

Lifting Connectivity in Aotearoa New Zealand

Government Statement of Intent for
Improving Digital Connectivity

DECEMBER 2022



MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Te Kāwanatanga o Aotearoa
New Zealand Government



Ministry of Business, Innovation and Employment (MBIE) Hīkina Whakatutuki – Lifting to make successful

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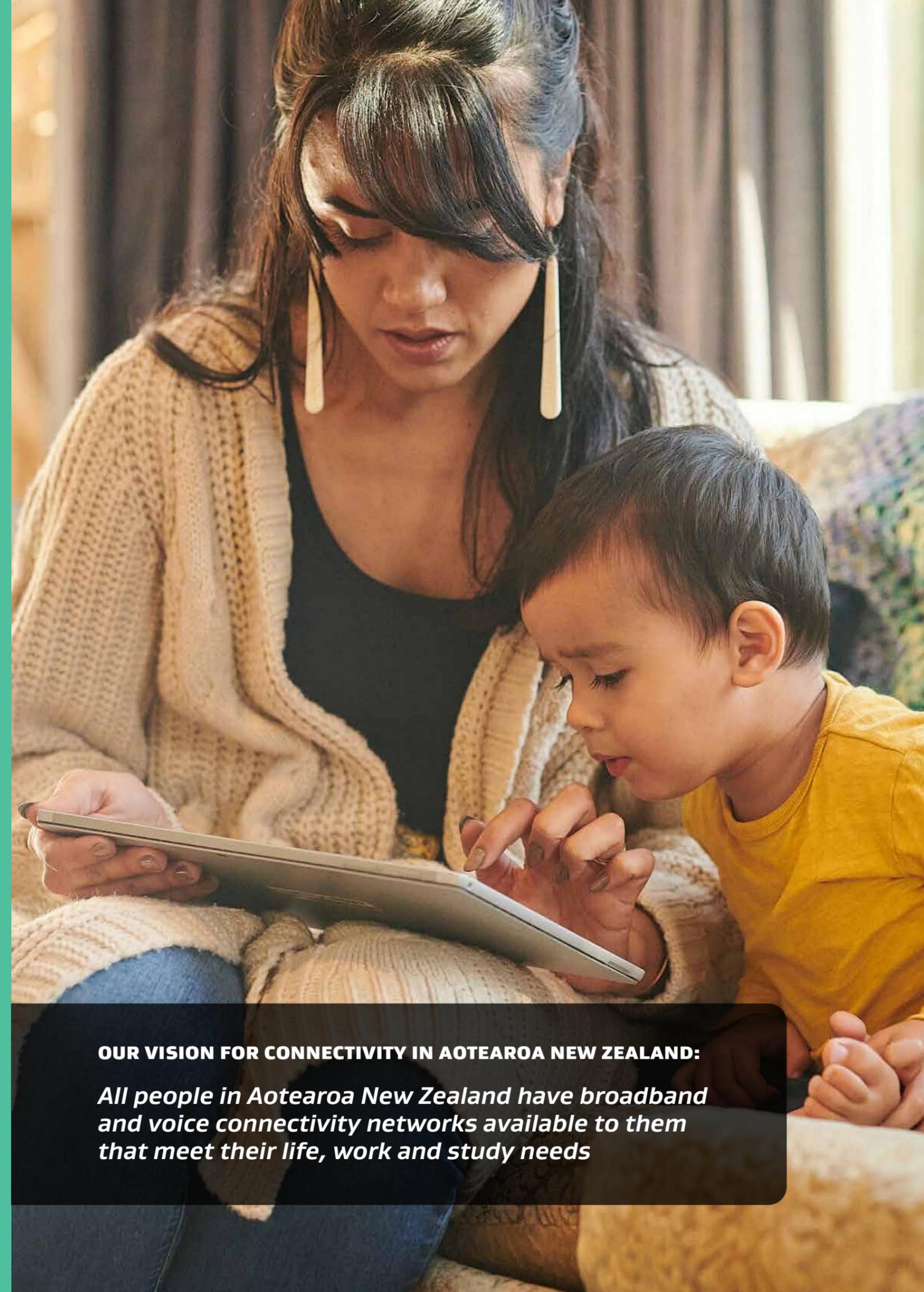
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OUR VISION FOR CONNECTIVITY IN AOTEAROA NEW ZEALAND:

All people in Aotearoa New Zealand have broadband and voice connectivity networks available to them that meet their life, work and study needs



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Minister's Foreword

E ngā mana, e ngā reo, e ngā karangatanga maha huri noa i te motu, tēnā koutou, tēnā koutou, tēnā koutou katoa.

