

ACMA, Expiring spectrum licences, stage 2

Submission of NBN Co

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Public

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1 Introduction

nbn welcomes the opportunity to provide information and feedback on the issues that will inform the Australian Communications and Media Authority’s (**ACMA**) stage 3 preliminary views on future arrangements for the spectrum covered by expiring spectrum licences (**ESLs**),¹ in particular, **nbn**’s use of the 2.3 and 3.4 GHz band spectrum. This submission is to be read in conjunction with our submission to the ACMA’s proposed approach to considering ESLs as set out in the consultation paper dated May 2023.

nbn was established in 2009 as a Government Business Enterprise (**GBE**), to provide fast, reliable and affordable connectivity and to enable Australia to seize the economic opportunities before it and service the best interests of consumers. It remains the principal responsibility of **nbn** to operate, and continue to build and upgrade, the **nbn** network in accordance with the expectations of the Government, as set by the Shareholder Ministers’ Statement of Expectations (**SoE**) and its obligations as the default Statutory Infrastructure Provider (**SIP**). The Federal Government expects that **nbn** will operate on a commercial basis to the maximum extent possible, driving a culture of efficiency and innovation, to enhance Australia’s digital capability by delivering services to meet the current and future needs of households, communities and businesses, and promote digital inclusion and equitable access to affordable and reliable broadband services.² The SoE also acknowledges that meeting our obligations will not always be commercial, and indeed the Regional Broadband Scheme (**RBS**) was established to make explicit the cross-subsidisation of **nbn**’s loss-making satellite and fixed wireless (**FW**) networks.

2 Executive Summary

- **nbn** currently holds spectrum licences in the 2.3 and 3.4 GHz band that are due to expire in 2030. These spectrum licences are fundamental to the provision of the **nbn** FW network and renewal of those licences is consistent with the relevant Ministerial Policy Statement on Expiring Spectrum Licences (**MPS**)³ and the public interest criteria identified by the ACMA for the ESL process:
 - facilitates efficiency;
 - promotes investment and innovation;
 - enhances competition;
 - balances public benefits and impacts; and
 - supports relevant policy objectives and priorities.

¹ Spectrum licences due to expire between 2028 and 2032 in the 700 MHz, 850 MHz 1800 MHz, 2 GHz, 2.3 GHz, 2.5 GHz, 2.5 GHz mid-band gap, and 3.4 GHz bands.

² NBN Co Limited, Statement of Expectations, 19 December 2022

³ [Radiocommunications Ministerial Policy Statement – Expiring Spectrum Licences\) Instrument 2024](#)

- **nbn** supports the ACMA’s views that continued wireless broadband (**WBB**) usage of the 2.3 and 3.4 GHz band is conducive to promoting the long-term public interest. There is no evidence that the reallocation of the 2.3 and 3.4 GHz band spectrum to a different use would be in the public interest.
- All of the 2.3 and 3.4 GHz band spectrum held by **nbn** is currently in active use delivering essential high speed FW broadband services, to over 400,000 residential and business premises, primarily in regional areas. By the end of 2024 it is anticipated that the expanded FW network footprint will cover approximately 750,000 premises as a result of the FW and Satellite Upgrade Program.⁴
- **nbn** has invested significant amounts in the rollout of its FW network and continues to invest to maintain the efficiency and service quality of the network into the future, including additional funding from a range of Government programs and initiatives.
- The availability of high-speed broadband within the **nbn** FW network is a key pillar of meeting **nbn**’s purpose, to lift the digital capability of Australia and **nbn**’s regulatory obligation to offer a wholesale high speed FW broadband service to Australian homes and businesses in compliance with the Federal Government’s SIP regime and SoE.
- The **nbn** FW network delivers substantial public benefits to end users. Fast and reliable broadband drives improved economic and social outcomes for Australia including:⁵
 - **significant GDP benefits** to the Australian economy (particularly in regional and remote areas and in lower socio-economic communities);
 - a positive impact on individual wellbeing, including:
 - 78% of regional and remote **nbn** users who worked from home or used job search platforms reported the **nbn** network positively impacted their **employment outcomes**;
 - 80% of regional and remote **nbn** users who engaged in education from home reported the **nbn** network positively impacted their **education outcomes**;
 - 77% of regional and remote **nbn** users who accessed telehealth or online medical information, resources or records reported the **nbn** network positively impacted their **health outcomes**;
 - 73% of regional and remote **nbn** users who connect with family, friends and others or access news or community information online reported the **nbn** network positively impacted their **social and community connectedness**; and

⁴ <https://www.nbnco.com.au/content/dam/nbn/documents/about-nbn/weekly-progress/2024/public-progress-data-20240530.pdf.coredownload.pdf>

⁵ Accenture Economic and Social Impact Report 2024, p 11 (<https://www.nbnco.com.au/content/dam/nbn/documents/about-nbn/reports/reports-and-publications/accenture-2024-economic-and-social-impact-insight-report.pdf.coredownload.pdf>)

- 87% of regional and remote **nbn** users who work, study, access health or other services online reported having fast internet via the **nbn** network helped them **to reduce their emissions**.
- The significant disruption to those end users and potential loss of those economic and social benefits, must be a primary matter for consideration by the ACMA in reaching a position regarding the renewal of **nbn**'s ESLs.
- In addition, the ACMA must have regard to the substantial economic inefficiency that would arise if **nbn**'s 2.3 and 3.4 GHz licences are not renewed, including billions in sunk capital investment that would potentially be stranded, and the need for **nbn** to further invest to provide wholesale high speed broadband to serve customers in the current FW footprint – which would need to be funded by Government, industry levy and/or higher wholesale broadband prices.
- In relation to pricing, **nbn** recommends that the ACMA take a conservative approach, particularly in respect of spectrum in regional and remote areas, and in the case of spectrum held by **nbn**, pricing should give due regard to the loss-making nature of the **nbn** FW network, which provides substantial public benefit and is required under relevant statutory obligations and the **nbn** SoE.

3 Ongoing access to spectrum underpins nbn's ability to lift the digital capability of Australia

End users in regional Australia have benefitted from nbn's significant investment in our FW network, enabled by our spectrum holdings

Since the establishment of **nbn**, we have invested significant capital into our loss-making FW network in order to meet our SoE and, from 2020 onwards, our SIP obligations. We publicly report expenditure related to our FW network annually through our RBS Transparency Report.⁶ For FY23, we reported incurred expenditure related to the FW network of \$129m for direct operating costs and \$307m for capital expenditure.⁷ **[C-i-C] [end C-i-C]**.

The significant investments made by **nbn** in its FW network are underpinned by, and rely on, **nbn**'s 2.3 and 3.4 GHz band spectrum. These holdings which are due to expire in 2030 are fundamental to the ongoing operation and coverage of the **nbn** FW network. The majority of our existing 2.3 and 3.4 GHz band spectrum holdings were held under licences which were renewed in 2015 following the then Minister for Broadband, Communications and the Digital Economy's

⁶ [nbnc0-rbs-transparency-report-2023](#)

⁷ For transparency, the capital expenditure includes grant funded amounts from the federal government for the FW and Satellite Upgrade Program

determination in 2012 that it would be in the public interest to reissue licences to incumbent licensees who had used the licence to provide WBB services in the 2.3 and 3.4 GHz band.⁸

We use world-leading technology and network design in the use, and planned use, of our spectrum licences in conjunction with our 28 GHz band millimetre wave (**mmWave**) area wide apparatus licences (**AWLs**). In designing our network, we have worked with industry and the 3GPP to ensure that our combination of spectrum across different frequency bands delivers optimum network outcomes, making use of the entirety of our spectrum regardless of licence type. Our 2.3 and 3.4 GHz band spectrum is our primary coverage layer, while we use our 28 GHz band AWLs to maximise capacity where technically feasible (noting line of sight limitations of mmWave spectrum). In this way, our 28 GHz spectrum holdings are complementary to our spectrum licences, they are not substitutable.

The renewal of the entirety of our 2.3 and 3.4 GHz spectrum is critical to **nbn** and, by extension, to the retail service providers (**RSPs**) and Australians that rely on the **nbn** network.

Without our existing 2.3 and 3.4 GHz spectrum, **nbn** would be forced to meet its SIP obligations using alternative, more economically inefficient means. This could involve incurring extraordinary costs to build fixed-line connections to premises currently reliant on the FW network or could instead mean migrating FW end-users to a satellite network – a network which has a finite amount of available bandwidth to share among all end users.

nbn strongly supports the ACMA's views that continued support for WBB usage of the 2.3 and 3.4 GHz band is conducive to promoting the long-term public interest, noting that the Australian market is relatively small in terms of equipment demand and that as such, we must operate within a compatible international ecosystem. There is no evidence that the reallocation of the 2.3 and 3.4 GHz band spectrum to a different use would be in the public interest when weighed up against:

- The consequence of non-renewal for **nbn**'s FW network end users and our RSPs with continuity of supply impacts.
- The extraordinary costs that would be incurred by **nbn** in establishing an alternate service to meet its SIP obligations in what would be a resource intensive and lengthy process.
- The significant impact on **nbn**'s FW RSPs in transitioning their end users to a new **nbn** service (with the potential that some of the affected RSPs do not offer **nbn** services on the technology over which the end user would need to transition to receive a **nbn** service).

⁸ Radiocommunications (Class of Services) Determination 2012

- The significant investments that **nbn** has made and continues to make including with the Federal Government as part of the \$750 million FW and Satellite Upgrade Program and with State and Federal Government as part of regional co-investments.

[C-i-C]

- [end C-i-C]

Continued investment to upgrade nbn’s FW network requires continued certainty of access to spectrum

As of 23 May 2024, there are approximately 400,000 active FW connections on the **nbn** network, each of which represents a household or business potentially impacted by the outcomes of the ESL process. By the end of 2024 it is anticipated that the expanded **nbn** FW network footprint will cover approximately 750,000 premises as a result of the FW and Satellite Upgrade Program across rural, regional and outer-metro fringe areas.⁹

Our \$750 million FW and Satellite Upgrade Program (of which \$480 is contributed by the Australian Government) requires full use of our 2.3 and 3.4 GHz band spectrum holdings within the expanded FW footprint. That is, we will be fully utilising our spectrum including maximising its re-use across sites and also the number of MHz available in each sector to support end user traffic. This program will extend the **nbn** FW footprint and uplift FW speeds. In particular, it will:

- Extend **nbn** FW: Expand the **nbn** FW footprint by up to 50%, enabling approximately 120,000 former satellite-only eligible premises to access **nbn** FW services.
- Improve **nbn** FW typical wholesale busy hour speeds: Network improvements are expected to allow the network to achieve ‘typical wholesale busy period speeds’ of at least 50Mbps (download).
- Deliver faster **nbn** FW wholesale speeds: Once launched, **nbn** proposes all homes and businesses in the expanded FW footprint will be able to order FW Plus via their RSP, 90% will be able to order FW Home Fast which has a peak wholesale download and upload speed range of 200 -250/8-20Mbps. Additionally, it is anticipated 80% of the expanded footprint will also be able to order FW Superfast, which has a peak wholesale download speed range of 400Mbps.

Separately, **nbn** has been piloting an uplifted FW Plus product delivering wholesale speeds of 100/20 Mbps which has recently launched alongside the two new products.

In addition to **nbn**’s FW and Satellite Upgrade Program, we are also committed to future FW network investments as part of the Regional Connectivity Program (**RCP**) where we will be upgrading homes and businesses from **nbn**’s satellite network to **nbn**’s FW network. This is in

⁹ <https://www.nbnco.com.au/content/dam/nbn/documents/about-nbn/weekly-progress/2024/public-progress-data-20240530.pdf.coredownload.pdf>

addition to the significant ongoing capital investment [C-i-C] [end C-i-C] that is generally required each year for capacity expansion, customer connections and new site builds.

nbn's FW network will need to continue to evolve to meet future requirements and customer needs in a changing technological and policy environment

Beyond **nbn's** existing upgrade plans, **nbn's** FW network will need to continue evolving as future demands emerge, to enable the company to continue to lift the digital capability of Australia. Population demographic trends and higher data usage are changing the profile of network demand and usage, particularly in regional Australia. Traffic growth is continuing in line with our forecast in 2022 of a 300% rise in customer demand data on the **nbn** FW network by 2032.¹⁰ However, the exact details and the full extent of impact of the future technological and policy landscape in which **nbn** will be required to operate is unknown. Given this, we seek to future proof where possible our network investments balancing the costs involved given the long-term nature of the relevant decisions and the significant capital involved. For example, the latest WNTD that **nbn** is deploying at premises in the FW footprint can support future services with speeds of up to 2000/200Mbps over mmWave spectrum, and downloads of up to 460Mbps over **nbn's** 2.4 and 3.4 GHz spectrum, noting that products achieving these speeds have not yet been developed by **nbn**.

Given the unknowns within which **nbn** will be required to operate and comply with its regulatory obligations and the Government SoE, it is critical that **nbn's** 2.3 and 3.4 GHz band spectrum is renewed to enable **nbn** to deliver on future requirements and opportunities as they arise. Considerations that are currently live which need to be accounted for by the ACMA in its ESL process include the following:

- The SOE guides **nbn** so that its strategic direction is aligned with the Government's objectives for the **nbn** network and delivering the Government's commitments to increase access to faster, more reliable broadband. Of particular relevance to the ESL process, the SOE includes an expectation that **nbn** will continue to improve its services and assist in addressing access challenges in regional and remote areas to enhance connectivity, improve safety and increase productivity. The SOE specifies that outcomes of those improvements should include implementing upgrades to provide all premises in the **nbn** FW network with access to wholesale download speeds of up to 100 megabits per second and typical wholesale busy hour speeds of at least 50 megabits per second. **nbn's** ability to deliver those outcomes will require ongoing access to adequate spectrum.
- The Australian Government is examining universal telecommunications service arrangements in light of changes in available technologies and consumer preferences over recent years. A key principle for Government is that any change to existing arrangements will only be considered if there are tested and proven alternatives to

¹⁰ NBN Co Limited Annual Report 2022, p25

existing technologies and services. As part of the Federal Government’s Alternative Voice Services Trials Program, **nbn** trialled services using a new FW solution using low band (sub 1 GHz) spectrum and demonstrated the existing prioritised performance of the existing FW network on 2.3 and 3.4 GHz band spectrum.

- The regional legacy copper networks that have supported the Telstra universal service obligation for decades are reaching end-of-life, meaning approx. 285,000 customers will need to be migrated to alternative solutions.¹¹ While much industry and policy discussion focusses on the role that LEO satellite networks can play in this space, it is likely that a large proportion of these end-users will be located within **nbn**’s FW network footprint. **nbn** believes terrestrial FW networks should be preferred over LEO based services wherever possible due to their proven reliability, performance capabilities and the well-established competitive retail market.
- **nbn** is satisfied with the operation of the secondary market, taking opportunities to defragment, align boundaries and trade underutilised spectrum areas for areas of higher value. These activities have enhanced the utility of the relevant spectrum and demonstrate that there is no compelling justification for reallocation of spectrum to effect change and optimisation between licence holders as technology has evolved.

