sewerage, power and water utilities
- business services essential to community recovery, such as banks, petrol stations and supermarkets

4.2.5 nbn's approach to resilience moving forward

nbn's approach to resilience is undergoing transformation necessitated by the ever-evolving threat landscape. This evolution reflects nbn's recognition that true resilience requires a holistic approach that encompasses all aspects of operations, infrastructure, and partnerships and reflects their increasing complexity and interconnectedness in a digital world. The resilience of any enterprise, including nbn, depends on multiple factors including the ability to respond and recover from disruptions, and the robustness of nbn's infrastructure, the reliability of its IT systems, the integrity of its data, and the resilience of nbn's third-party partners.

In the telecommunications industry more generally, the traditional approach to resilience of telco networks has focused primarily on engineering solutions such as redundancy and additional fibre links. However, as telco networks and technology become increasingly digital in nature, nbn has observed a growing interconnection between the nbn® network, IT systems, and data management practices. This convergence creates new threats, and opportunities for resilience improvement, requiring more sophisticated and integrated approaches. These approaches must consider all phases of disruption management: how nbn prepares, its capacity to absorb impacts, adapt, respond, recover, learn and transform. Exactly where nbn invests is determined based on the consequence of failure and impact to customers while maintaining a level of flexibility so nbn can quickly pivot to respond to emerging and evolving threats.

4.2.6 Consultation questions

10. To what extent do you think nbn has struck the right balance between proactive risk management measures and reactive response and recovery measures? If not, what should **nbn** prioritise differently?
11. Considering the current and future activities nbn is undertaking:
    i. What aspects of nbn's proactive risk mitigation should it focus more on?
    ii. What else should nbn do to respond during major emergencies? What could nbn do more of or differently in relation to expedited recovery after an event?

4.3 Investment in FTTP and HFC to enable speeds above 2 Gbps

Summary

- In Australia, data usage continues to double every five years as Australians leverage the benefits of technology.
- In recognition of the increasing demand for data and faster internet speeds nbn will begin offering mass market plans with wholesale download speeds of 2 Gigabits per second (Gbps) on the FTTP and HFC networks from September 2025.
- Broadband services with gigabit and multi-gigabit advertised download speeds are now commonplace in many markets around the world.
- Responding to the increase in data and usage demands continues to be a consideration for nbn and forms part of the Company's longer-term planning. nbn must continue to undertake proactive network planning to cater for the ever-increasing usage requirements of customers, enhance service quality and customer experience and improve network reliability.
- nbn has assessed the nature and timing of required future investments and upgrades required to continue to improve operational efficiency and meet the increasing capacity demands of customers on the fixed line network.
- Given forecasts of demand, nbn is planning to implement a capacity driven approach to maximise the lifecycle of its existing asset base on the fixed line network which will see a gradual increase in the fixed line network's availability to support speeds beyond 2 Gbps. Based on the current plan and projection for network upgrades, the proportion of the network capable of speeds greater than 2 Gbps is expected to grow to within the range of 50 to 60 per cent in 10 years' time, but this could be higher or lower depending on traffic growth in the meantime.
- nbn is interested in your feedback on the timing of these future investments, including how it works in partnership with RSPs on potential new speed tiers above 2 Gbps.

Demand on the nbn® network is increasing over time. The latest statistics from June 2024 show that:

- Peak downstream traffic increased almost 20% from the same period the year before to almost 30 terabits per second;
- Average downstream usage per premise increased by 8.5% from the same period the year before to 497 gigabytes/month;
- Average user uploads were 44.9 gigabytes in June, an increase of 17% on the year before; and
- Nearly 1 million services downloaded more than 1 terabyte in June, an increase of 18% on the year before.

A fast-paced technological step-change is unfolding globally, where the mainstream adoption of new technologies is driving customer demand for greater data upload and download speeds. In Australia, data usage continues to double every five years[22] as Australians leverage the benefits of technology. In December 2023, the average household consumed 443[14] gigabytes of data across an estimated 22 devices[23] . This is a significant increase from a decade ago when households used only 40 gigabytes[14] of data per month on just 7.4 devices[24]. The forecast trend suggests continued growth, with projections indicating an average of 33 devices per household by 2026[15], equivalent to more than 350 million[15] internet connected devices in total in Australia. In addition to this, significant forecast growth in mainstream adoption of new technologies including 4K streaming, cloud-based computing, increasingly large game updates and virtual reality, is increasing the importance of high-speed, reliable broadband connections to customers.