New Zealand has come a long way since the days of dial up internet.

Since 2017, the proportion of our country with access to Ultra-Fast Broadband has increased from 63% to 85% at the end of 2021. We proudly rank high on the world stage when it comes to access to and uptake of digital connectivity. This recognition has been the result of successive governments investing billions of dollars into New Zealand's connectivity infrastructure.

The impact of COVID-19 forced many of us to quickly form new habits. We saw first-hand the importance of having access to reliable internet, so we could stay connected with friends and whānau, work from home, learn in an online environment and digitally access health services.

As Minister for the Digital Economy and Communications, I've been there to mark some significant milestones in New Zealand's connectivity journey. In December last year, I celebrated with the residents of the Chatham Islands as they received broadband and mobile services. In February this year, Government and the Māori Spectrum working group, signed an enduring long-term agreement between Māori and the Crown, recognising Māori interests in radio spectrum. More recently I had the opportunity to reflect on the success of the rollout of the Ultra-Fast Broadband (UFB) programme on my own home soil, when Warrington in Dunedin received UFB. We are currently on track to reach our goal of ensuring 99.8 per cent of the population has access to improved broadband by the end of 2023.

Lifting Connectivity in Aotearoa outlines the foundation for the digital connectivity we currently have, and the areas we need to continue to address in order to reach the overarching vision of *enabling Aotearoa New Zealand's people, communities, economy and environment to flourish and prosper in the digital era* outlined in the Digital Strategy for Aotearoa released this year.

This will be a living document that continues to evolve, as new emerging digital technologies and connectivity becomes available. I look forward to seeing Aotearoa's connectivity journey continue.

Hon Dr David Clark
Minister for the Digital Economy and Communications

Glossary of key terms

Access Network	Access Network, for the purposes of this document, is the telecommunications infrastructure connecting a machine or a user via copper, fibre and wireless-based technologies.	Megabits per second (Mbps)	A measure of speed or data throughput. Mbps is faster than Kilobit per second (Kbps) but slower than Gigabits per second (Gbps).
Asymmetric Digital Subscriber Line (ADSL)	A broadband access network technology using copper telephone lines.	Mobile Black Spot Fund (MBSF)	The government-funded programme to improve availability of mobile services on state highways and tourism sites from 2016-2023. By the end of 2023, approximately 1,400km of state highways and over 168 tourism sites will receive mobile coverage.
Backhaul	The middle of a telecommunications network, providing high-capacity links that connect the core network with local access networks and mobile base stations.	Rural Broadband Initiative Phase 2 (RBI2)	The government-funded programme providing enhanced broadband for approximately 84,000 rural houses and businesses rolled out by the end of 2023.
Connectivity	<p>Connectivity, for the purposes of this document, means the ability to connect two or more points through telecommunications networks for transferring data or voice information back and forth.</p> <p>Connectivity encompasses various characteristics such as speed, latency, capacity and coverage, which are often considered key factors to assess network quality.</p>	Ultra-Fast Broadband (UFB)	The government-funded programme of providing fibre to over 410 cities and towns and key institutions (schools, hospitals, medical centres) rolled out between 2011 and 2023.
Download speed	The maximum rate at which users can download data (e.g. a file such as an image or video clip, or browse or move between websites) over the internet.	Very-high-speed Digital Subscriber Line (VDSL)	An upgrade to ADSL technology that allows for an increased speed of internet access over conventional, aging copper telephone lines.
EUL	End User Locations	Wireless Internet Service Provider (WISP)	Local, relatively small providers that provide internet connection services to rural or remote areas of New Zealand using wireless (radio) technology.
Fibre	Fibre-optic cables and associated equipment that allow optical transmission between points at very high speeds.	4G	The generic term describing the fourth generation of mobile phone and fixed wireless access network standards
Fixed wireless	Fixed wireless is a broadband service that enables an end user to connect through wireless technology, for example cellular.	5G	The generic term describing the fifth generation of mobile phone and fixed wireless access network standards
Internet of Things (IoT)	The increasingly vast range of physical objects and devices that are able to connect to the internet and each other to communicate and share data.		
Latency	The time it takes for data to be transferred between the sender of the data and its destination. Latency is measured in milliseconds. Common experiences are the delay or lag a person observes when making a voice call over a satellite link or when playing a fast-moving online game that is hosted overseas.		
Local Fibre Company (LFC)	Fibre companies such as Chorus, Tuatahi First Fibre, Enable and Northpower, as defined in Section 156AB of the Telecommunications Act 2001.		
Low Earth Orbit satellite (LEO)	Satellites that orbit the Earth at a lower height (often less than 1,000 kilometres) than geostationary satellites, frequently in large, interconnected groups known as constellations.		