As outlined above, **nbn**’s ongoing access to our 2.3 and 3.4 GHz band spectrum is clearly in the public interest. As such, and for the same reasons, we anticipate it will maximise the derived public interest for renewal of this spectrum to be priced to allow **nbn** to continue delivering on the objectives set out in our SoE, to meet SIP obligations and to support the critical role that **nbn**’s loss-making FW network plays in contributing to the communication policy objectives of the Government. We look forward to participating in industry discussion on this matter throughout 2024 and beyond.

4 Information requested from incumbent licensees

We have provided additional information below with regard to Appendix A of the consultation paper which requests information on the following:

- How does your current and planned use of the spectrum facilitate efficiency?
- How does your current and planned use of the spectrum promote investment and innovation?
- How does your current and planned use of the spectrum enhance competition?

¹¹ Telstra, March 2024, submission in response to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts discussion paper on Better delivery of universal services, p4

- How does your current and planned use of the spectrum balance public benefits and impacts?
- How does your current and planned use of the spectrum support regional, rural, and remote connectivity, investment and competition?
- Alternative Uses for Spectrum.
- Approaches to examining use under existing licences.
- Temporary disaster response / resilience.
- Rollout obligations, UIOLI and UIOSI conditions.

This section is intended to be read in conjunction with section 3 above and our stage 1 submission.

a) How does your current and planned use of the spectrum facilitate efficiency?

The Federal Government’s SoE requires **nbn** to operate on a commercial basis to the maximum extent possible, driving a culture of efficiency and innovation that yields results. An assessment of the efficiency with which spectrum is used must consider the efficiency of resources generally to achieve our SIP obligations, SoE and purpose of lifting the digital capability of Australia and not be confined to those that are spectrum specific. Our current, and planned use, of 2.3 and 3.4 GHz band spectrum facilitates efficiency in a range of ways as set out below.

Optimisation of our FW investments for our multi-technology mix model

With our substantive network investments, both historic and planned, the renewal of our spectrum licences will be the most economically efficient option to continue to provide a service to our FW premises that complies with the Government’s SIP regime and our SoE. We note that there are live discussions regarding the potential for new entrants and use cases, including whether LEO satellite networks will play a role in universal service delivery in regional and rural Australia. However, while **nbn** maintains our status as default SIP across all of Australia, we must retain our 2.3 and 3.4 GHz band spectrum in order to continue to offer services within our FW footprint.

Developing technology solutions to maximise spectral efficiency

The Minister has identified that a relevant policy consideration is the benefits of technological developments that improve spectrum utilisation and efficiency. **nbn**’s current and planned use of our spectrum licences is designed to achieve a high-level of spectral efficiency from the entirety of our spectrum holdings (i.e. including our complementary mmWave holdings).

nbn has been leading the development of technology solutions with our partners that address our need for capacity using the 2.3 and 3.4 GHz band spectrum. Specifically, we have adapted

lens antennas to maximise our re-use and pioneering long-range mmWave to provide an effective complement to the 2.3 and 3.4 GHz band spectrum. The WNTD v4 is co-designed with our suppliers and specifically addresses our network requirements, while employing unique antenna designs that both maximise the performance of the device and minimise the costs of the active components.

The technology and network design we have deployed delivers world leading spectrum re-use with sectorisation achieving a re-use factor of up to 12x with high spectral efficiency in each carrier. This is comparable, and in some cases superior, to the best that we have seen from 5G Active Antenna Systems in similar bands. **nbn** will continue to optimise its network and the technology in use, with WNTDs in the field being progressively upgraded to a 5G variant. As the progressive upgrade of WNTDs to a 5G variant is completed in coverage areas, **nbn** will take the opportunity to realise the incremental gains in efficiency, capacity and performance from upgrading the local network to 5G.

These technology solutions combine to enable both the technical feasibility to extend the range of the FW network and the capacity to be able to offer a good service experience to the additional 120k satellite premises that are being flipped to FW as part of the FW and Satellite Upgrade Programme.

The existing 2.3 and 3.4 GHz band technical framework which supports **nbn**'s existing, and planned, network deployment is fit for purpose and enables **nbn** to use its spectrum in a way that supports the long-term public interest derived from the spectrum. It accommodates **nbn**'s existing and planned network evolution, including the continued use of 4G and gradual transition to 5G noting the cost and time involved in replacing WNTDs across the entire footprint.

Optimising the geographic coverage of our 2.3 and 3.4 GHz band spectrum holdings for our multi-technology mix model

Where **nbn** determines to serve a premises with FW, it is because we consider it the most efficient and reasonable technology (compared with our fixed-line and satellite options) to meet our regulatory (**SIP**) and commercial wholesale broadband agreement (**WBA**) obligations. The efficiency of **nbn**'s usage of our spectrum holdings should not therefore be solely assessed based on our coverage maps (i.e. the number of premises covered). Where we select FW as the most appropriate choice, we deploy coverage to ensure relevant premises can access performance levels in accordance with our SIP and WBA requirements. These performance levels will differ from those of a mobile operator whose services are not subject to the same minimum performance expectations as **nbn**'s.

A consequence of this approach is that the areas **nbn** serves with FW do not form the absolute boundary that our spectrum holdings must cover. That is, our FW signal will propagate beyond this boundary, albeit at signal levels that may not support our minimum performance requirements. As such, the technical framework needs to accommodate the deployment of **nbn**'s spectrum to premises right up the border of the geographic spectrum boundary.

For example, in using spectrum to provide FW to premises in the peri-urban areas, the spectrum management framework must accommodate **nbn**'s existing and planned usage to be efficient and in the long-term public interest. As part of **nbn**'s recent agreement to excise inner metro holdings from its 3.4 GHz spectrum, it was agreed that the technical framework would accommodate the deployment of **nbn**'s spectrum to premises right up to the geographic border.¹²

For completeness, there are premises within the FW network footprint which are serviced by **nbn**'s fixed line or satellite networks as required. For example, small regional towns may have fixed line network serving the main street and surrounding residential areas, with premises located further from the centre of town served with FW.

In assessing the geographic use of spectrum, the ACMA should adopt an approach that is not too granular and aligns where possible with existing geographic spectrum boundaries to ensure ease of interference boundary management, facilitate contiguity and avoid fragmentation.

Utilising the secondary market to maximise the derived public benefit

nbn's experience has been that the secondary market has been successful in enabling spectrum to be used in a manner that promotes the long-term public interest derived from the spectrum.

For example, **nbn** has successfully acquired spectrum on the secondary market which has resulted in further defragmentation of 3.4 GHz band spectrum with the contiguous bandwidth realised as a result enabling relevant spectrum users to deploy world class technologies.

In addition, **nbn** has successfully acquired spectrum on the secondary market which has enabled it to offer additional capacity and performance to FW users in certain areas. **nbn** recently completed a trade with Telstra that supports **nbn** to increase the capacity available in the FW network in Darwin, improving the performance of the network and reducing congestion.

These examples demonstrate the ability and willingness of licensees to enable spectrum holdings to be used in the most efficient way for the Australian public.

Regional co-investment to improve digital connectivity

nbn's 2.3 and 3.4 GHz band spectrum has enabled **nbn** to successfully obtain regional co-investment funding from federal and state government, resulting in **nbn** satellite premises being switched to **nbn** FW. Renewal of the spectrum licences in these areas will help to ensure that government funding has been prudently and efficiently spent. In addition, it will ensure end

¹² The ACMA's Draft 2024-2029 Five Year Spectrum Outlook flags that the ACMA plan to consult on technical and licensing arrangements for highly localised WBB services in Q3 2024.

users at these premises maintain access to **nbn**'s high-speed tier FW products in areas where there may be limited availability of comparable alternative products.

The certainty of having sufficient 2.3 and 3.4 GHz band spectrum available to support further extensions to **nbn**'s FW network also means that **nbn** can confidently make applications for future co-investment funding to support government regional policy objectives and deliver these projects in a timely manner. By way of example, under round three of the Commonwealth's RCP (RCP3), **nbn** has been successful in securing eighteen co-funded projects. Seventeen of these projects plan to switch more than a combined ~30,000 premises in regional, rural and remote areas from the current **nbn** satellite network to the **nbn** FW network. Nine of these projects are targeted specifically at improving connectivity in First Nations communities, allowing ~6,000 premises to be switched to **nbn** FW, which is intended to help improve First Nations digital inclusion.¹³

b) How does your current and planned use of the spectrum promote investment and innovation?

Our SoE requires that **nbn** drive a culture of innovation that yields results and promotes innovation through network upgrades, development of new services to meet RSP and consumer needs, and the flexibility to adopt to future innovations and advancements. In addition, our SoE requires that **nbn** be commercially sustainable to the maximum extent possible to support efficient investment in the network.

Our current and planned use of the spectrum promotes investment and innovation in the following ways:

- Our \$750 million FW and Satellite Upgrade Program is estimated to provide an additional \$6.1 billion in regional GDP over the years FY22 -26.¹⁴ This is in addition to the significant ongoing capital investment [C-i-C] [end C-i-C] generally required each year.
- Regional co-investments. Through RCP3, we have been able to deliver regional upgrades with total project value of [C-i-C] [C-i-C ends]. Research conducted for **nbn** by Accenture indicates the impact of increases in average broadband speeds on Gross Regional Product are 16x greater in remote areas and 2x greater in regional areas relative to the impact on major cities.¹⁵

¹³ <https://www.nbnco.com.au/corporate-information/about-nbn-co/newsroom/articles/community/building-australias-regional-future>

¹⁴ **nbn** Media Release, 22 March 2022 <https://www.nbnco.com.au/corporate-information/media-centre/media-statements/750-million-investment-to-5G-enable-nbn-fixed-wireless-to-deliver-faster-speeds-to-regional-australia>

¹⁵ Accenture Economic and Social Impact Report 2024, p 11 (<https://www.nbnco.com.au/content/dam/nbn/documents/about-nbn/reports/reports-and-publications/accenture-2024-economic-and-social-impact-insight-report.pdf.coredownload.pdf>)

- Confidence in investment decisions. Early presumption of renewal of our spectrum licences will provide business confidence and certainty regarding future investment decisions which are relevant to the customer experience.
- Technology innovation in extending the range of our time division duplex (TDD) network beyond the original 14km limit facilitating the offload of 120k Satellite premises to FW and to the achievement of high level of spectral efficiencies through the use of novel antennas and site designs as discussed in section 4(a).

c) How does your current and planned use of the spectrum enhance competition?

nbn's current 2.3 and 3.4 GHz band spectrum has underpinned the delivery of retail competition to regional, rural and remote Australia in accordance with the original vision for **nbn**, with strong and growing infrastructure-based competition driving **nbn** to continue to invest to improve the performance of our FW network.

The rollout of the nbn FW network has delivered retail competition to consumers in regional and rural Australia

nbn occupies a unique place in the Australian telecommunications industry as a national broadband network provider operating under a wholesale only mandate. We supply services to RSPs on a non-discriminatory basis with extensive regulatory oversight of our commercial activities. Promotion of competition is a specific expectation set out in the **nbn** SoE, which stems from one of the perceived issues with the Australian telecommunications market at the time of **nbn**'s inception in 2009 (i.e. a lack of effective retail competition).

As at the end of 2023, the ACCC's **nbn** Wholesale Market Indicators Report showed 10 discreet RSP groups who each accounted for at least 1% of the total **nbn** FW base (with a further 2.5% of total FW services provided by smaller providers). These RSPs include a mix of national telcos and smaller more regionally focused operations and deliver approx. 400,000 FW services to end users. This has allowed consumers and businesses to move away from legacy and lower performing ADSL based services provided primarily over Telstra's legacy infrastructure.

nbn continues to invest in our FW network to improve speeds and service quality

nbn is currently upgrading its FW network through the implementation of the **nbn** FW and Satellite Upgrade program which will expand **nbn**'s FW coverage footprint, while increasing speeds across the network.

While this program is strongly backed by **nbn**'s SoE which specifically requires **nbn** to upgrade the FW network, there is a strong commercial imperative for **nbn** to make these investments.

In 2022, **nbn** estimated that approx. 12% of all residential premises within Australia were connected to a competitor's FW / mobile broadband networks rather than the **nbn** network, with over 40 discreet non-MNO FW providers (including Swoop, Field Services Group, Pentanet

and Superloop) targeting certain regional and remote areas of Australia.¹⁶ This competition and the resulting churn of **nbn** subscribers to competing networks drives **nbn** to improve the attractiveness of its FW offerings in order to try and retain customers which in turn drives competing operators to deliver innovative and attractive options for end users – a healthy mix of infrastructure and retail competition.

Any assessment of competition should recognise the substitutability of different spectrum for downstream applications

Importantly, where the ACMA wishes to consider the competitive benefits of spectrum licences, it must recognise the significant overlap between different licences and frequency bands that support competitive outcomes in downstream markets. In particular, despite differences in performance and propagation characteristics, consideration of competition in the WBB market should account for all the bands that are currently used for WBB, including those which are not the subject of this consultation process.

Further, regard must be had to the ability, and practice of licence holders engaging in spectrum trading to suit their individual coverage and capacity needs, and to maximise the utility of available spectrum. **nbn** has participated in spectrum trades as outlined in section 4a above.

d) How does your current and planned use of the spectrum balance public benefits and impacts?

nbn's purpose is to lift the digital capability of Australia and our FW network relies on the continued use of our 2.3 and 3.4 GHz band spectrum holdings to offer a wholesale high speed FW broadband service to Australian homes and businesses in compliance with the Federal Government's SIP regime and SoE.

The legislated SIP regime recognises the significant public benefits that high-speed broadband provides and ensures that all people in Australia can access high speed broadband services. Research conducted for **nbn** by Accenture (**Attachment A**) shows the **nbn** network roll out has had a profound impact on broadband availability and speeds. **nbn** has contributed 76% to the uplift of estimated average broadband speeds across Australian households, with a +44 Mbps increase in average broadband speeds among Australian households from 9 Mbps in December 2011 to 53 Mbps in December 2022.¹⁷ The research also highlights the significant relationship between increases in average broadband speeds enabled by the **nbn** network, and positive economic and social impacts.

Accenture found the **nbn** network supported 4% of aggregate GDP growth in 2012-2022. Additionally, access to faster broadband has enabled positive impacts across overall

¹⁶ **nbn** SAU supporting submission, November 2022, pp26-35

¹⁷ Accenture Economic and Social Impact Report 2024, p 4.

wellbeing, social and community connection, health, education and employment.¹⁸ While these findings apply to the **nbn** network overall, these economic and social benefits exist equally for premises in the FW footprint.

Our FW and Satellite Upgrade Program alone is estimated to provide an additional \$6.1 billion in regional GDP over FY22-26.¹⁹ This is in addition to the public benefits that are provided to Australians who are, or will be able to, obtain our FW service due to our RCP co-investments. The Accenture research indicates the GDP benefit of faster broadband speed is up to 16x greater in remote areas and 2x greater in regional areas.²⁰ Additionally, **nbn** users in regional and remote areas reported positive wellbeing impacts of similar magnitude to the national average.²¹ Without our FW network, Australians in these areas would have limited alternative retail broadband options of the same quality.