4.3.1 What is the status quo on speed?

The download and upload speeds nbn is able to deliver vary across access technologies. The table below shows the highest speed tier currently available on each access technology, which reflects the underlying capability and performance of each network. References to speeds in the table below are not to end customer speeds, they are wholesale layer 2 peak information rate bandwidth provided to retail service providers unless stated otherwise. An end customer's experience, including the speeds actually achieved over the nbn network, depends on the nbn network technology and configuration over which services are delivered to their premises, whether they are using the internet during the busy period, and some factors outside of nbn's control (like the end customer's equipment quality, software, chosen broadband plan, signal reception, or how their provider designs its network).

Table 33: Highest speed tier available across nbn's network access technology

nbn network	Fibre	FTTN/B	FTTC	HFC	Fixed Wireless	Satellite
Highest speed tier available (Mbps)	1,000[1] / 400	25-100 / 5-40	50-100 / 20-40	500-1,000[2] / 50	400 / 10-40	100 / 5[3]

Notes:

1. *The Maximum Data Transfer Rate will be less than but close to 1,000 Mbps*
2. *The Maximum Data Transfer Rate will fall anywhere between 500 Mbps and less than but close to 1,000 Mbps*

[22] **nbn** strategic network insights - average downstream GB usage per **nbn** service by month. Dec-2023 = 443GB. Jun-2013 = 40GB

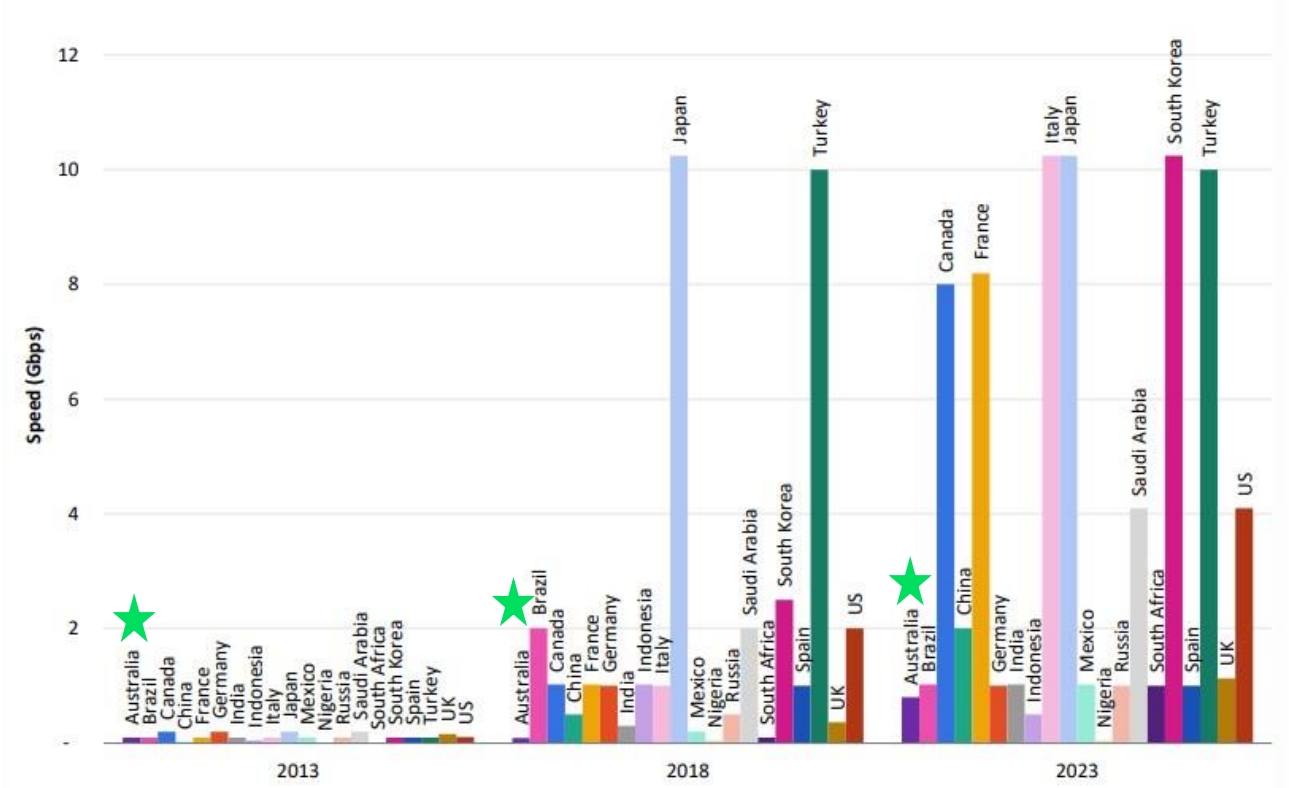
[23] Telsyte Australian IoT@Home Market Study (2022)