INTRODUCTION: Enabling more people to benefit from connectivity

Lifting Connectivity in Aotearoa reflects on our progress towards achieving world-class telecommunications networks in New Zealand and sets out our ambitions to improve access to connectivity infrastructure, particularly for rural and remote communities.

Delivering on connectivity is essential if we are to reach the vision of the Digital Strategy for Aotearoa namely:

Enabling Aotearoa New Zealand’s people, communities, economy, and environment to flourish and prosper in the digital era.

The Digital Strategy for Aotearoa is the start of the journey towards supporting everyone in New Zealand to seize the opportunities of digital technologies. It is framed around three pillars, each with specific goals:

- › **Mahi Tika – Trust:** New Zealanders feel safe and empowered in online environments. Organisations and businesses design and use digital technologies and data in fair, culturally appropriate, trustworthy ways; and our digital and data infrastructures are fit-for-purpose and secure.
- › **Mahi Tahī – Inclusion:** All New Zealanders have the tools, skills and confidence to participate in an increasingly digital society; and digital infrastructure, content and services meet people’s diverse needs.
- › **Mahi Ake – Growth:** Our businesses and organisations innovate and increase productivity using digital technologies and data; and we have a thriving, fast growing and inclusive technology sector.

Good access to high-quality connectivity underpins the ability of people, communities, the economy and the environment to benefit from digital technologies. It will support Aotearoa New Zealand to be a more equitable, innovative place with a strong economy that is resilient, sustainable, and ready for the future. Digital technologies and data will support wellbeing, and will provide new opportunities to ‘earn, learn and thrive.’

Lifting Connectivity in Aotearoa, the Government’s Statement of Intent, outlines the foundation for the digital connectivity we have, and the areas we need to address to reach the vision we have for Aotearoa New Zealand in the Digital Strategy for Aotearoa.

PART 1: Building on successful foundations

Digital connectivity progress we have made as a nation since the launch of the Ultra-Fast Broadband (UFB) programme in 2010

Aotearoa New Zealand’s access to the digital world is enabled by a strong foundation, due to bold investment and a commitment from successive New Zealand governments to ongoing connectivity improvements. Since the launch of the UFB programme, major upgrades of New Zealand’s telecommunications infrastructure have been made, in partnership with private network operators, to lift the standard of New Zealand’s connectivity infrastructure and availability across both urban and rural areas.

Government investment (as allocated to programmes)

\$1.785b Ultra-Fast Broadband (UFB, fibre-optic cabling for towns and key institutions such as schools and hospitals)		\$300m Rural Broadband Initiative Phase 1 (RBI1)	\$23.9m Regional connectivity initiative: Marae Digital Connectivity (MDC)
\$51m Regional connectivity initiative: Southland and West Coast	\$43m Rural Capacity Upgrades (2022 Phase 2 extension of programme)	\$297m Rural Broadband Initiative Phase 2 (RBI2) and Mobile Black Spot Fund (including upgrades and mobile coverage on the Chatham Islands)	
\$15m Remote Users Scheme	\$65m Rural Capacity Upgrades (Phase 1) comprising: <ul style="list-style-type: none"> › \$15 million for rural towers › \$50 million in general capacity upgrades (towers, some fibre, and additional marae connectivity) 		

(Source: Crown Infrastructure Partners)

The digital connectivity progress we have made as a nation

2010



Launch of UFB

Target set for 75% population with access to fibre, and all schools and hospitals with download speeds of 100 Mbps+



Launch of RBI1

Targets were to get 80% of rural households to speeds greater than 5Mbps, and others to speeds of greater than 1 Mbps

2015



UFB

UFB builds complete for schools, public hospitals, most private health facilities and most businesses

2016



Conclusion of RBI1

Over 293,000 rural households and businesses able to access broadband.