Improved connectivity enabled by **nbn** FW network in regional and remote areas has been shown to improve education outcomes through better use of technology by schools and households. Additionally, because a number of regional and remote areas have limited range of health and wellbeing services, **nbn** FW improves access to these services, including Telehealth, as well as making communication between doctors, specialists and patients easier. The Accenture research found 73% of regional and remote **nbn** users say having the **nbn** network at home has had a positive impact on their satisfaction with life and individual wellbeing, including.

- 78% of regional and remote **nbn** users who worked from home or used job search platforms reported the **nbn** network positively impacted their **employment outcomes**.
- 80% of regional and remote **nbn** users who engaged in education from home reported the **nbn** network positively impacted their **education outcomes**.
- 77% of regional and remote **nbn** users who accessed telehealth or online medical information, resources or records reported the **nbn** network positively impacted their **health outcomes**.
- 73% of regional and remote **nbn** users who connect with family, friends and others or access news or community information online reported the **nbn** network positively impacted their **social and community connectedness**.
- 87% of regional and remote **nbn** users who work, study, access health or other services online reported having fast internet via **nbn** network helped them **to reduce their emissions**.

¹⁸ Accenture Economic and Social Impact Report 2024, p 18.

¹⁹ **nbn** Media Release, 22 March 2022 <https://www.nbnco.com.au/corporate-information/media-centre/media-statements/750-million-investment-to-5G-enable-nbn-fixed-wireless-to-deliver-faster-speeds-to-regional-australia>

²⁰ Accenture Economic and Social Impact Report 2024, p 11 (<https://www.nbnco.com.au/content/dam/nbn/documents/about-nbn/reports/reports-and-publications/accenture-2024-economic-and-social-impact-insight-report.pdf.coredownload.pdf>)

²¹ Accenture Economic and Social Impact Report 2024, p 21.

The benefits enabled by the **nbn** FW network are also in-line with **nbn**'s commitment to achieving Target 17 of the Closing the Gap initiative, which commits to First Nations people having equal levels of digital inclusion by 2026.²²

Without the renewal of our spectrum licences, there would be no continuity of service and significant disruption to our RSPs and Australians using our FW network, with there being currently ~400,000 active services across the peri-urban, regional and rural areas.

e) How does your current and planned use of the spectrum support regional, rural, and remote connectivity, investment and competition?

nbn's purpose is to lift the digital capability of Australia and our loss-making FW network relies on the continued use of our 2.3 and 3.4 GHz band spectrum to offer a wholesale high speed FW broadband service to Australian homes and businesses in rural, regional, and peri-urban locations.

Statement of Expectations

nbn is guided by a SoE issued by its Shareholder Ministers. The current SoE was issued in December 2022, and emphasises **nbn**'s role in delivering on the Government's commitments to increase access to faster, more reliable broadband for Australia. Specific expectations include:

- enhancing digital capability and productivity;
- promoting equitable access;
- improving connectivity for regional and remote Australians; and
- operating commercially to the maximum extent possible (including managing trade-offs between commercial objectives and meeting obligations and policy expectations).

In turn, these broad categories contain numerous, more detailed expectations, including:

- to promote take-up and utilisation;
- to upgrade and improve the network;
- to promote competition and innovation;
- to improve service and consumer experience;
- to promote access to broadband services and connect First Nations Australians;
- to improve services and address access challenges in regional and remote areas; and

²² Accenture Economic and Social Impact Report 2024, p 23.

- to work to optimise the delivery of baseline voice and broadband.

In many respects, the SoE is framed without reference to a particular technology. Rather, the Government’s expectations are directed to **nbn** as the national wholesale-only access network which, in practice, comprises fixed-line, FW and satellite access technologies. Where relevant, however, the SoE does refer to particular **nbn** access technologies. It includes several references to the Government’s expectations for the **nbn** FW network, centred around the efficient implementation of the **nbn** FW upgrades to provide all premises in the footprint with access to wholesale download speeds of up to 100Mbps and typical wholesale busy hour speeds of at least 50Mbps. These FW-specific expectations support several of the more general expectations noted above, including improving connectivity for regional and remote Australia, and upgrading and improving the **nbn** to support Australia’s digital capability and productivity.

Retirement of legacy telecommunications infrastructure

The regional legacy copper networks that have supported the Telstra universal service obligation for decades are reaching end-of-life, meaning approx. 285,000 customers will need to be migrated to alternative solutions. While much industry and policy discussion focusses on the role LEO satellite networks can play in this space, it is likely that a large proportion of these end-users are located within **nbn**’s FW network footprint.

RCP

We are also continuing to invest in initiatives like the Australian Government’s RCP. Through these investments, we’re helping to deliver enhanced connectivity under co-funded projects to be built in regional, rural and remote areas, as further outlined in section 4a above.

First Nations communities

We note that the ACMA refers to the potential benefits that could be realised by rolling out mesh wi-fi and LEO sat in relation to First Nations Australians’ digital inclusion in regional and remote areas. **nbn** now has 109 satellite Community Wi-Fi services across First Nations communities around Australia. While the majority of these connections are single-point Wi-Fi systems, **nbn** has deployed four free pilot mesh wi-fi systems, enabling public wi-fi coverage to extend throughout external spaces in the community. **[C-i-C] [C-i-C end]**. Usage numbers have been high for both the single point Community Wi-Fi and mesh Wi-Fi, demonstrating the desire to connect to the digital world. The Community Wi-Fi services are based on **nbn** Sky Muster Plus and have no download limits, enabling access to support services, education, health services, entertainment, and social communication. **[C-i-C] [C-i-C end]**

FW and Satellite Upgrade Program

nbn expects that, by the end of 2024, the upgrades we are making across the **nbn** FW network as part of the \$750 million FW and Satellite Upgrade Program will enable the expanded FW footprint of around 750,000 homes and business to enjoy better broadband as discussed in section 3.

See section 4(b) and 3(c) above for details on how **nbn**'s use of the spectrum promotes investment and innovation, and enhances competition in regional, rural and remote Australia.

f) Alternative Uses for Spectrum

Noting the consequence of non-renewal, the significant sunk costs, and that **nbn** is only able to use spectrum for which there is a compatible international ecosystem, **nbn** strongly supports the ACMA's views that the continued support for WBB of the 2.3 and 3.4 GHz band is conducive to promoting the long-term public interest.

We note that there are live discussions regarding the potential for new entrants and use cases, including for LEO satellite networks to offer a baseline broadband service as part of a modern and more fit-for-purpose Universal Service Obligation. However, while **nbn** continues to be the default SIP across all of Australia, **nbn** will need to continue to retain its 2.3 and 3.4 GHz spectrum to offer a FW service.

There are a range of mid-band spectrum allocations which could be considered by parties seeking spectrum in addition to the spectrum which continues to be available in the 26 and 28 GHz bands. This includes:

- the 3.8 GHz band AWLs allocation process which is currently on foot; and
- the 3950 – 4000 MHz (regional and metropolitan areas) and 3400 - 3475 MHz ('urban excise' areas) expected to be allocated in the 2024 calendar year.

Other mid-band spectrum bands that could also be considered by alternate users include the following as identified in the ACMA's Draft 2024-2029 FYSO:

- the 6 GHz band for potential RLAN or WBB use-cases, and
- the 1800 MHz band in remote area.

The mid-band allocations implement the ACMA's planning outcomes, which are designed to support new wide-area, highly localised and restricted-cell WBB use-cases, while protecting incumbent and adjacent band users. The combination of different licence types (including AWLs and geographic segmentation of the allocations) is intended to support a wide range of WBB use-cases across regional, rural and remote Australia.

We note that the ACMA has designed spectrum allocations which have enabled more than traditional telecommunications providers to access spectrum that can support diverse use cases. However, the customisation of spectrum in this respect must be balanced against the impact this has on spectral efficiency. For example, in the recent 3.4 - 4.0 GHz band remote

AWL allocations, the allocation has resulted in a complex frequency allocation and geographic boundary conditions.

g) Approaches to examining use under existing licences

Coverage maps are a useful input into a holistic assessment of spectrum use provided limitations are recognised

nbn acknowledges the ACMA’s measured approach to utilising coverage maps as one input into forming preliminary views about the overall use of spectrum licence bands and the public benefit derived from the use of the spectrum. As such, **nbn** has approved the ACCC’s disclosure of our historic coverage maps provided under the Infrastructure RKR over the last 5+ years.

As submissions to the ACMA’s stage 1 consultation correctly highlight, coverage maps alone do not form a complete picture of spectrum utilisation as they do not reflect other dimensions of spectrum utilisation such as reserving spectrum for future capacity or coverage use. The ACMA also notes that predictive coverage maps do not necessarily reflect spectrum boundaries as signals may propagate beyond the areas in which operators predict service availability.

nbn notes these issues may be more pronounced for **nbn**’s coverage maps than for those of the mobile operators, by virtue of likely significant differences in the mapping input assumptions (i.e. **nbn** predicts coverage that will deliver a minimum of 25/5Mbps in line with our SIP obligations and the Peak Information Rate objective in our Wholesale Broadband Agreement, whereas mobile operators likely predict coverage to a lower data speed, or using different measurements relating to the ability of an end user in coverage to make or receive a phone call). In turn, this would also likely mean there is more ‘over-propagation’ of **nbn**’s signals compared to mobile operators. **nbn** also notes the FW and Satellite Upgrade Program that is currently underway will not yet be fully represented within the latest Infrastructure RKR data set **nbn** provided to the ACCC (which was based on the network as at 31 January 2024). **nbn**’s next RKR report which will be provided early in 2025 is expected to provide a more comprehensive picture of the extent to which we are further expanding the use of our spectrum, incorporating the complete upgrade program.

h) Temporary disaster response / resilience

nbn acknowledges the importance of network resilience to support the availability of communications services during emergencies, particularly in regional Australia, and we note the ongoing work of industry and government to continue to improve resilience. **nbn** takes resilience of our FW network seriously and continues to harden power supply and backhaul connectivity at key sites to maximise the availability of services that utilise our spectrum licences, including in emergency or disaster situations. As part of the recent Australian Government Telecommunications Disaster Resilience Innovation Program, **nbn** applied for, and was granted, funding to enhance power resilience across a range of FW sites using smart

modular power solutions and hybrid power cubes. We were also awarded funding to support enhancements to our temporary FW mast trailers that will enable faster response in a tower outage emergency situation.

i) Rollout obligations, UIOLI and UIOSI conditions

nbn understands that the ACMA has been asked to consider rollout obligations and their effectiveness in achieving broader coverage, which the ACMA is taking to mean expand the geographic coverage and quality of services in underserved areas. We understand that some jurisdictions have considered investment commitments in return for lower spectrum prices. If this approach is considered by the ACMA, we suggest that the investment commitments would need to be flexible enough to meet evolving market conditions as appropriate and the level of administrative burden that licence owners would need to bear to evidence fulfilment with investment commitments would need to be carefully considered.²³ We have provided more information below on the geographic area of **nbn**'s FW footprint and FW product offerings for reference.

- Where it is cost effective and feasible, we seek to achieve broader coverage by upgrading premises from our satellite network to our FW network leveraging regional co-investment programs where available. Given this, it is critical that we retain our 2.3 and 3.4 GHz band spectrum holdings in regional, rural and remote areas. Further, the timing / roll-out schedule of our FW network upgrades needs to be considered alongside the demands of **nbn**'s entire network. **nbn** operates a fixed line, satellite and FW network and its SoE requires that **nbn** operate efficiently and on a commercial basis to the maximum extent possible.
- We will be launching our new speed tiers on our FW network to RSPs as part of the FW and Satellite Upgrade Program shortly. **nbn** has also been piloting and has now launched an uplifted FW Plus product delivering wholesale speeds of 100/20 Mbps.

The existing spectrum management framework enables the long-term public interest derived from the spectrum to be achieved efficiently without recourse to use it or lose it (**UIOLI**) and use it or share it (**UIOSI**) conditions. We consider that the use of any renewed licences should be a criterion for future further renewal and that the approach to examining use should be consulted on, noting that the ACMA will be examining the approach to use for the 28 GHz band AWLs. In respect to **nbn**'s use, we draw the ACMA's attention to the following.

- **nbn** is fully utilising its spectrum licences within the **nbn** FW footprint as part of the FW and Satellite Upgrade Program. The 2.3 and 3.4 GHz band spectrum holdings are also used as part of **nbn**'s regional co-investment programs to upgrade users from **nbn**'s satellite network to its FW network where appropriate.

²³ GSMA, 'Spectrum Policy Trends 2024', February 2024, pages 15-16

- **nbn**'s current, and planned, use of our spectrum licences is designed to achieve a high-level of spectral efficiency from the entirety of our spectrum holdings (i.e. including our complementary mmWave holdings).
- The ACMA is able to impose statutory limits with respect to the issue of licences and must consult the ACCC on the need for allocation limits, and the nature of any such limits. Since the introduction of the relevant regime with reforms of the *Radiocommunications Act (Cth)* in 2020, the ACMA has imposed statutory limits for each allocation that has been held. I.e. the 850/900 MHz spectrum auction, the 3.4 – 4.0 GHz band remote AWL administrative allocation, the 3.4/3.7 GHz spectrum auction and the 3.8 – 3.95 GHz band AWL administrative allocation.
- **nbn**'s experience has been that the secondary market successfully enables spectrum to be used in a manner that promotes the long-term public interest derived from the spectrum and that maximises efficiency as discussed in section 4(a).
- The technical framework enables licensees to adjust their use of spectrum over time to align with technological advances where commercially available. For example, the synchronisation fall-back condition to manage interference for all 3.4 and 3.6 GHz band spectrum licences eliminated the need for guard bands.

5 The proposed approach to valuing spectrum

Setting appropriate prices is a key element of the ESL process to encourage efficient use of the spectrum.

We understand that the ACMA is currently still determining their preferred valuation methodology. In this context, this section provides some preliminary feedback in relation to:

- The public benefits provided by **nbn** that supports the Commonwealth Government's communication policy objectives.
- The general decline in industry profitability and prices paid by industry for spectrum.
- The benefits of a conservative approach to valuing spectrum, particularly for regional and remote Australians.²⁴

In the case of spectrum held by **nbn**, the chosen valuation approach should give due regard to the loss-making nature of the **nbn** FW network, which provides substantial public benefit and is required under relevant statutory obligations and the **nbn** SoE.

The public benefits enabled by nbn's loss-making FW network should be taken into account in pricing

²⁴ To be read in conjunction with **nbn**'s stage 1 submission

The provision of the **nbn** FW network in accordance with the SIP legislation and SoE forms part of the Government’s communications policy objectives and therefore the loss-making nature of this network is a relevant matter that should be taken into account in setting prices for **nbn**’s spectrum licences at renewal. **nbn**’s use of 2.3 and 3.4 GHz band spectrum which underpins our FW network is critical to enabling **nbn** to achieve the Government’s communication policy objectives, as reflected in the SoE, SIP obligations and the MPS.