[24] Telsyte Digital Consumer Study (2016)

3. *Maximum wholesale speed is expected to be achieved at least one at any time of day per 24hr period and is not the typical busy period speed. Fair Use Policy and shaping apply.*

Broadband services with gigabit and multi-gigabit advertised download speeds are now commonplace in many markets around the world, as can be seen in Figure 22 below. As 1 Gbps broadband services gain popularity in developed broadband markets, multi-gigabit offerings are being introduced as the new premium speed tiers. Today, these offers are aimed at high-end users, however in the future, they will be expected in order to support high-bandwidth applications such as cloud storage, virtual reality/augmented reality, and other artificial intelligence and cloud-based applications.[25]

Figure 22: Global trends in advertised broadband speeds, selected countries, 2013, 2018 and 2023



Source: Omdia (2024) Fibre Development Index Analysis – 2024, pg 17.

[25] Omdia, (2024), Fiber Development Index Analysis – 2024, pg 8.

4.3.2 What are the benefits of greater speeds?

Speed, alongside reliability and service standards, are important considerations for nbn in the way it provisions the network and develops products, particularly as the number of concurrent internet-connected devices in the average home continues to grow.

As outlined above, the volume of data downloaded and uploaded across the nbn® network continues to increase. This is driven by advances in technology and greater use of data intensive applications, such as high-definition content streaming, video conferencing, virtual reality/augmented reality, online gaming education and medical / health applications.

4.3.2.1 Drivers of demand for broadband

Demand for data is forecast to continue to grow across residential and business markets as connected technology continues to integrate into everyday lives. Together with the increasing importance of broadband services for all Australians, this drives demand for higher speed and more reliable services on the nbn network.

Future demand for broadband is expected to be driven by factors such as:

- increasing use of data intensive applications,[26]
- increase in time spent online,
- developments in the "Internet of Things" in the business and residential markets including the adoption of smart household devices,[27]
- development of immersive technologies such as virtual reality and augmented reality,[28] and
- increasing reliance on internet-based business applications for operations and data storage[19].

The rate of development of technology and infrastructure and the accessibility and affordability of higher speed broadband will also shape the outlook of Australia's telecommunications industry. All of this means continued growth in data and an increasing reliance on high-speed networks.

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[26] Both the growth in applications, and the increasing bandwidth requirements of applications are driving demand for higher speed services. Omdia (2024) Fibre Development Index Analysis – 2024, pg 14.

[27] The average number of internet-connected devices in the home in Australia is expected to grow by nearly 10 in the next 4 years and the average number of smart home devices set to grow by nearly half by 2027, equivalent to more than 353 million internet-connected devices in total. Telesyte Australian Smart Home Market Study 2023.