355 cell towers upgraded, 154 new towers are live, 39 hospitals and health centres, 1,034 schools with fibre, 49 remote schools with improved connectivity, and extension of fibre by over 3,300km



Launch of RBI2 and MBSF

Targets set for 64,000 households able to connect to improved broadband; and mobile coverage for around 1,000 kilometres of state highways, more than 100 tourism spots, and 20% additional geographic coverage

2017



UFB extended

Targets increased to 87% of households and businesses and to 412 towns by the end of 2022



UFB

Number of towns with fibre: 22
Availability: 1.2 million including households and businesses, Uptake: 35%



RBI2

Rural Connectivity Group appointed to build 500 cell towers under RBI2 +MBSF
RBI2 target increased to 70,000 End User Locations (EUL)

2022



Commencement of Works for Rural Capacity Upgrades (RCU)

Rural Capacity Upgrades contracted for 43,000-47,000 rural households and businesses



Māori/Crown Memorandum of Understanding on Radio Spectrum signed

Landmark agreement for 20% spectrum allocated to Māori Spectrum Entity to be established in legislation by end 2022



Rural Tower Upgrades

Upgrades completed on 70 towers



Regional Connectivity Initiatives

Completion of Fox-Hāwea fibre link

Budget 2022 Package

Further capacity upgrades to benefit 26,000 additional rural households and businesses, an extension to the MDC, and for a Remote Users Scheme

2021



RBI2

80% of target
Covers 67,606 homes and businesses
Chatham Islands: 5 new mobile towers and improved backhaul works completed



UFB

Uptake 65%
Number of towns 309
Availability 1.76 million households and businesses



MBSF

268 towers in rural areas and blackspots
877km of state highway covered
70 tourism spots covered



MDC

475 marae connected
445 with hardware installed

2020

Rural Capacity Upgrades and Marae Digital Connectivity extension (COVID Recovery Fund) to relieve congestion on rural networks and extend Marae Digital Connectivity



Rural Tower Upgrades

Capacity upgrades to at least 70 rural mobile towers



RBI2

62% of target, Improved service to 51,904 rural homes and businesses



UFB

Uptake 60%, Number of towns 194
Availability 1.68 million households and businesses



MBSF

126 towers in rural areas and blackspots
629km of state highway covered
50 tourism spots covered



MDC

177 marae connected, 79 with hardware installed



Regional Connectivity Initiatives launched

Hāwea-Fox Glacier and Te Anau-Milford Sound fibre links, and extension of mobile and UFB coverage on West Coast

2019



Marae Digital Connectivity (MDC) Announced

Target to cover all eligible marae (around 877) that apply, to provide broadband connections for five years and associated hardware



RBI2

Improved services to 38,662 homes and businesses, 46% of target



UFB

Number of towns: 110
Population coverage 78%
Availability 1.6 million households and businesses



MBSF

25 towers in rural areas and blackspots
238km of state highway covered
26 tourism spots covered

2018



RBI2

Covers 31,755 homes and businesses
43% of target



UFB

Number of towns with fibre: 50
Availability: 1.4 million including households and businesses
Uptake: 44%



MBSF

2 towers in rural areas and blackspots (plus, 167 site acquisition underway)
Target increased to about 1,400km state highways and 168 tourism spots



RBI2

Target increased to 84,000 rural households and businesses

Telecommunications sector investing in the future of connectivity

In addition to government investment in connectivity, the telecommunications sector invests approximately \$1.6 billion a year in infrastructure. In 2020 New Zealand had the fourth-highest level of telecommunications investment in the OECD, when measured as a percentage of Gross Domestic Product (GDP).

Mobile network operators have provided 2G/3G/4G based services and now 5G to around 98 per cent of New Zealand’s population with Wireless Internet Service Providers (WISPs) providing wireless internet coverage to over 70,000 additional New Zealanders in rural areas.

New Zealand has five international submarine cables that connect us to the rest of the world. Upon the completion of the fifth, New Zealand’s international fibre optic cable will have a total capacity of 72 Terabits of data per second (sufficient to screen more than 4.5 million Ultra high-definition 4K videos simultaneously).