Because of Australia’s geography and terrain, regional and remote areas are extremely costly areas to supply telecommunications services. To support digital connectivity and investment in regional and remote areas, **nbn** has made significant historic investments to date, with significant future investments planned, including the \$750 million FW and Satellite Upgrade Program with Federal Government and co-investments with Federal and State governments. **[C-i-C] [end C-i-C]**. The ACCC in its update of the model used to inform the RBS levy estimated the net present value (**NPV**) of past losses of NBN Co’s FW and satellite networks (i.e. losses between 1 July 2009 and 30 June 2020) to be \$7.526 billion and total expected forward-facing losses (i.e. losses between 1 July 2020 and 30 June 2040) to be \$5.424 billion.²⁵

Although the **nbn** FW network is currently operated at a loss it provides substantial benefits to end users. These benefits are particularly felt in regional Australia and urban fringe areas that are often underserved by other communications infrastructure which can result in limited or no comparable network alternatives available for end users.

We discuss the public benefits of **nbn**’s FW network in more detail at section 4(d).

The decline in industry profitability is resulting in increased investment risk profiles and a decline in the prices paid for spectrum

The limited levels of competition in the recent 3.4/3.7 GHz band auction and the resulting prices paid for spectrum are reflective of the decline in industry profitability and the subsequent increased level of investment risk generally.²⁶ There was limited competition for spectrum in all available geographies and lots, with the majority of lots sold at or close to reserve in addition to some lots remaining unsold.

While we expect the decline in the prices paid for spectrum generally to be reflected in an appropriately designed international benchmarking study, we note the complexity involved in the selected parameters that may impact the utility as a comparator for the Australian market. We also note the backwards looking nature of any benchmarking study which means that any market price derived from the study may be out-of-date by the time it is used.

²⁵ ACCC, ‘Report on modelling of the Regional Broadband Scheme levy initial base component’, October 2020. The ACCC adopted the BCR’s avoidable cost methodology for estimating the indirect costs of NBN Co’s fixed wireless and satellite networks and applied this methodology to estimate the indirect costs of NBN Co’s past and forecast expenditure. This contrasted with NBN Co’s updated cost data, which was based on a fully distributed cost methodology.

²⁶ Venture Insights ‘REPORT: Five-year Outlook for Telco Market in Australia and New Zealand 2023’ 21 September 2023.

Based on current information, we would expect the price paid for spectrum in the recent 3.4/3.7 GHz band auction to be the upper limit of what is considered to be a relevant market price. We also note that the intrinsic value of spectrum does not increase over time and it would not be appropriate to consider indexing the price paid to CPI for example. We note that the ACMA in its pricing of apparatus licences calculated using the licence tax formula recently moved towards updating the taxes to changes in geography-specific population data rather than CPI to provide more efficient prices by enabling a spectrum price to reflect differential underlying demand for spectrum across geographic area.²⁷

The risks associated with excessive pricing, particularly for regional and remote Australians, support a conservative approach to valuing spectrum

A conservative approach to setting the price for renewals is warranted where public benefits support licence renewal. A conservative approach could involve discounting the market rate or considering a lower figure within a range of market rates identified, for example, through a benchmarking study. Factors supporting a conservative approach include the following:

- Because of Australia’s geography and terrain, regional and remote areas are already extremely costly areas to supply telecommunications services. A conservative approach to prices for spectrum being used to supply services to end users in these areas would support ongoing network investment which is contributing to the communication policy objectives of the Commonwealth.
- We consider that the decline in industry profitability and the subsequent increased level of investment risk noting that the cost of capital has also risen is a trend that will continue. Venture Insights recently reported that ‘[o]ne of the key megatrends in the global telco industry has been the decline of return on invested capital (ROIC) over the last decade, putting telcos under pressure to improve capital efficiency. The battle to increase profitability is expected to continue over the coming years.’²⁸ For industry generally, the ability to increase pricing to counteract declining returns on invested capital during a period of inflation and cost of living pressures is difficult with an end user’s willingness to pay also a constraint over the long term. A conservative approach to spectrum prices would aid in balancing the risk to licence owners that their expected return does not eventuate, such that they can nonetheless invest in anticipation of a reasonable rate of return being achieved.²⁹
- As observed by GSMA recently, there is strong evidence that high spectrum prices have a negative impact on the speed of network deployments, the quality of services, and affordability, which are critical factors in increasing digital inclusion.³⁰

²⁷ [Implementation of proposed changes to apparatus licence pricing | ACMA](#)

²⁸ Venture Insights ‘REPORT: Five-year Outlook for Telco Market in Australia and New Zealand 2023’ 21 September 2023. See figure 8 ‘Telecommunications industry return on invested capital (ROIC,%) for further detail’

²⁹ GSMA, ‘Best practice in spectrum licence renewals, A toolkit for licensing authorities’, 2014

³⁰ GSMA, ‘Spectrum Policy Trends 2024’, February 2024

- It is typically challenging to ensure that benchmarking study parameters result in a price or price range that encapsulates local market conditions.
- The short-term income boost for Government associated with higher spectrum prices may have less value in the long term when compared to the GDP growth and overall social benefit that could be achieved.³¹

³¹ GSMA, 'Spectrum Policy Trends 2024', February 2024

The economic and social impact of investment in the **nbn** network

Key Insights Report

January 2024

 **accenture**

nbnTM 





This report has been commissioned by **NBN Co** and prepared by Accenture.



We acknowledge the Aboriginal and Torres Strait Islander peoples as the traditional custodians of our land – Australia.

We acknowledge the continuing culture and contributions of First Nations Peoples and pay our respects to Elders past, present and emerging.

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Executive Summary

BACKGROUND

Broadband is the principal way Australians tap into the transformative benefits of the internet.

In 2023, there were more than 8.5 million households¹ with **nbn** broadband connections, reflecting near-ubiquitous uptake across the country. Home broadband is a gateway to the benefits of the internet, which is broadly considered a general-purpose-technology ('GPT'). GPT's have proven revolutionary impacts across the economy and the internet is no different. Ubiquitous, fast and reliable broadband supports a range of **economic** and **social** benefits, that are essential to Australia's prosperity.

The national broadband network ('nbn') builds and operates the infrastructure that has transformed Australia's connectivity.

The **nbn** network roll out has had a profound impact on broadband availability and speeds in Australia. When the **nbn** roll out commenced in 2011, the average household broadband download speed was 9 Mbps; and at the end of 2022 this had grown six-fold to 53 Mbps. The **nbn** network is responsible for an estimated **76% of this speed uplift** (33 Mbps of the total 44 Mbps increase). The number of total broadband connections has also grown substantially with the **nbn** network roll out.

PURPOSE OF THIS REPORT

The purpose of this report is to quantify the economic and social impact of nbn-enabled fast broadband in Australia.

The purpose of the **nbn** network is to lift Australia's digital capability, inclusion and access, as highlighted in its Statement of Expectations. This report articulates the **nbn**'s progress against this objective in the most comprehensive research prepared to date. It builds on previous research that has assessed the affordability and value of **nbn**-enabled connections².

METHODOLOGY

An academic, data-led approach has been used to measure the nbn's economic and social impact.

This report summarises the key findings from two interconnected research projects that leverage leading academic literature and best-practice approaches to impact measurement.

- To measure the **economic impact of the nbn network**, a first-of-its-kind longitudinal dataset of Australian broadband connections at a geographic community level (SA2³) was built and statistical modelling based on highly cited economic literature was performed to estimate productivity, business and jobs impacts.
- To measure the **social impact of the nbn network**, a detailed review of literature and industry-referenced social impact frameworks led to development of **nbn**'s *Social Impact Approach*. A fit-for-purpose impact thesis was developed and was tested using a survey of 1,500 **nbn** users, yielding statistically significant results of the **nbn**'s impact on individual wellbeing across five domains.

KEY RESULTS

The nbn network has had a profound impact on the Australian economy

- **Productivity:** Over the period 2012 to 2022, we estimate the **nbn** network has enabled productivity benefits of **\$122 billion of GDP**. This impact equates to a **0.14% annual contribution to multifactor productivity growth** between 2012 and 2022, which is almost one quarter of all MFP growth (0.54% per year) in the period. Looking forward to 2030, a further **\$399 billion** in productivity benefits is expected to be enabled by the **nbn** network.
- **Jobs:** Supporting 169,000 additional jobs between 2012 and 2022, of which 101,000 (60%) are held by women. A further **113,000** jobs enabled by the **nbn** network are expected between 2023 and 2030.
- **Businesses:** Supporting **87,000** additional businesses between 2012-2022. A further 55,000 are expected to be supported between now and 2030.
- **Equalising economic opportunity:** Importantly, we found remote communities experienced up to **16 times** the productivity benefit experienced in major cities. Furthermore, the most disadvantaged communities (SA2s in the bottom 20% of SEIFA scores⁴) experienced **5 times** the productivity benefit experienced by relatively advantaged communities (SA2s in the top 60% of SEIFA scores).

Access to nbn-enabled fast broadband has had positive, measurable social impact on Australians

- **Overall wellbeing:** Fewer than 1% of **nbn** users reported the **nbn** network as having a negative impact on wellbeing. 3 in 4 **nbn** users say that having the **nbn** at home has had a positive impact on their satisfaction with life in the last year.
- **Employment and income:** 77% of **nbn** users who worked from home or used an internet enabled job search felt the **nbn** network positively impacted their employment outcomes.
- **Education and skills:** 82% of **nbn** users who engaged in education from home felt the **nbn** network positively impacted their educational outcomes.
- **Health:** 77% of **nbn** users who accessed telehealth or medical information online felt the **nbn** network positively impacted their health outcomes.
- **Social and community connection:** 74% of **nbn** users who connected with others or accessed news or information online felt the **nbn** network positively impacted their connectedness.
- **Environment:** 85% of **nbn** users who work, study, access health or other services online felt the **nbn** network allowed them to reduce their emissions.

Notes: 1. The term 'households' as used throughout the report includes broadband connections to residential business and businesses activity conducted on consumer internet connections. 2. These results represented the expected benefits attributable to the **nbn**, recognising that alternative technologies have played a role in supporting economic development over the period. 3. SA2 refers to the Australian Bureau of Statistics' Statistical Area Level 2 which are used to aggregate statistics against "meaningful regions" comprising of approximately 10,000 people. 4. SEIFA stands for 'Socio-Economic Index for Areas' and is a socioeconomic ranking system used by the Australian Bureau of Statistics.

This report considers the impact of internet subscriptions delivered to a fixed address via any technology (including all fixed line connections, fixed wireless and satellite). The modelling approach does not account or control for the impact of internet delivered via mobile networks (using mobile devices with embedded SIM cards or eSIMs). See technical report for further details. All dollars are shown in \$FY21, in line with the ABS' latest National Accounts. Future dollar have not been adjusted for inflation or discounting. See [Affordability of services over the nbn network](#) and [Value of services over the nbn network](#).

The nbn network roll out has had a profound impact on broadband availability and speeds...

Since the nbn network roll out began in 2011, household broadband availability and speeds have increased.



+ 44 Mbps

Increase in average broadband speeds among Australian households from 9 Mbps in Dec-2011 to 53 Mbps in Dec-2022.

76%

nbn's contribution to the uplift of estimated average broadband speed across Australian households.¹

8.5m households active on the nbn network.

...delivering significant economic and social benefits to Australia

Economic benefits

Based on a new Australian broadband dataset and first-of-their-kind statistical models, we have quantified the economic impact of the nbn network from 2012-2022 and leveraged this understanding to forecast uplift from 2023-2030.

Gross Domestic Product

\$122 billion

Projected GDP uplift enabled by the nbn network where a 1Mbps increase yields a **+0.04% uplift to GDP** 2012-2022

With GDP uplift **16x higher in remote communities** and **5x higher in the most socioeconomically disadvantaged communities**

+ \$399 billion

Projected GDP uplift enabled by the nbn network 2023-2030

Employment

169,000

Additional **jobs** enabled by the nbn network between 2012-2022

with **women benefiting 1.5x** compared to men

+ 113,000

Projected additional jobs enabled by the nbn network between 2023-2030

Businesses

87,000

Additional **businesses** enabled by the nbn network between 2012-2022

+ 55,000

Additional **businesses** enabled by the nbn network between 2023-2030

Social benefits

A survey of over 1,500 adult nbn users was conducted to understand the broader social impact of the nbn network. The survey employed a bespoke framework to understand social impact across five domains, finding:

3 in 4 nbn users say that having the nbn at home has had a positive impact on their satisfaction with life in the last 12 months

Where nbn users had ...

... worked from home or used job search,

77% reported positive impacts on employment outcomes

... engaged in education from home,

82% reported positive impacts on education outcomes

... accessed telehealth or medical info online,

77% reported positive impacts on health outcomes

... connected with others or accessed news or information online,

74% reported positive impacts on their connectedness

... worked, studied, accessed health or other services online,

85% reported that it allowed them to reduce their carbon emissions

Source: Accenture analysis. See body of report for further details.

1. This report considers the impact of internet subscriptions delivered to a fixed address via any technology (including all fixed line connections, fixed wireless and satellite). The modelling approach does not account or control for the impact of internet delivered via mobile networks (using mobile devices with embedded SIM cards or eSIMs).

PURPOSE OF THIS REPORT

This report provides quantitative insight into the nbn's performance against its economic and social impact objectives



The purpose of the nbn network is set out in a Statement of Expectations

"The enduring purpose of the nbn is to provide fast, reliable and affordable connectivity to enable Australia to seize the economic opportunities before it and service the best interests of consumers.

It is essential to enabling access to key services, maximising employment and educational opportunities, and driving productivity and economic growth.

NBN Co will enhance Australia's digital capability by delivering services to meet the current and future needs of households, communities and businesses, and promote digital inclusion and equitable access to affordable and reliable broadband services..."

– **NBN Statement of Expectations, December 2022**¹



PURPOSE OF THIS REPORT

The purpose of this report is to quantify the economic and social impact of nbn-enabled fast broadband in Australia.

- The purpose of the **nbn** network is to lift Australia's digital capability, inclusion and access, as highlighted in the company's Statement of Expectations.
- The research outlined in this report was commissioned to objectively assess **nbn**'s progress against these objectives in the most comprehensive economic research prepared to date.
- This report considers both the productivity gains and employment benefits for Australia – along with changes to individual wellbeing for people connected to the **nbn** network. In other words, it considers the **economic and social impact** of the network, for the first time.