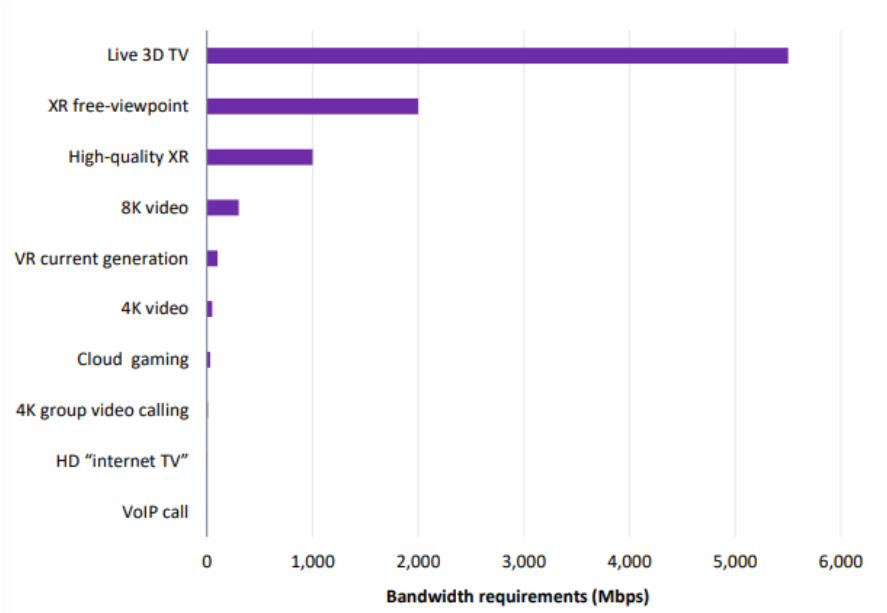
[28] Omdia notes that extended reality technologies including virtual reality and augmented reality will see a further step change in terms of network demand. Advanced applications could require speeds of 1-2 Gbps and a maximum and consistent latancy of less than 5ms. Today, augmented reality (AR) glasses and mixed reality (MR) headsets are almost entirely used for enterprise applications. However, consumer virtual reality (VR) headsets are becoming more common, largely driven by increased investment from organizations such as Meta (Facebook). Consumer-grade AR glasses are expected to go mainstream from 2025 onward. Omdia (2024) Fibre Development Index Analysis – 2024, pg 14.

4.3.2.2 Benefits of greater speeds

Higher speeds can change the way nbn's customers do things online. For example, faster speeds allow customers to download and upload files faster, enjoy smoother video calls, stream higher resolution videos, and play online, including cloud-based games, at the same time without lag or buffering.[29]

Using compression techniques, today's video-streaming services can offer HD videos using less than 5 Mbps. However, high-quality 4K video streams can require speeds of up to 50 – 60 Mbps, and 8K video streams can require up to 300 Mbps.[30] The range of bandwidth requirements across a range of internet applications is shown in Figure 23 below.

Figure 23: Advanced video and extended reality (XR) applications have high bandwidth requirements (bandwidth requirements shown are per device)



Source: Omdia (2024) Fibre Development Index Analysis – 2024, pg 14.

Notes: Extended reality (XR) includes augmented reality, virtual reality (VR) and mixed reality. XR technology blends physical and digital elements to create immersive user experiences. 8K video and 4K video refers to the horizontal display resolution of video content. 8K has a horizontal display resolution of approximately 8,000 pixels and 4K has a horizontal display resolution of approximately 4,000 pixels. VoIP or Voice over Internet Protocol is a technology that allows you to make calls over the internet.

[29] A customers' experience, including the speeds actually achieved over the **nbn** network, depends on the **nbn** access technology and configuration over which services are delivered to customers' premises, whether customers are using the internet during the busy period, and some factors outside of **nbn**'s control (like customers' equipment quality, software, chosen broadband plan or how the customer's provider designs its network). The activities supported by each **nbn** speed tier may also be impacted by a number of factors (and could be degraded depending on the number of people online at the same time, and the customer's **nbn** access technology).

[30] Omdia, (2024), Fiber Development Index Analysis – 2024, pg 14.

Every home connection has a finite data bandwidth limit. This is the maximum amount of data that can be transmitted over an internet connection over a given amount of time. The higher the bandwidth and speed of the internet connection the more it can handle at once.