Striving for world-class telecommunications infrastructure

Significant investment by the government and private sector over the last decade means we rank well amongst other countries for the standard of our connectivity infrastructure:

- › New Zealand ranked 14th in the OECD for overall average fixed broadband speeds in 2021 (as sourced from Ookla data)
- › New Zealand ranked in the top eight OECD countries for the percentage of fibre connections of total fixed connections
- › A recent report by the Commerce Commission comparing broadband services between Australia and New Zealand found that we had faster uploads and downloads in our fixed line and fibre plans, and fewer outages.

Our expectations of our connectivity networks are growing as New Zealanders increasingly engage with digital technology in more aspects of their daily lives. Twenty years ago, average download speeds experienced by users were around 250Kbps (sometimes much less in rural areas), a level of service that today would not support many applications New Zealanders expect to access online. In 2022, 25-50 Mbps is considered a reasonable level of service to support High Definition (HD) video streaming, advances in technology mean that satellite services are able to deliver 100Mbps in remote locations, and fibre plans are available for Gigabit speeds.

With much of the backbone of our connectivity infrastructure in good shape, New Zealand is now in a position to focus on connecting the hardest to reach areas, and to maintain and build on the high standard of connectivity already in place.

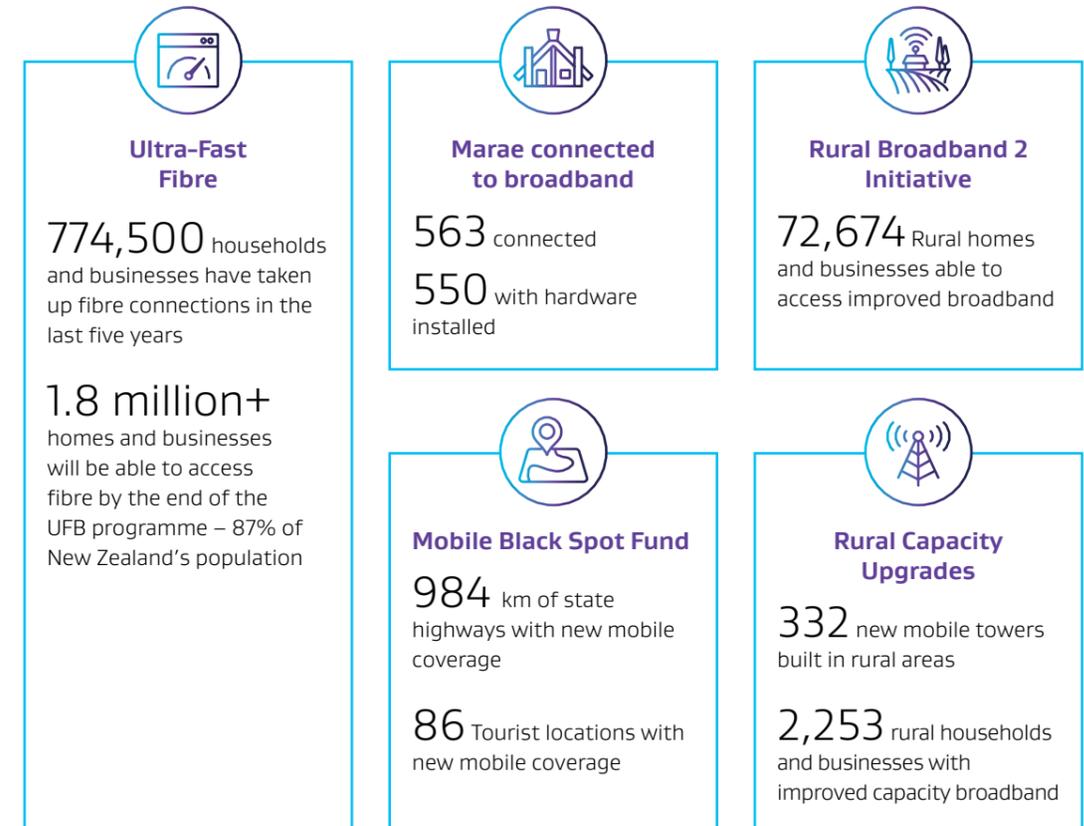
Remote and rural New Zealanders are still not always able to access the connectivity they need. That is why we are investing in the next chapter of rural connectivity, to connect the hardest to reach areas. We are creating a \$15 million Remote Users Scheme, to extend coverage and support use of innovative connectivity options for New Zealanders in remote and hard to reach areas. This will mean more New Zealanders have access to broadband and voice connectivity that meets their life, work and study needs.