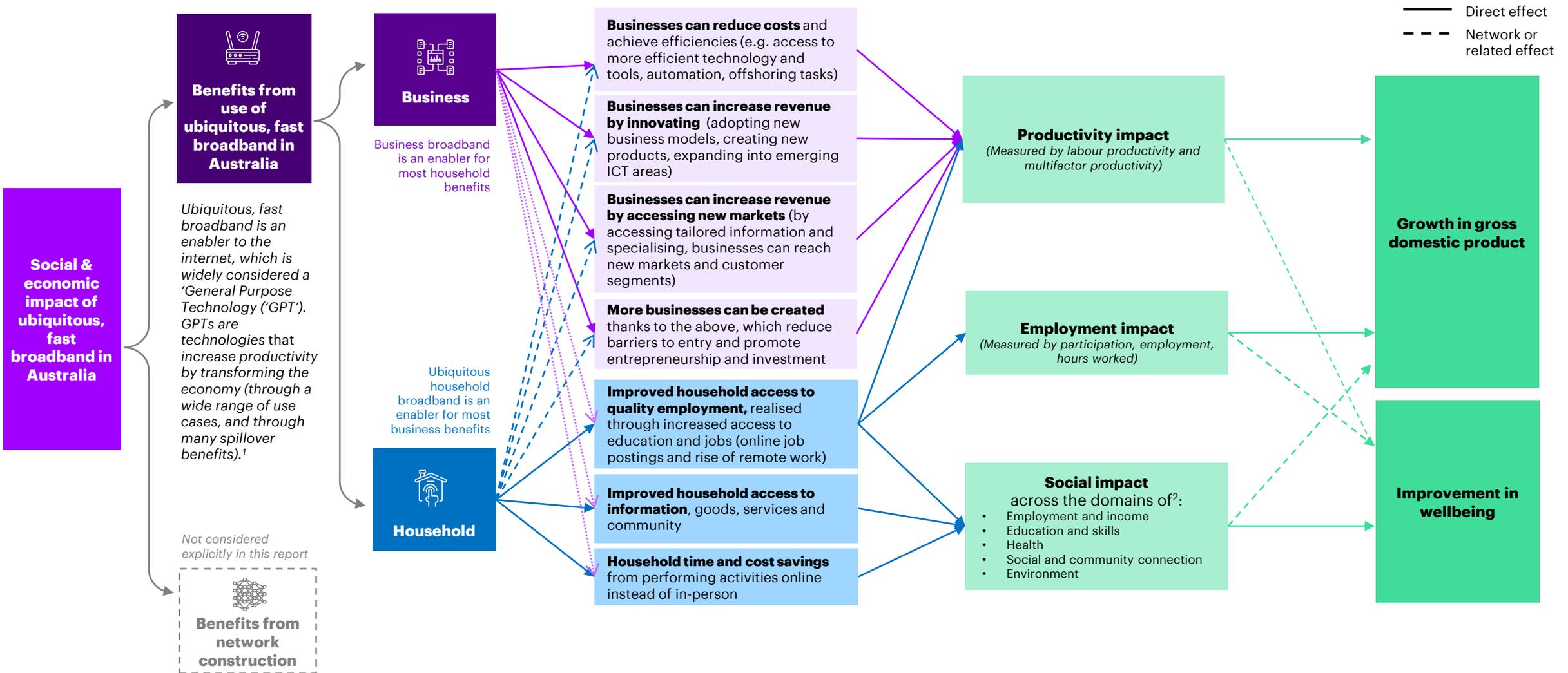


Ubiquitous, fast and reliable broadband drives improved economic and social outcomes for Australia

Source of benefits

Benefits of broadband to users

Economic and social impact



Notes: 1. Lipsey et al. 'Economic transformations: general purpose technologies and long-term economic growth', 2005. 2. Five priority domains have been considered and measured for this research, but broader impacts are likely.

01

Economic impact



KEY RESULTS - GDP

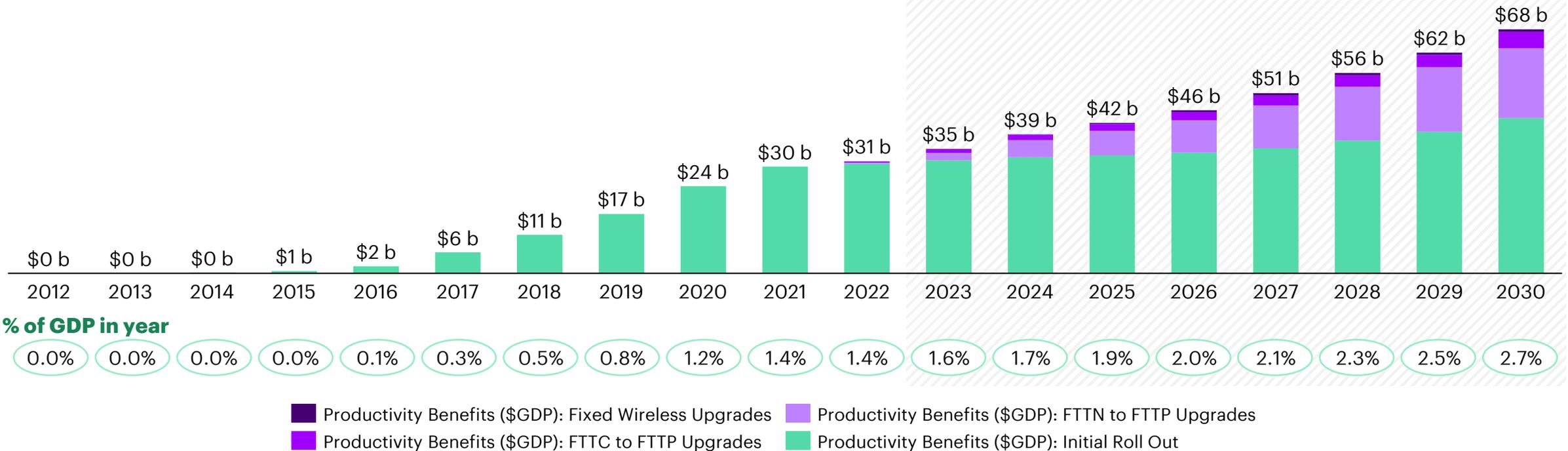
Our model finds that investment in the nbn network has delivered significant GDP benefits to the Australian economy

GDP uplift enabled by the nbn network¹

\$, billions, 2012-2030

2012-2022: \$122 billion
total GDP impact of the initial roll out of nbn network across 2012-2022.
This impact implies **average annual contribution to growth in MFP of 0.14% between 2012 and 2030².**

2023-2030 (forecast): \$399 billion
\$287b is attributable to the initial roll out of the nbn network³ and **\$112b** is attributable to additional investments in the network⁴, comprising of FTTC to FTTP upgrades (**\$88b**), FTTC to FTTP upgrades (**\$21b**), and Fixed Wireless upgrades (**\$3b**).

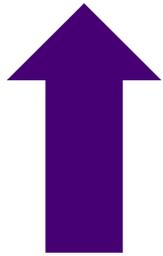


Source: Accenture modelling, see technical report for detailed modelling approach. Note: Forecasts of future nbn network impacts hold the share of nbn-connected households constant at its 2023 level and non-nbn broadband speeds at current levels. The numbers of households grows in line with population forecasts. 1. Our model estimates the impact of all broadband speeds on GDP. The GDP figures shown are the portion of this productivity impact that is attributable to the nbn network. This has been calculated in each year by determining the portion of average speed increases that has been driven by increased take up on the nbn network and increasing speeds of those already connected to the nbn network. This has been deconstructed further into the impacts of major investment programs based on the relative impact of each program on overall speed increases. Results shown are based on the square root specification model that accounts for diminishing marginal returns to speed. 2. Based on the contribution of historical MFP to GDP growth, estimated by the ABS. This result is indicative only. 3. For simplicity we have included the impact of other smaller investment programs not separately specified. 4. A small percent of GDP benefits from upgrades accrued in 2022. These benefits have been counted in the forecast period (2023-2030) for simplicity. Dollars are in FY20-21 terms inline with the latest ABS accounts, and are not inflated or discounted.

KEY RESULTS – GDP

Our model finds a positive, statistically significant relationship between increases in average broadband speeds and GDP

Key Results:



From 2012-2022, every +1Mbps increase in average broadband speed resulted in

+ 0.04% GDP



In 2023-2030, every +1Mbps increase in average broadband speed is forecasted to

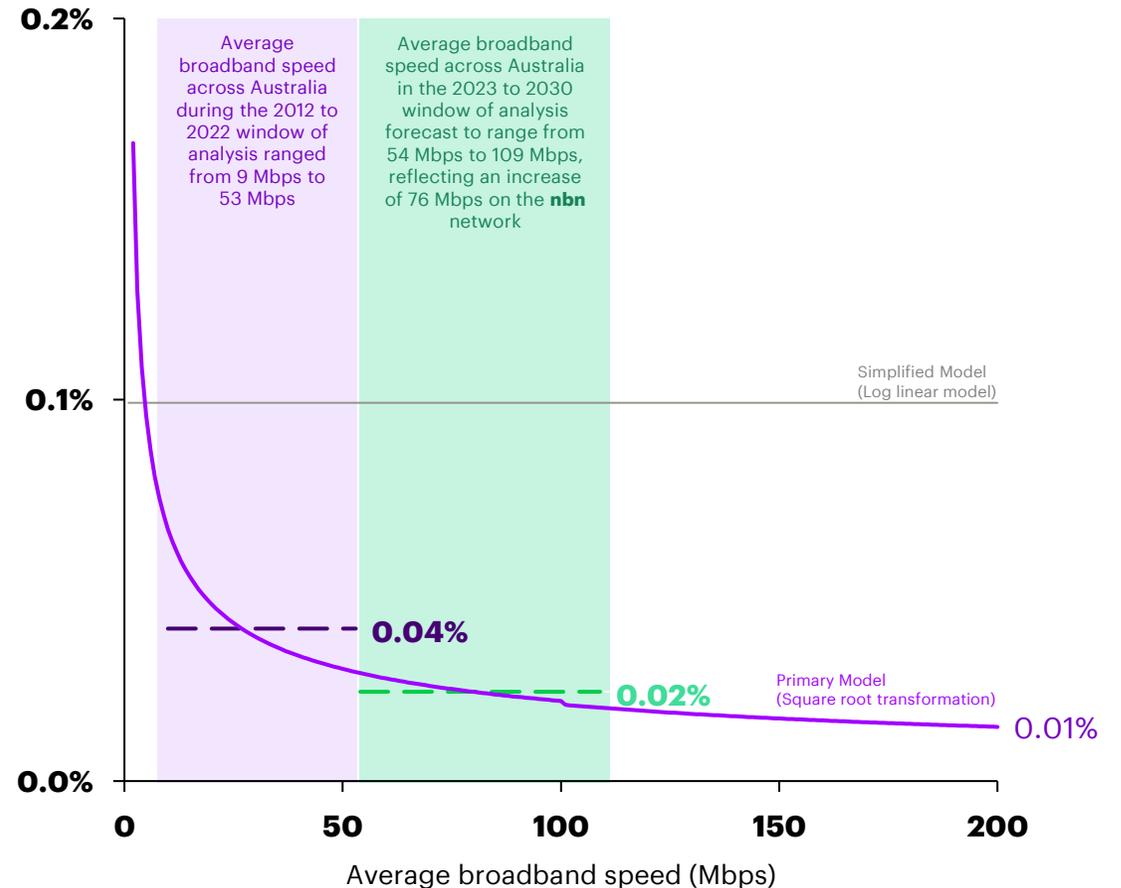
+ 0.02% GDP

As illustrated on in the graph to the right, the model finds that the marginal in GDP decreases as average broadband speeds increase. Therefore, benefits in the early period of analysis (where average speed is lower) are larger than benefits in later years (where average speed is higher), and the marginal benefits are expected to reduce into the future as average speed continues to increase¹. The curve is based on historical data and slowly approaches zero but is never negative. New internet-enabled technology applications, such as generative AI, may shift the curve overtime by driving step-changes in productivity and are not captured in our historical dataset. These results are based on all broadband connections in Australia, not just **nbn**-enabled connections. When the model is applied, an attribution factor is used to isolate the “**nbn**-effect”. See the technical report for more detail on the attribution factors used.

These results are comparable to results found in international studies. Brigaluer et al. (2021) who found that a 1Mbps increase in average speeds translated to a 0.18% increase in productivity induced GDP. Briglauer and Gugler (2018) who found a 1% increase in basic broadband adoption increased GDP by 0.015% and an increase in ultra-fast broadband adoption led to an incremental increase of 0.004%-0.005%. Katz and Collorda (2019) who found a 1% increase in average speeds delivered a 0.01% increase in GDP.

Relationship between increase in average broadband speed and GDP

GDP benefit (expressed as a % change in GDP) per 1 Mbps increase in average broadband speed

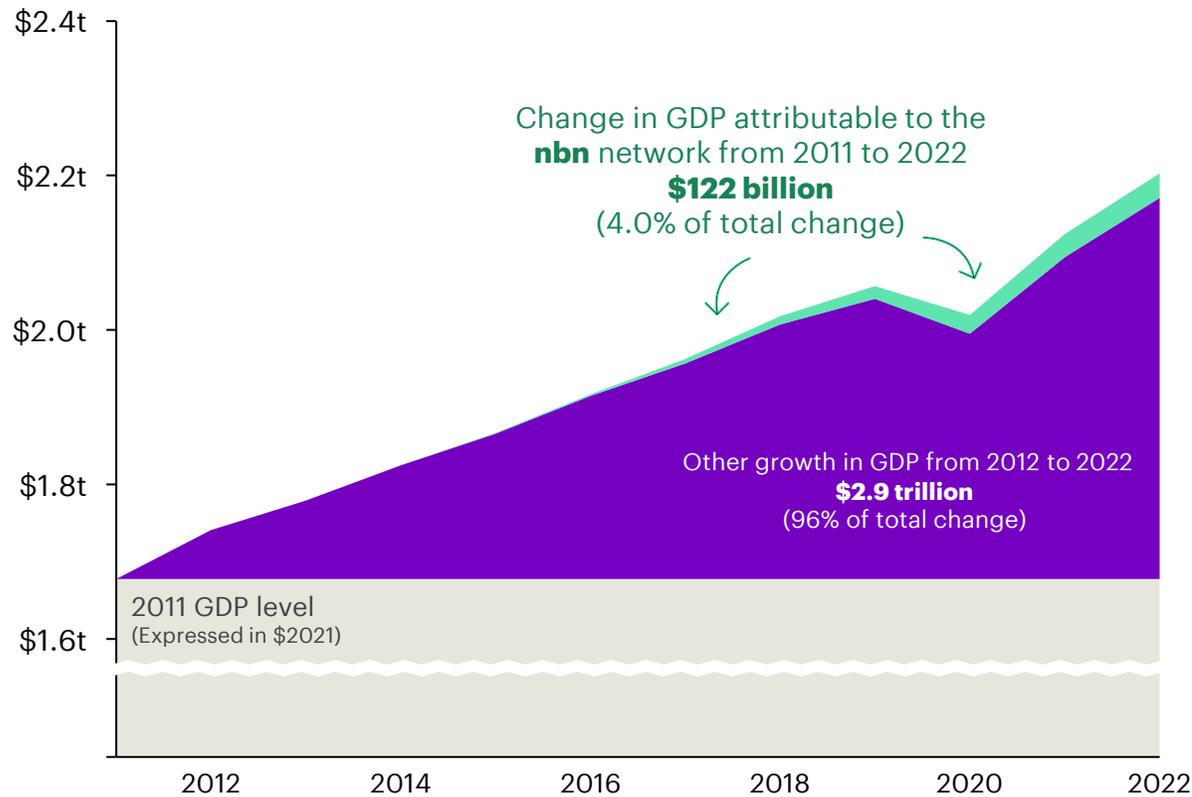


KEY RESULTS - GDP

The GDP benefit of the nbn network between 2012 and 2022 (\$122 billion) equates to 4% of all growth in GDP, and one quarter of annual MFP growth in the period