As the number of devices in people's homes increases, there will be an increase in parallel online activity. Higher speeds will help multiple users coexist online with minimal interruptions. Figure 24 below shows how a customer's experience can differ across three of nbn's current speed tiers across a range of use cases.

Figure 24: User experience across a range of use cases and nbn speed tiers

		Max wholesale speed on a nbn plan		
		50/20 Mbps	100/20 Mbps	1000/50 Mbps
STREAMING	Downloading a 4K movie	28 mins	15 mins	3 mins
	Multiple concurrent streams	2x 4K on Netflix or 1x 4K on Apple TV+	4x 4K on Netflix or 2x 4K on Apple TV+	7+ 4K on Netflix or 10+ 4K on Apple TV+
WORKING FROM HOME	Download 10GB Upload 1GB	28 mins 9 mins	15 mins 9 mins	3 mins 4 mins
	Multiple person video-conference	Good experience	Good experience	Seamless experience
GAMING	Downloading a large game (~130GB)	~5.6 hours	~2.8 hours	~22 mins
	Cloud gaming while others are streaming	Degraded when others using internet	Good when others using internet	Best experience

Please note: These results are based on testing conducted in nbn's product lab environment of nbn HFC and FTTP products at the layer-3 level in April/May 2024. Your experience, including the speeds actually achieved over the nbn® network depends on the nbn access technology and configuration over which services are delivered to your premises, whether you are using the internet during the busy period, and some factors outside of nbn's control (like your equipment age, quality, software, chosen broadband plan or how your provider designs its network). The activities supported by each nbn speed tier may also be impacted by a number of factors (and could be degraded depending on the number of people online at the same time, and your nbn access technology).

As data usage, and the use of applications that require increasing amounts of bandwidth grows, customers will increasingly require, and benefit from, faster internet speeds.

4.3.3 What is nbn planning in the short-term?

In recognition of the increasing demand for data and faster internet speeds nbn recently completed a consultation with industry on increasing speeds available on some residential wholesale products. Following on from this consultation, from 14 September 2025 nbn will:

- Accelerate the wholesale download and upload speeds on its three highest speed residential wholesale products and make them available to internet retailers to sell to eligible residential and business customers connected to the nbn® network via Fibre to the Premises (FTTP) or Hybrid Fibre Coaxial (HFC) technology; and
- Building on the 1 Gbps speeds nbn currently offers, begin offering plans with wholesale download speeds of 2 Gbps to internet retailers to sell to eligible residential and business customers connected to the nbn network via FTTP or HFC technology.

The table below shows the highest speed tier that will be available on each access technology from September 2025.[31]

Table 44: Highest speed tier available across nbn's network access technology from September 2025

nbn network	Fibre	FTTN/B	FTTC	HFC	Fixed Wireless	Satellite
Highest speed tier available (Mbps)	2,000[1] / 500	25-100 / 5-40	50-100 / 20-40	2,000 / 100[2]	400 / 10-40	100 / 5[3]

Notes:

1. *The Maximum Data Transfer Rate will be less than but close to 2,000 Mbps*
2. *The availability of these speed tiers is subject to the capacity within each individual HFC segment or FTTP PON port reflected in the service qualification function (and may affect RSPs' ability to place an order)*
3. *Maximum wholesale speed is expected to be achieved at least one at any time of day per 24hr period and is not the typical busy period speed. Fair Use Policy and shaping apply.*

4.3.4 What is nbn planning in the longer term?

Responding to the increase in data and usage demands continues to be a consideration for nbn and forms part of the Company's longer-term planning. The Company's investment strategy is designed to keep ahead of national data demand and help unlock social and economic benefits for the nation, and nbn needs to continue to be capable of delivering on the increasing usage requirements of customers.

[31] References to speeds in the table below are not to end customer speeds, they are wholesale layer 2 peak information rate bandwidth provided to retail service providers unless stated otherwise. An end customer's experience, including the speeds actually achieved over the **nbn** network, depends on the **nbn** network technology and configuration over which services are delivered to their premises, whether they are using the internet during the busy period, and some factors outside of **nbn**'s control (like the end customer's equipment quality, software, chosen broadband plan, signal reception, or how their provider designs its network).