The Government is continuing to work to understand the coverage, capacity and resilience needs of New Zealand’s telecommunications network.

Around \$90 million from the COVID Recovery Fund and Budget 2022 has been invested in the Rural Capacity Upgrade programme. This investment is expected to provide better connectivity to approximately 70,000 rural homes and businesses.

Long-term rights to the 3.5 GHz spectrum are also being allocated to support roll-out of 5G wireless technology in New Zealand.

By the numbers - Government connectivity programmes over the last five years, as at March 2022:



(Source: Crown Infrastructure Partners)





CASE STUDY

**IMPROVING CONNECTIVITY IN THE REGIONS:
Ultra-Fast Broadband (UFB) Fibre expanding to small towns and urban fringe**

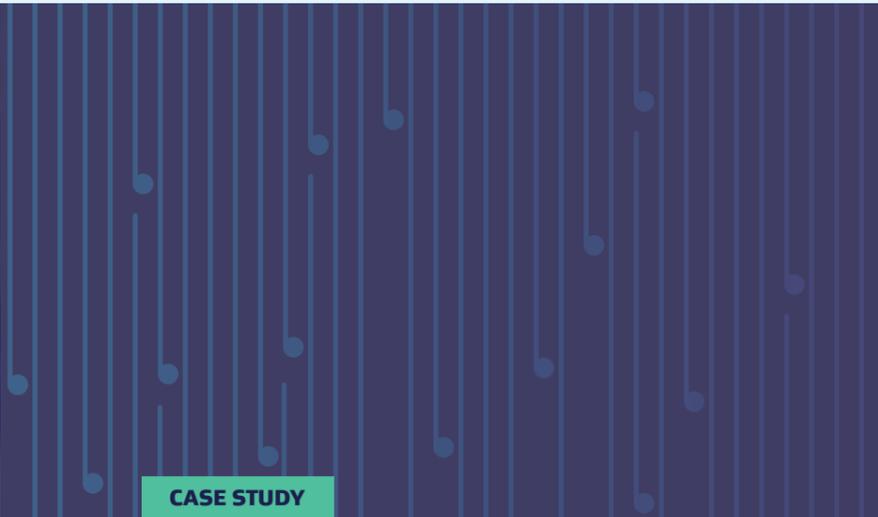
The UFB public-private partnership model has been highly successful for supporting the delivery of fibre networks across Aotearoa New Zealand. Launched in 2010, the original roll-out targeted high-density areas but has been expanded to reach smaller towns several times (UFB, UFB2, UFB2+), so that small and/or isolated towns now have access to fibre broadband.

In late 2021, the Rural Capacity Upgrade (RCU) programme included a further extension of fibre networks into smaller towns via Crown funding.

Haast is one of the most remote West Coast towns in New Zealand to benefit from UFB. The inclusion of Haast for UFB fibre has been enabled by construction of a high-capacity regional fibre link between Fox Glacier and Lake Hāwea. With UFB rolling out to more towns in rural areas, some of New Zealand’s biggest sectors including agriculture and tourism, will benefit greatly from the improvements that better connectivity offers.

In addition, for urban fringe and new development areas, fibre is being added on a commercial basis due to widespread recognition of the benefit it provides. For areas with new subdivisions, property developers themselves are incorporating it into developments. One such developer, Yeoman Property Group, says their decision to design and build all developments with access to fibre puts it in a great position. “Fibre broadband is all people want now,” says managing director Andrew Yeoman.

Fibre-to-the-Home (FTTH) will be available to more than 1.8 million premises by the end of 2022. Chorus is the largest fibre company, operating nationally and accounting for 69.4% of the UFB network. Local Fibre Companies (LFC) account for the remainder, with Tuatahi First Fibre at 13.7% (covering Hamilton, Cambridge, Te Awamutu, Tauranga, Tokoroa, New Plymouth, Hawera and Whanganui), Enable with 15.3% (Christchurch and Rangiora), and Northpower with 1.6% (Whangārei).