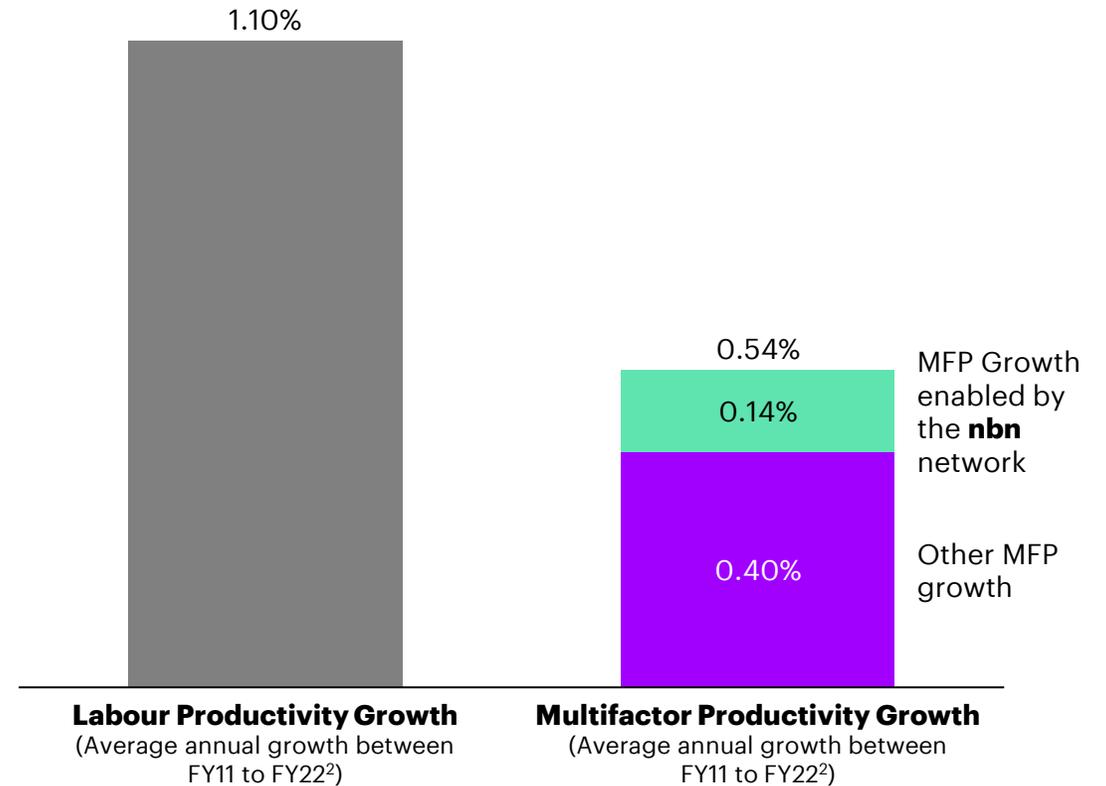
The nbn network has supported 4% of aggregate GDP growth 2012 - 2022

Australia's GDP, \$2021, trillions, split into a baseline (2011), change from 2011 and the impact of the nbn network¹ by year



... and approximately one quarter of all multifactor productivity growth

Compound annual growth rate (2010-11 to 2021-22)²

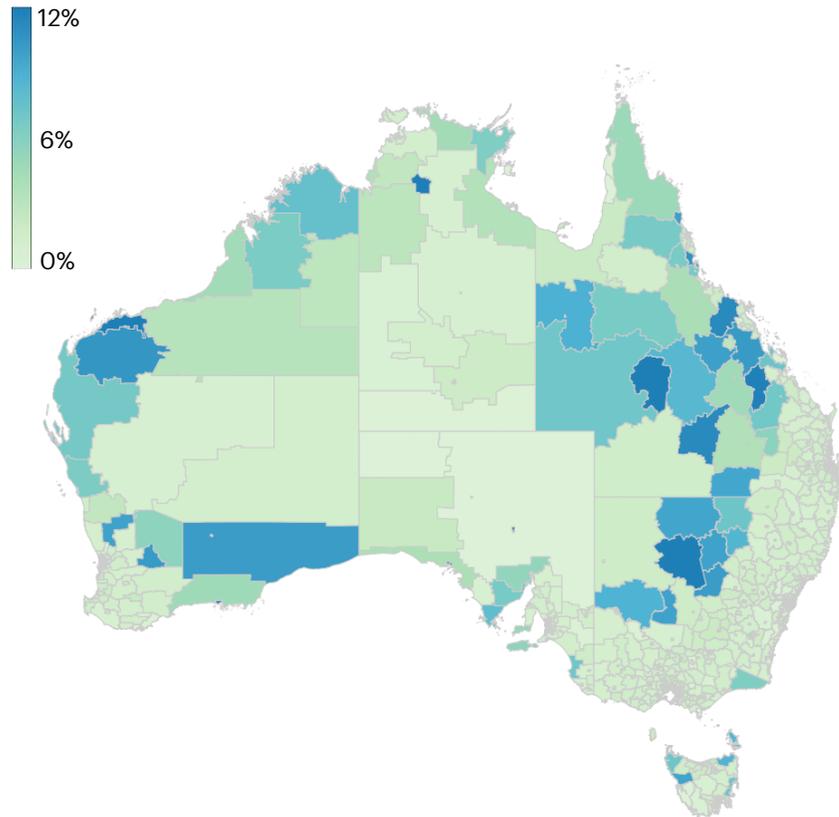


Source: Accenture modelling, see appendix for detailed modelling approach. Notes: GDP expressed in FY20-21 terms, inline with the latest ABS Accounts Basis. 1. Our model estimates the impact of all broadband speeds on GDP. The GDP figures shown are the portion of this productivity impact that is attributable to the nbn network. This has been calculated in each year by determining the portion of the overall increase in the average broadband speed that has been driven by increased take up of the nbn or the increases in speeds of those already connected to the nbn network. Results shown are based on the square root specification model that accounts for diminishing marginal returns to speed. 2. Compound annual growth rate based on ABS estimates between 2010-11 and 2021-22 on a quality adjusted hours worked basis. Results are indicative only.

The GDP benefit of faster broadband is up to 16x greater in remote areas and 2x greater in regional areas, compared to major cities

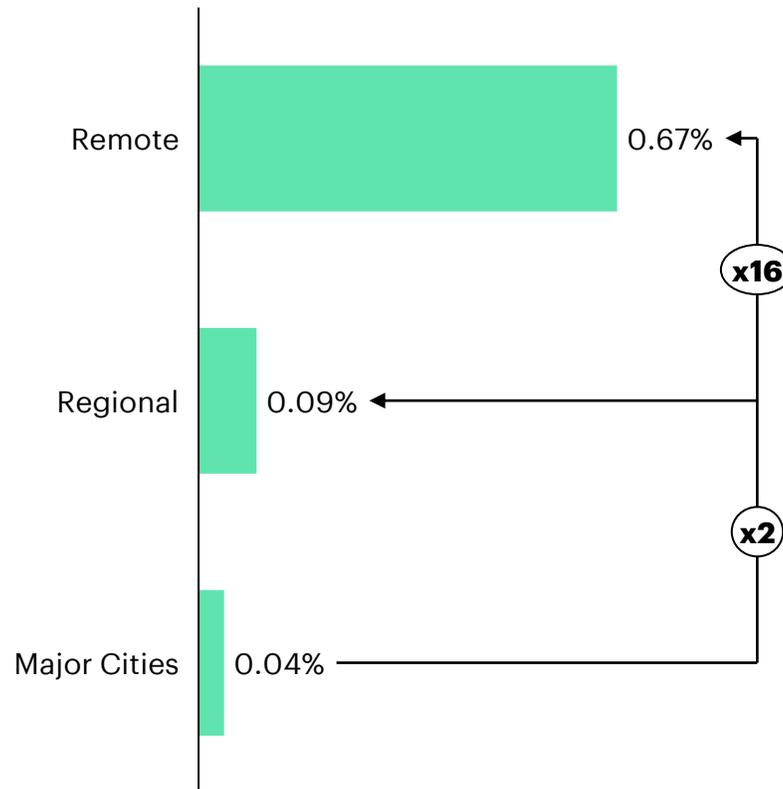
Remote and regional areas saw outsized GDP benefits from faster broadband speed

Relative annual GDP uplift in 2022 (% GDP)¹



Remote areas experienced 16x the GDP uplift compared to major cities

Average GDP uplift per 1 Mbps increase in average broadband speed



Why have regional and remote communities benefited more from faster broadband?

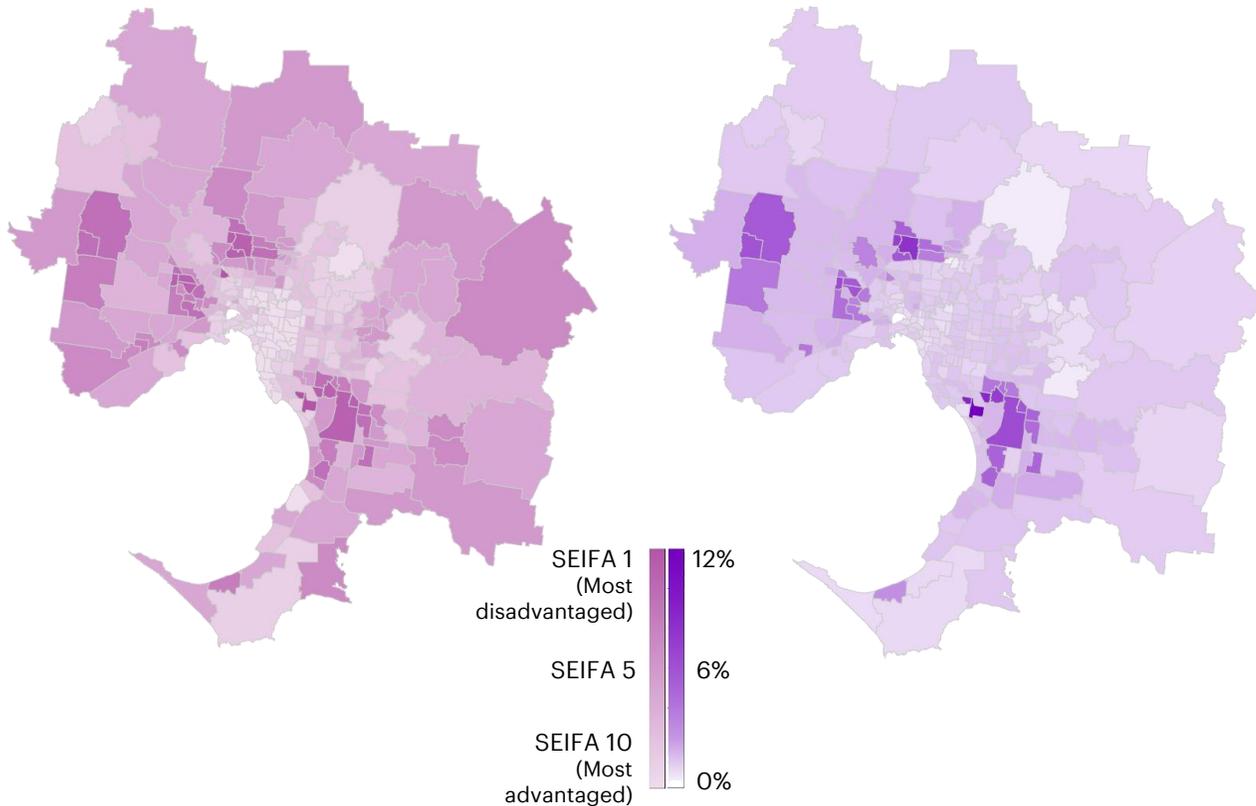
- **Lower starting speeds and the impact of diminishing marginal returns.** The productivity gains for every additional 1 Mbps speed increase in speeds are larger when starting speeds are lower. Regional and remote communities had lower average broadband speeds prior to the **nbn** network roll out; In 2011, only 55% of households were connected to broadband and the average national speed was 7 Mbps.
- **Underlying benefits of connectivity are stronger in more isolated locations.** Even when accounting for diminishing returns, these areas experienced a higher unit benefit. We hypothesise this is driven by the underlying value of broadband in connecting people is more powerful in isolated regions. For example, by expanding customer reach through e-commerce, or enabling remote work, allowing more people to live and work in regional and remote areas.