The needs of consumers are constantly evolving and consequently so are the demands upon the nbn network to meet current and future consumer demand. To meet this demand nbn must continue to undertake proactive network planning to cater for the ever-increasing usage requirements of customers, enhance service quality and customer experience and improve network reliability. This proactive planning will consider the use of emerging and future technologies. Enabling mass market speeds beyond 2 Gbps forms part of this proactive planning.

4.3.4.1 Timing of investment and capability to launch mass market speeds beyond 2 Gbps

nbn has assessed the nature and timing of required future investments and upgrades required to continue to improve operational efficiency and meet the increasing speed demands of customers on the fixed line network.

In the feedback to the recent speed consultation, a number of RSPs highlighted that they do not expect high demand in the short to medium term for multi-gigabit plans. However, there was also recognition from some RSPs that 2 Gbps services could potentially help unlock and meet demand from customers to access a full range of higher speed tiers. This is consistent with nbn's forecasts of demand across the speed tier mix.

Given these forecasts of demand, nbn is planning to implement a capacity driven approach to maximise the lifecycle of its existing asset base on the fixed line network. nbn's forecast capex in the network upgrades and capacity category for the next Regulatory Cycle outlined in section 3.4.1 is based on this capacity driven approach. This investment approach will see a gradual increase in the fixed line network's availability to support speeds beyond 2 Gbps:

- By FY28, a small portion of the fixed line network would be capable of speeds beyond 2 Gbps; and
- Based on the current plan and projection for network upgrades, the proportion of the network capable of speeds greater than 2 Gbps is expected to grow to within the range of 50 to 60 per cent in 10 years' time, but this could be higher or lower depending on traffic growth in the meantime.
- Rollout of the technology that enables >2 Gbps across the full FTTP and HFC networks is expected to be complete by the end of the next decade.

4.3.5 Consultation questions

12. How important is increasing internet speed to customers?
13. How important is it for Australia to offer services comparable with other developed countries worldwide? Why?
14. What are your views about expected consumer demand for >2 Gbps speeds in the medium-term?
15. What would RSPs require as part of a minimum viable product to productise a new speed tier above 2 Gbps?
16. What would be required for customers to require and/or take-up a new speed tier above 2 Gbps?

17. What action should nbn be taking now to deliver higher speeds in the future? When responding to this question, please consider:
    - nbn's current investment plan is to progressively update the FTTP and HFC networks when it makes sense to do so, with the rollout of the technology that enables speeds >2 Gbps across the FTTP and HFC networks expected to be complete at the end of the next decade. Expenditure for a progressive upgrade of the FTTP and HFC networks is included in the capex plans shown in section 3.4.1.
    - An accelerated delivery approach would be to update the network more quickly to enable speeds >2 Gbps across the entire network earlier by bringing forward capital expenditure. For example, accelerating the timeframe to complete network upgrades to the end of FY35 would bring forward capital expenditure in the order of $0.6 billion. Accelerating the timeframe to complete the network upgrades to the end of FY32 would bring forward capital expenditure of around $1.2 billion. The extent to which the upgrade program can be accelerated is dependent on the availability of workforce and equipment, as well as balancing the extent and length of planned outages to customers' services due to upgrade activities.

5 Entry Level Offers

Summary

- The criteria for the selection of the Entry Level Offers for the next Regulatory Cycle are defined in the SAU.
- The TC-4 speed tier on each of the fixed-line and fixed wireless networks that is selected as an Entry Level Offer for the next Regulatory Cycle will be subject to a stricter individual price control than nbn's other TC-4 products on those networks.
- The 25/5 Mbps speed tier on each of the nbn fixed-line and fixed wireless networks is an Entry Level Offer for the current Regulatory Cycle.
- nbn's current view is that the 25/5 Mbps speed tier continues to be the appropriate Entry Level Offer for the next regulatory period having regard to the criteria set out in the SAU.

As set out in the introduction of this Consultation Paper, nbn will submit an Entry Level Offers Proposal as part of its RMA. This section relates to that proposal.