CASE STUDY

**IMPROVING CONNECTIVITY IN THE REGIONS:
Targeted solutions in the isolated reaches of ranges**



Isolated parts of the country present some of the greatest challenges to providing broadband and mobile coverage.

Rugged terrain and extreme weather are more expected in these areas, but over the past two and a half years, COVID-19 lockdowns and related resource and supply-chain issues have posed additional difficulties. Even so, progress on both RBI2 and MBSF initiatives are running to schedule.

Ōtaki Gorge

Ōtaki Gorge’s new tower under the RBI2 programme is a prime example of the government and private sector working together to come up with a targeted solution.

The new cell tower came online in June 2022 to provide broadband coverage for 80 households, as well as one of the main entrances to the tramping, hunting and walking opportunities in the wild landscape of the Tararua Forest Park.

The difference these connectivity upgrades can make for a community should not be underestimated.

Ōtaki Gorge resident Andrew Collins said of the new tower, that he is excited not only to know that mobile phone coverage has been vastly improved for the community but also that many will now receive broadband internet services. Andrew also says “the signal that now extends up the Gorge itself potentially could save the lives of those who come unstuck whilst tramping up there, and with improved coverage throughout the entire community the ability to be able to call emergency services has significantly increased.”

The Rural Connectivity Group (RCG) is an independent entity jointly owned by Spark, Vodafone and 2degrees, appointed by the government to be the provider for shared infrastructure under the RBI2 and MBSF.

The three mobile network operators share radio access network (RAN) equipment and one set of antennae on each facility built. As a world first, this unique funding and shared-cost model addresses some of the commercial barriers and enables modern digital services to be delivered further into isolated and rural parts of New Zealand.

Innovative solutions to tricky site locations require collaborative engagement with many stakeholders including local interested communities, landowners, councils, iwi and hapū representatives, engineers, archaeologists, Heritage NZ and Department of Conservation (DOC).

Marahau

A karakia marked the start of construction for a new cell site in Marahau. The blessing was led by Ihaka Griffin-Matthews (*Ngāti Rārua, Ngāti Koata, Ngāti Tama, Te Ati Awa, Ngāti Toa, Ngāti Kuia, Rangitāne ki Wairau, Ngāti Apa ki te Rā Tō*), with representatives from Te Rūnanga o Ngāti Rārua, Te Ātiawa Manawhenua Ki Te Tau Ihu Trust, Wakatū Incorporation, local community and business stakeholders, Tasman District Council elected members, RCG and members of the build team involved in the construction of the site.

The new facility in Marahau will deliver reliable 4G wireless broadband and voice calling services to local homes, businesses, and visitors to the settlement of Marahau, as well as to the entrance of Abel Tasman National Park, the launch point for popular activities such as tramping and kayaking.

“In the aftermath of Cyclone Gita and the subsequent civil defence emergency response, the community called for better and more resilient telecommunications should they be faced with a similar situation,” says RCG Chief Executive John Proctor.



“The need for up-to-date communication services is critical to support the future of our region. This new telecommunications network will have far-reaching benefits, supporting our local families, businesses, DOC, and emergency service teams along the National Park coastline. Daily life in Marahau will be enhanced when the cell site is switched on, providing access to online services, and it will help local businesses cater to the returning international visitor sector and support DOC to champion their ecological initiatives,” says Motueka Ward Councillor David Ogilvie.

The Marahau site will join 17 connectivity sites already live across the Tasman District, currently providing access to services for over 700 local households, 60km of state highway and four tourist locations, previously with poor, or no network connectivity.



CASE STUDY

IMPROVING CONNECTIVITY IN THE REGIONS: Improved connectivity on the Chatham Islands

In December 2021, mobile and broadband services were switched on for the 663 residents of Rēkohu / Wharekauri / Chatham Islands, around 800km from mainland Aotearoa New Zealand. The Government contributed \$11.5 million to the project.

“We are so excited to have the new network switched on with fast broadband and mobile services available for residents and visitors to Chatham Islands. Being able to keep track of our tourist operations and keeping people safe as they travel the island is a huge advantage, saving time, resource, improving efficiency and ultimately enhancing the visitor experience. Our whole health and safety approach on the island is now enhanced because of the new network, and now 111 Emergency calls can be made from mobiles, as well as landlines, which will improve our response times for incidents,” says Mayor Monique Croon.