Faster broadband has been an equaliser of opportunity for Australians in lower socioeconomic communities

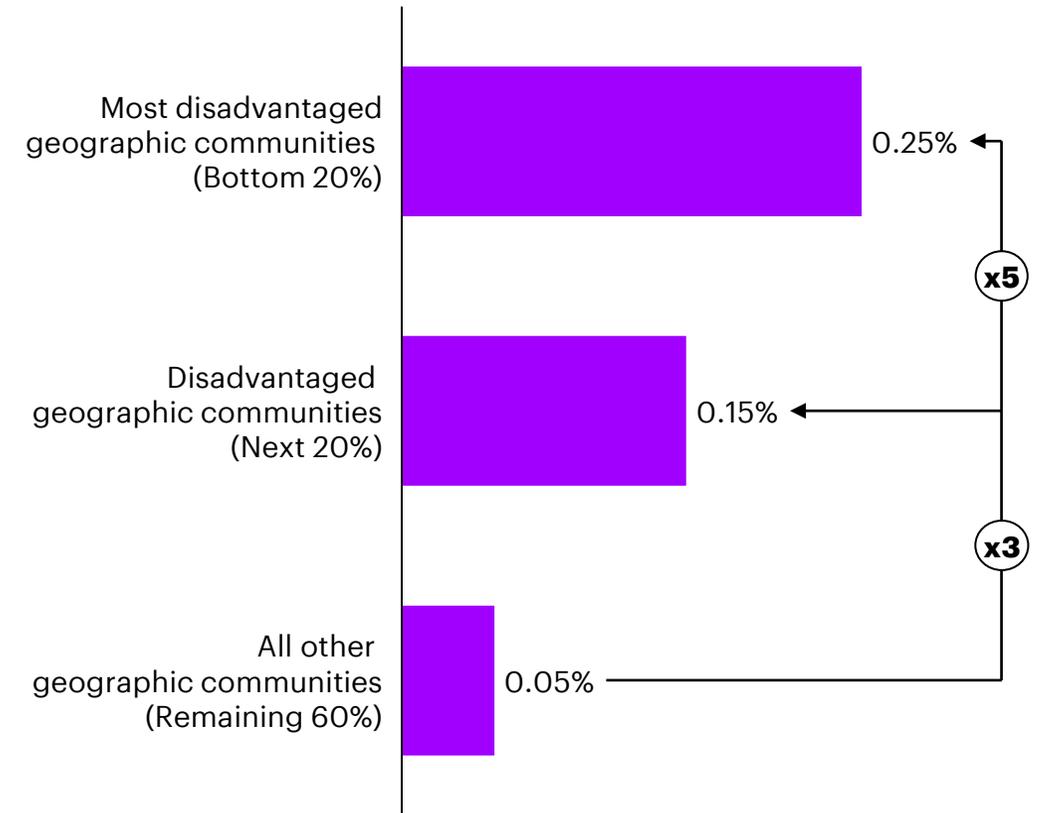
Lower socioeconomic communities saw an outsized GDP uplift; exemplified by Greater Melbourne

SEIFA score¹ for geographic communities in Greater Melbourne [LHS], Relative annual GDP impact due to broadband speeds (2022, %GDP)² [RHS]



The most disadvantaged communities experienced up to 5x the GDP uplift of those in more advantaged communities³

Average GDP uplift per 1 Mbps uplift in average broadband speed (% GDP)

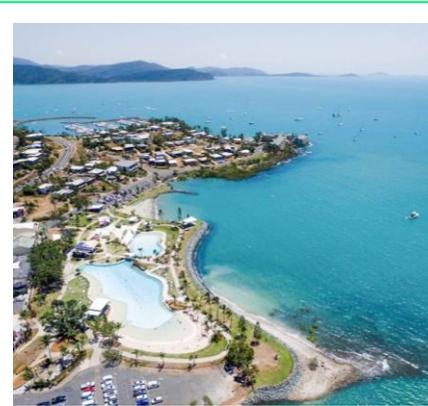
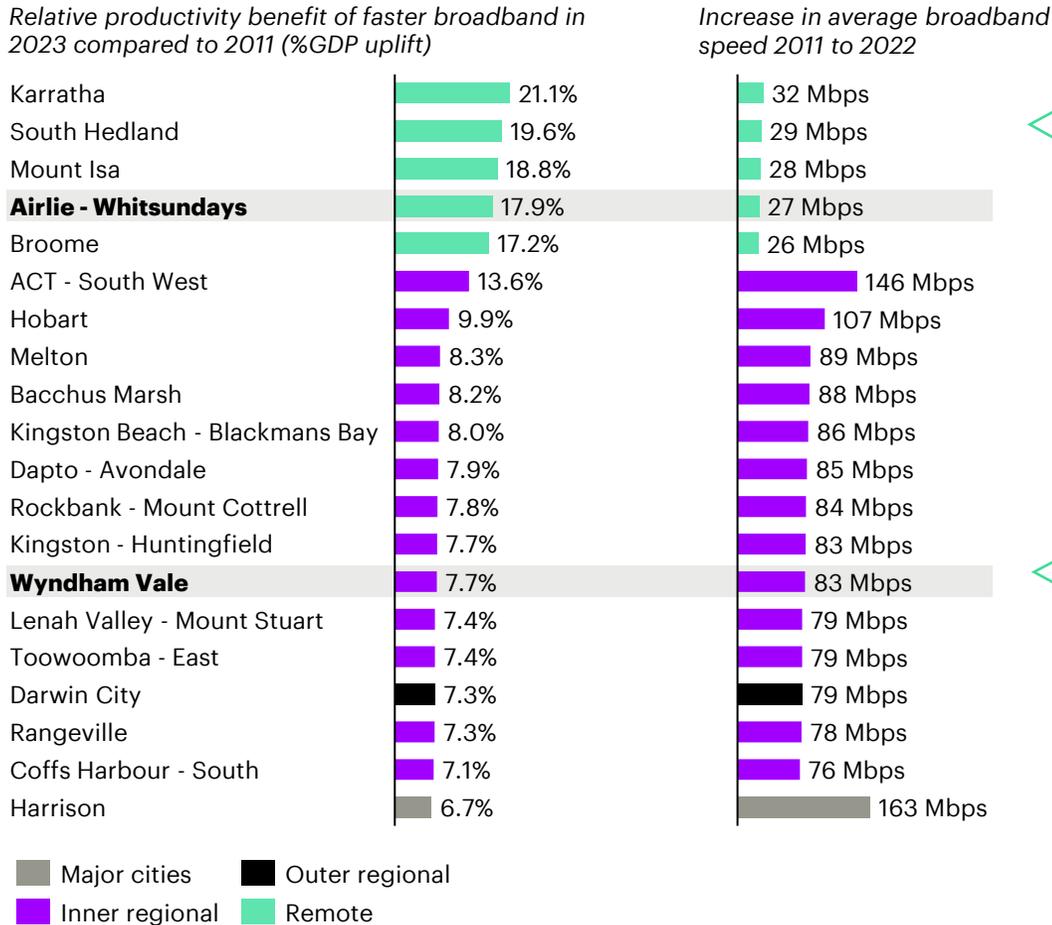


Source: Accenture analysis. Note: 1. SEIFA scores measure socioeconomic status, 2. The uplift in GDP attributable to the increase in average broadband speeds between 2011 and 2022. 3. Results for 'Most disadvantaged' and 'Disadvantaged' categories were statistically significant at the 1% level, with results for the 'All other SA2s' significant at the 5% level. SA2s based on 2011 boundaries to ensure consistency throughout the analysis period. Results shown are for the log-linear model split by SEIFA group. These results are based on all broadband connections in Australia, not just nbn-enabled connections. When the model is applied, an attribution factor is used to isolate the "nbn-effect". See the technical report for more detail on the attribution factors used.

KEY RESULTS – GDP

The majority of regions experiencing the biggest productivity benefits from faster broadband speeds are classed as regional or remote

Top 20 local geographical communities with the largest relative productivity uplift



Consider **Airlie - Whitsundays**, which is located on the Great Barrier Reef in north east Queensland and has a population of 15,100.

- Average broadband speeds increased from 6 Mbps in 2011 to 33 Mbps in 2023 (an increase of 27 Mbps)
- In 2023, GRP per capita was \$77,600 and we estimate this is **17.9% higher** due to the impact of faster broadband in the region.



Consider **Wyndham Vale**, which is located 31km south-west of Melbourne and has a population of **24,400**.

- Average broadband speeds increased from 10 Mbps in 2011 to 93 Mbps in 2023 (an increase of 83 Mbps)
- In 2023, GRP per capita was \$17,400 and we estimate this is **7.7% higher** due to the impact of faster broadband.

Source: Accenture analysis. Note: Regions defined by SA2, top 20 SA2 shown. SA2s with a working age population of less than 5000 or with mining intensity >20% of GRP are excluded from the list. SA2s are based on 2011 boundaries. GDP impacts are based on the log-linear model by remoteness region.

KEY RESULTS – GDP

Services industries such as professional and financial services benefit the most from the improved broadband speed delivered by the nbn

Productivity impacts of faster broadband by industry

Industry	Relative productivity impact (%GDP per 1 Mbps) ¹	Annual productivity uplift (\$GDP, 2022) ²
All industries	0.04%	+31 b
Professional, Scientific and Technical Services	0.08%	+ 5,757 m
Financial and Insurance Services	0.07%	+ 4,875 m
Construction	0.06%	+ 3,616 m
Administrative and Support Services	0.07%	+ 2,900 m
Retail Trade	0.06%	+ 2,035 m
Health Care and Social Assistance	0.04%	+ 1,851 m
Wholesale Trade	0.06%	+ 1,750 m
Other Services	0.11%	+ 1,414 m
Public Administration and Safety	0.03%	+ 1,053 m
Information, Media and Telecommunications	0.07%	+ 985 m
Manufacturing	0.02%	+ 955 m
Education and Training	0.02%	+ 846 m
Mining	0.01%	+ 704 m
Transport, Postal and Warehousing	0.02%	+ 556 m
Electricity, Gas, Water and Waste Services	0.03%	+ 527 m
Accommodation and Food Services	0.03%	+ 502 m
Rental, Hiring and Real Estate Services	0.02%	+ 482 m
Agriculture, Forestry and Fishing	0.02%	+ 360 m
Arts and Recreation Services	0.04%	+ 237 m

Professional, Scientific and Technical Services experienced the largest aggregate benefits from the **nbn** network, accounting for \$5.8b (18%) of the total GDP uplift in 2022. This is due both to the size of this industry segment and the outsized impact of broadband speed on productivity within it.

More generally, **services industries** (such as Professional, Financial, Administrative, and Other services) **saw larger relative productivity impacts** compared to goods industries (such as Mining, Manufacturing, and Agriculture) in terms of the relative impact. This is driven by the relative intensity of IT-related activity in services industries, resulting in larger productivity gains that can be generated by access to high-speed broadband.

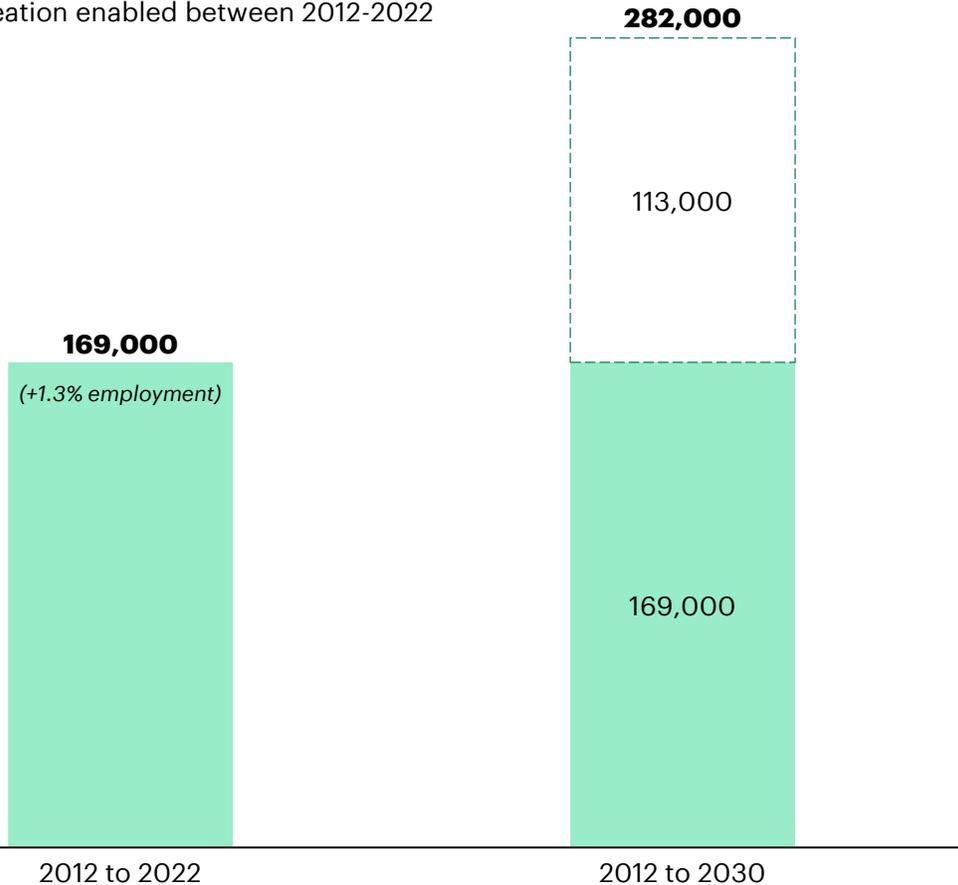
KEY RESULTS – EMPLOYMENT

The nbn network enabled the creation of 169,000 additional jobs between 2012 and 2022 and is projected to support the creation of a further 113,000 additional jobs by 2030

The nbn network enabled the creation of 169,000 additional jobs between 2012-22

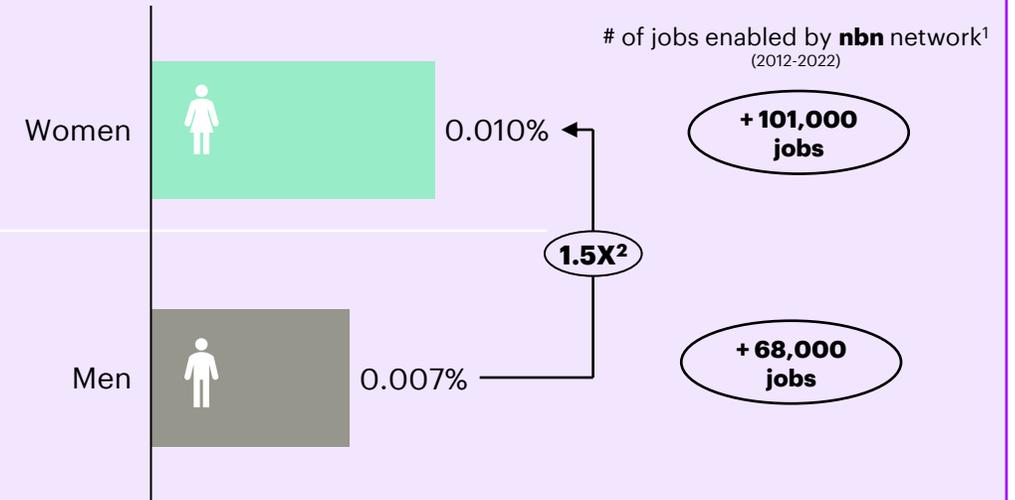
Jobs creation enabled by the nbn network¹

- Jobs creation enabled between 2023-2030
- Jobs creation enabled between 2012-2022



The nbn network has enabled the creation of 1.5x more jobs for women compared to men, supporting improved labour market outcomes for women

Impact of a 1% increase in average broadband speed on employment (%); male vs female



The nbn network has a **1.5x stronger impact on female employment** relative to male employment. Some possible explanations for this effect could include: the benefits of flexible work, benefits of online education and the concentration of benefits in industries with higher female representation.

Source: Accenture modelling. The figures shown are the portion of total impact from increased broadband speeds that is attributable to the nbn network. The nbn-impact considers both upgrades to the network and other increases from changes to speed tier mix over time. 1. Based on the portion of overall national broadband speed increases attributable to the nbn network (compared to other technologies) over the period and accounting for gender effects seen in the model. 2. Based on unrounded coefficients.