The SAU regulates the maximum price of 'NBN Offers', including for nbn's TC-4 speed tiers (i.e. Bundled TC-4 Offers and Flat-Rate Offers), with the SAU price controls governing by how much these prices can increase over time. Under the SAU, some of nbn's services are subject to individual price controls which apply in addition to the weighted average price control. Those individual price controls allow prices for TC-4 speed tiers on nbn's fixed line and fixed wireless networks (except a TC-4 speed tier designated as an 'Entry Level Offer') to increase each financial year by the greater of the annual percentage change in CPI or up to 5%. The SAU sets a stricter individual price control for a TC-4 speed tier designated as an 'Entry Level Offer' for the relevant Regulatory Cycle, for which the price cannot increase by more than the percentage change in CPI each financial year.

As part of its RMA, nbn must make an Entry Level Offers proposal setting out the TC-4 speed tier on each of the nbn fixed-line and fixed wireless networks that nbn proposes be an Entry Level Offer for the next Regulatory Cycle commencing on 1 July 2026. An Entry Level Offer must be for a TC-4 speed tier (i.e. a Bundled TC-4 Offer or a Flat-Rate Offer) that:

- has been introduced by nbn for more than 24 months (as at 1 July 2026);
- has a maximum download speed that is lower than the download speed of nbn's most ordered TC-4 speed tier group;[32]

[32] **nbn**'s most ordered speed TC-4 tier group is defined in the SAU as the 'Most Ordered TC-4 Download Offer Group' and comprises the Bundled TC-4 Offers and Flat-Rate Offers with the same maximum downlink Data Transfer Rate that are supplied in the greatest numbers across all of the NBN Co Networks (except the NBN Co Satellite Network), assessed based on data from the full Financial Year most recently ended at the time the Entry Level Offers are being proposed in a RMA or determined in an ACCC RMD.

- has the same maximum download speed as each other Entry Level Offer specified on each other nbn network (unless there is no set of TC-4 speed tiers with the same offer download rate on each nbn network, in which case the SAU specifies additional criteria for selecting an Entry Level Offer); and
- is reasonably considered by nbn to be nbn's entry level service.

The 25/5 Mbps TC-4 speed tier on each of nbn's fixed line and fixed wireless networks is an Entry Level Offer for the current Regulatory Cycle (ending 30 June 2026). The 25/5 Mbps speed tier was chosen over nbn's previous 12/1 Mbps 'entry level bundle' as part of the 2023 SAU variation in recognition of an increasingly competitive market, and in response to stakeholder concerns that the previous 12/1 Mbps entry level bundle did not meet growing consumer expectations.

The 50/20 Mbps speed tier group[33] is the most ordered TC-4 speed tier group at the time of publication of this paper and is forecast to be the most ordered TC-4 speed tier group for FY25. This would mean an Entry Level Offer must be either the 12/1 Mbps or 25/5 Mbps speed tier on each of the nbn fixed-line and fixed wireless networks, as these are the only TC-4 speed tiers which have a maximum download speed less than 50 Mbps and will have been supplied for 24 months as at 1 July 2026.

nbn's current view is that the 25/5 Mbps will continue to be nbn's entry level service for the next Regulatory Cycle and therefore is the appropriate Entry Level Offer for the next Regulatory Cycle. It is the nbn speed tier directly below the 50/20 Mbps speed tier which is currently the most ordered TC-4 speed tier group and is currently forecast to be the most ordered TC-4 speed tier for the entirety of the next regulatory period[34].

5.1 Consultation Question

18. To what extent is the 25/5 Mbps speed tier the appropriate Entry Level Offer which would be subject to stricter price controls under the SAU?

[33] This group comprises the NBN Offers for the following TC-4 speed tiers: 50/20 Mbps (FTTP, HFC and FTTC) and 25-50/5-20 (FTTB and FTTN).

[34] Noting that the SAU only requires the 'Most Ordered TC-4 Download Offer Group' to be that supplied in greatest number across all of the **nbn** networks based on data from the full financial year most recently ended at the time an Entry Level Offer is proposed in an RMA or determined in an ACCC RMD.