The nbn network is enabling improved economic outcomes across all of Australia’s states and territories

Economic benefits enabled by the nbn network by state and territory 2012 to 2022

Northern Territory

- GDP uplift: \$1.4b (Darwin: \$1.1b, rest of territory: \$0.3b)
- Jobs: 1,900 (Darwin: 1,300, rest of territory: 600)
- Businesses: 600 (Darwin: 500, rest of territory: 100)

Western Australia

- GDP uplift: \$20.5b (major cities: \$15.4b, regional: \$5.1b)
- Jobs: 18,200 (major cities: 14,400, regional: 3,800)
- Businesses: 8,100 (major cities: 6,200, regional: 1,900)

South Australia

- GDP uplift: \$6.5b (major cities: \$5.3b, regional: \$1.2b)
- Jobs: 11,200 (major cities: 8,700, regional: 2,500)
- Businesses: 5,300 (major cities: 3,800, regional: 1,500)

Tasmania

- GDP uplift: \$2.2b (Hobart: \$1.2b, rest of state: \$1.0b)
- Jobs: 3,900 (Hobart: 1,900, rest of state 2,000)
- Businesses: 1,700 (Hobart: 700, rest of state: 1,000)

Australia

Total GDP uplift: \$122b
 Total jobs: 169,000
 Total businesses: 87,000

Queensland

- GDP uplift: \$22.0b (major cities: \$14.8b, regional: \$7.2b)
- Jobs: 34,300 (major cities: 22,300, regional: 12,000)
- Businesses: 16,300 (major cities: 10,500, regional: 5,800)

New South Wales

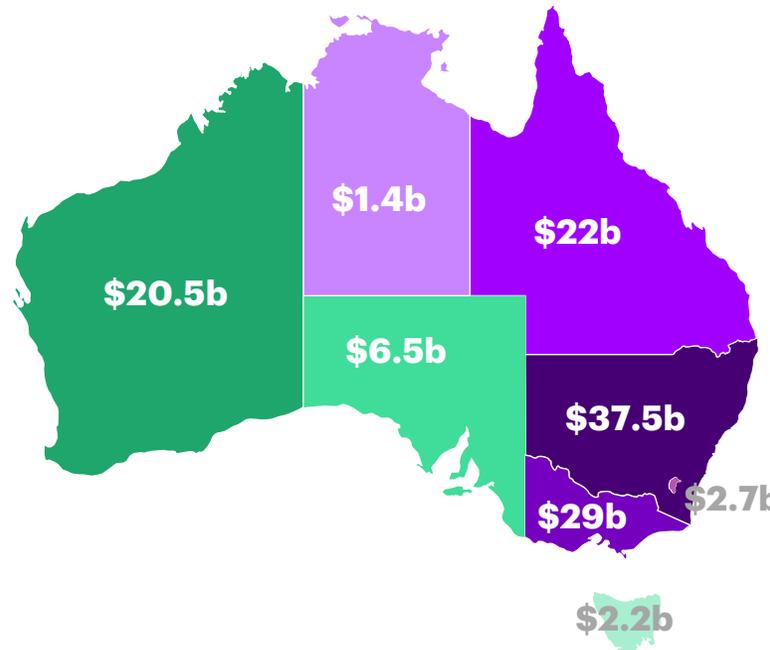
- GDP uplift: \$37.5b (major cities: \$30.2b, regional: \$7.3b)
- Jobs: 52,200 (major cities: 39,500, regional: 12,700)
- Businesses: 28,900 (major cities: 21,700, regional: 7,200)

Victoria

- GDP uplift: \$29.0b (major cities: \$23.8b, regional: \$5.2b)
- Jobs: 44,000 (major cities: 33,400, regional: 10,600)
- Businesses: 24,400 (major cities: 18,800, regional: 5,600)

Australian Capital Territory

- GDP uplift: \$2.7b
- Jobs: 3,300
- Businesses: 1,300



02

Social impact



NBN Co's Social Impact Approach aims to measure wellbeing effects across five domains and overall

What is social impact?

Social impact is the net effect of an activity on people and society, where an activity could mean an organisation, program, product or service. Social impact (sometimes referred to as 'social value') is usually considered in terms of wellbeing, which is a state of satisfaction encompassing physical, mental and social aspects of life.

NBN Co's Social Impact Approach

NBN Co has developed a seven-step approach to measure the social impact of the **nbn** network on user well-being (life satisfaction) across five domains:

- Employment and income
- Education and skills
- Health
- Social and community connection
- Environment

The approach, including these domains, we developed considering the OECD's wellbeing framework and Treasury's *Measuring What Matters* approach. Primary data was collected from a representative survey of 1,500 **nbn** users to measure changes in wellbeing (both positive and negative) across the five domains. Results were statistically significant and considered for select target populations.

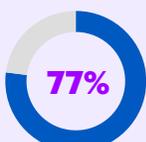
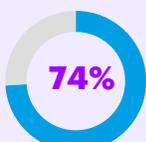
The research found that the nbn network is having a positive impact on individual wellbeing

- **Overall wellbeing:** 3 in 4 **nbn** users say that having access to the **nbn** network at home has had a positive impact on their satisfaction with life in the last 12 months (with fewer than 1% reporting a negative impact).
- **Employment and income:** 77% of **nbn** users who worked from home or used job search felt the **nbn** network positively impacted their employment outcomes.
- **Education and skills:** 82% of **nbn** users who engaged in education from home felt the **nbn** network positively impacted their education outcomes.
- **Health:** 77% of **nbn** users who accessed telehealth or medical information online felt the **nbn** network positively impacted their health outcomes.
- **Social and community connection:** 74% of **nbn** users who connected with others or accessed news or information online felt the **nbn** network positively impacted their connectedness.
- **Environment:** 85% of **nbn** users who work, study, access health or other services online felt the **nbn** network allowed them to reduce their carbon emissions.

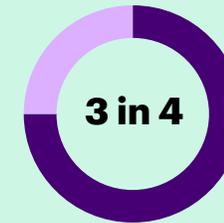
KEY RESULTS

The nbn network is having an overwhelmingly positive impact on wellbeing; fewer than 1% of nbn users reported the network having a negative impact on their life satisfaction

Overall impact results by domain

Employment & income	 77% of nbn users who worked from home or used job search platforms reported the nbn network positively impacted their employment outcomes in FY23
Education & skills	 82% of nbn users who engaged in formal or informal education from home via the nbn reported the nbn network positively impacted their education outcomes in FY23
Health	 77% of nbn users who accessed telehealth or online medical information, resources or records via the nbn network reported the nbn network positively impacted their health outcomes in FY23
Social & community connection	 74% nbn users who connect with family, friends and others or access news or community information online via the nbn network reported the nbn network positively impacted their social and community connectedness in FY23
Environment	 85% of nbn users who work, study, access health or other services online reported having fast internet via nbn network helped them to reduce their emissions in FY23

Overall wellbeing



nbn users say having the **nbn** network at home has had a positive impact on their satisfaction with life

The distribution of results:

- 25% reported a strong positive impact
- 50% reported a moderate positive impact
- 24% reported no impact
- 1% reported a moderate negative impact
- 0% reported a strong negative impact

The nbn network has enabled job and business creation, whilst also enabling users to boost their income and save money by using online alternatives



CREATING EMPLOYMENT OPPORTUNITIES

+169,000 jobs

enabled by the **nbn** network between 2012 and 2022

+87,000 businesses

enabled by the **nbn** network between 2012 and 2022

IMPROVING ACCESS AND QUALITY OF WORK

Job search: 1 in 3 of **nbn** users used the **nbn** network to access job search websites or platforms in the last 12 months. Of this group:

- 7% said they were unemployed, and were able to find employment via an internet enabled job search using the **nbn** network.
- 25% said they were employed, but were able to find a better job via internet enabled job search using the **nbn** network.

Work from home: 1 in 3 nbn users used the **nbn** network to work from home. Of this group:

- 72% reported that they could not have worked from home without the **nbn** network.
- 53% reported being better able to balance their interests and non-work commitments with work (e.g., improved work-life balance).
- 47% of this group reported being more productive which made them more successful in my job (e.g., reduced travel time, less distractions or more focused at home).

Overall, 77% of **nbn** users who worked from home or used job search platforms reported the **nbn** network positively impacted their employment outcomes in FY23.

Source: Accenture, **nbn** Social Impact Framework, 2023

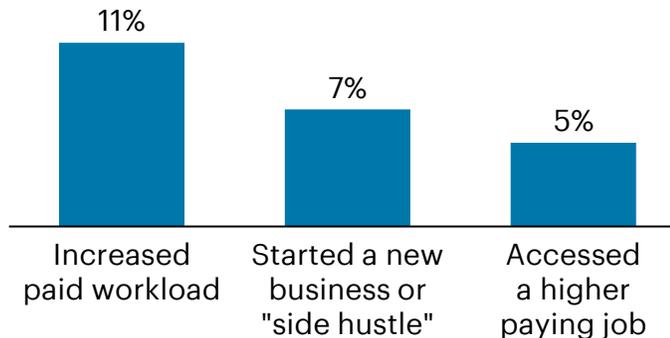


BOOSTING INCOME

Nearly **1 in 5 nbn users** have boosted their income by working remotely over the **nbn** network

% nbn users who have boosted income through WFH, by category

Users may have boosted income in multiple ways



Average reported income increase (\$)



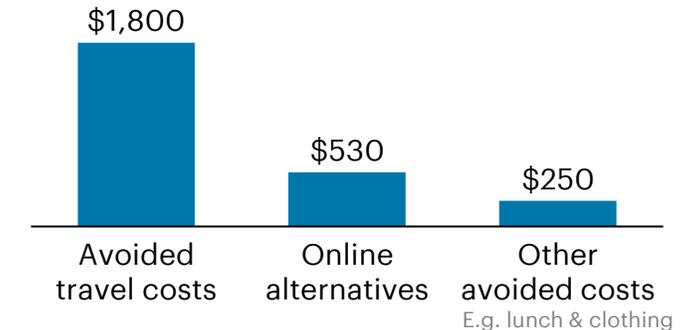
Source: [Value of services over the nbn](#). Based on a survey of **nbn** users in September 2022



SAVING MONEY

The average **nbn** user **saves \$2,580** per year by using the **nbn** network

Average costs savings for nbn users

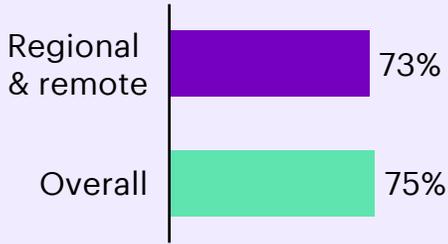


According to previous Accenture research the average **nbn** user pays \$16.90/week (or ~\$880/year) for this connection, significantly less than the estimated savings.

Source: [Value of services over the nbn](#). Based on a survey of **nbn** users in September 2022

nbn users in regional and remote areas reported positive wellbeing impacts of similar magnitude to the national average

Wellbeing (Overall)



73% of regional and remote nbn users say having the **nbn** network at home has had a positive impact on their satisfaction with life.

- 28% reported a strong positive impact
- 45% reported a moderate positive impact
- 25% reported no impact
- 2% reported a moderate negative impact
- 0% reported a strong negative impact

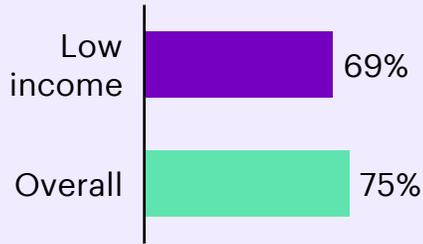
Overall Impact (Domain)

Domain	Regional & remote	Overall	Summary
Employment & income	78%	77%	78% of regional and remote nbn users who worked from home or used job search platforms reported the nbn network positively impacted their employment outcomes in FY23.
Education & skills	80%	82%	80% of regional and remote nbn users who engaged in formal or informal education from home via the nbn reported the nbn network positively impacted their education outcomes in FY23.
Health	77%	77%	77% of regional and remote nbn users who accessed telehealth or online medical information, resources or records via the nbn reported the nbn network positively impacted their health outcomes in FY23.
Social & community connection	73%	74%	73% of regional and remote nbn users who connect with family, friends and others or access news or community information online via the nbn reported the nbn network positively impacted their social and community connectedness in FY23.
Environment	87%	85%	87% of regional and remote nbn users who work, study, access health or other services online reported having fast internet via nbn network helped them to reduce their emissions in FY23.



Fewer than 1% of low income nbn users reported that access to nbn-enabled broadband had had a negative impact on their wellbeing

Wellbeing (Overall)



69% of low income household¹ nbn users say having the **nbn** network at home has had a positive impact on their satisfaction with life.

- 23% reported a strong positive impact
- 47% reported a moderate positive impact
- 29% reported no impact
- 1% reported a moderate negative impact
- 0% reported a strong negative impact

Overall Impact (Domain)

Domain	Low income	Overall	Description
Employment & income	72%	77%	72% of low income nbn users who worked from home or used job search platforms reported the nbn network positively impacted their employment outcomes in FY23.
Education & skills	74%	82%	74% of low income nbn users who engaged in formal or informal education from home via the nbn reported the nbn network positively impacted their education outcomes in FY23.
Health	73%	77%	73% of low income nbn users who accessed telehealth or online medical information, resources or records via the nbn reported the nbn network positively impacted their health outcomes in FY23.
Social & community connection	71%	74%	71% of low income nbn users who connect with family, friends and others or access news or community information online via the nbn reported the nbn network positively impacted their social and community connectedness in FY23.
Environment	80%	85%	80% of low income nbn users who work, study, access health or other services online reported having fast internet via nbn network helped them to reduce their emissions in FY23.

3 in 4 First Nations nbn users reported the nbn network had a positive (moderate or strong) impact on their satisfaction with life

Wellbeing (Overall)



74% of First Nations nbn users say having the **nbn** network at home has had a positive impact on their satisfaction with life.

- 35% reported a strong positive impact
- 39% reported a moderate positive impact
- 20% reported no impact
- 6% reported a moderate negative impact
- 0% reported a strong negative impact

Overall Impact (Domain)

Domain	First Nations	Overall	Description
Employment & income	92%	77%	92% of First Nations nbn users who worked from home or used job search platforms reported the nbn network positively impacted their employment outcomes in FY23.
Education & skills	75%	82%	75% of First Nations nbn users who engaged in formal or informal education from home via the nbn reported the nbn network positively impacted their education outcomes in FY23.
Health	68%	77%	68% of First Nations nbn users who accessed telehealth or online medical information, resources or records via the nbn reported the nbn network positively impacted their health outcomes in FY23.
Social & community connection	80%	74%	80% of First Nations nbn users who connect with family, friends and others or access news or community information online via the nbn reported the nbn network positively impacted their social and community connectedness in FY23.
Environment	64%	85%	64% of First Nations nbn users who work, study, access health or other services online reported having fast internet via nbn network helped them to reduce their emissions in FY23.



About Accenture

Accenture is a leading global professional services company that helps the world's leading businesses, governments and other organizations build their digital core, optimize their operations, accelerate revenue growth and enhance citizen services—creating tangible value at speed and scale. We are a talent and innovation led company with 738,000 people serving clients in more than 120 countries. Technology is at the core of change today, and we are one of the world's leaders in helping drive that change, with strong ecosystem relationships. We combine our strength in technology with unmatched industry experience, functional expertise and global delivery capability. We are uniquely able to deliver tangible outcomes because of our broad range of services, solutions and assets across Strategy & Consulting, Technology, Operations, Industry X and Accenture Song. These capabilities, together with our culture of shared success and commitment to creating 360° value, enable us to help our clients succeed and build trusted, lasting relationships. We measure our success by the 360° value we create for our clients, each other, our shareholders, partners and communities. Visit us at www.accenture.com.

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