The Chatham Islands boast the title of being home to New Zealand’s second-largest fishing fleet. For workers who are at sea for days at a time, broadband and mobile coverage enable them to keep in touch with their families and the mainland.

In addition to this, all three schools based in the Chatham Islands now have improved connectivity thanks to Network for Learning and the 4G network. The improved connectivity gives students and teachers in Kaingaroa School, Pitt Island School and Te One School access to a more reliable internet connection and increased internet speeds.

The new 4G network is enabled by five new cell towers around the main island and is supported by a new satellite link and satellite dish providing 8.5 times the capacity of the previous satellite link serving the island. The improved coverage for businesses, schools, marae, the airport and households has helped to strengthen the local economy and support the way of life in this remote part of New Zealand.

The new network also enables 111 Emergency calling to be available on the island for the first time. Users of the mobile networks are now able to contact emergency services from their mobiles, providing a crucial service for the community.

CASE STUDY

IMPROVING CONNECTIVITY IN THE REGIONS: Improved connectivity to the West Coast and Southland



In March 2022 the first of two regional fibre links in the West Coast and Southland regions was completed.

The purpose of the fibre links is to enable more reliable and faster broadband access to locations along the paths of the links.

The West Coast fibre link starts in Hāwea and traverses State Highway 6 north to Haast, then heads north up the state highways to Fox Glacier township - a total distance of approximately 240 kilometres.

The high-capacity backhaul will also enable further RCG towers to provide new mobile coverage on these stretches of State Highway, with improvements for tourist experience and road safety.

The Southland fibre link, currently under construction, starts in Te Anau and traverses north and west along State Highway 94 and into Milford Sound for 120 kilometres. New sites enabled by the high-capacity backhaul will deliver connectivity to areas of Te Anau Downs, Mt Eglinton, Mirror Lakes, Knobs Flat, Cascade Creek, the Routeburn Track, Hollyford Corner, Homer Tunnel and Milford Sound.

CASE STUDY

IMPROVING CONNECTIVITY IN THE REGIONS: Marae Digital Connectivity



In partnership with Crown Infrastructure Partners, Te Puni Kōkiri and Kānoa, the Marae Digital Connectivity Programme is making significant progress to enable marae to receive grant-funded broadband connections and associated hardware.

The Marae Digital Connectivity programme supports whānau and hapū to undertake economic activity and enhance their digital capabilities. As of March 2022, of the 877 eligible marae, 563 are connected to broadband and 550 have hardware installed. Various broadband solutions were approved to give marae connectivity. Where UFB was available this was chosen. Mobile 4G and WISP wireless solutions have also been used to deliver marae connectivity.

Marae have reported extensive use of the connectivity including digital hui, digital kapa haka classes, hapū members using the marae as a 'business hub', tamariki doing digital homework and hapū members using the Wi-Fi for everyday activities such as online appointments, banking, shopping, school assessments and work activities.

An inspiring example of marae utilising newfound connectivity includes Tuatini Marae, which took on the students of Hatea-a-Rangi School in Tokomaru Bay after the school was damaged by heavy rain that hit the Tairāwhiti region in June 2021. The school's 29 students participated in classes from the Tuatini Marae, highlighting a perfect example of the programme's objective of enabling whānau and hapū to continue learning in their communities.

Challenges and opportunities for the future

Investment in Aotearoa New Zealand’s telecommunications infrastructure has built a strong foundation for our participation in the digital world. However, connectivity technology and how people use it are always evolving, and we need to keep looking to the future as we plan to meet those changes. We face both challenges and opportunities as we strive to maintain world-class levels of connectivity.

Challenges and areas of focus

By the end of 2023, 87 per cent of New Zealanders will have access to fibre at their home, and a total of 99.8 per cent will have some form of improved access to broadband at the conclusion of current government connectivity initiatives.

In addition, mobile coverage is available in most places where New Zealanders work, live and study, and 5G is increasingly becoming available in regions across the country.

While these are achievements to be proud of, there is still a need to improve the quality of connectivity for many New Zealanders. There still remain large areas of New Zealand’s land mass where options for connectivity are limited, because of remoteness and very low population density such as over a large farm property or in a national park. In such cases, satellite coverage may be the only option for digital connectivity.

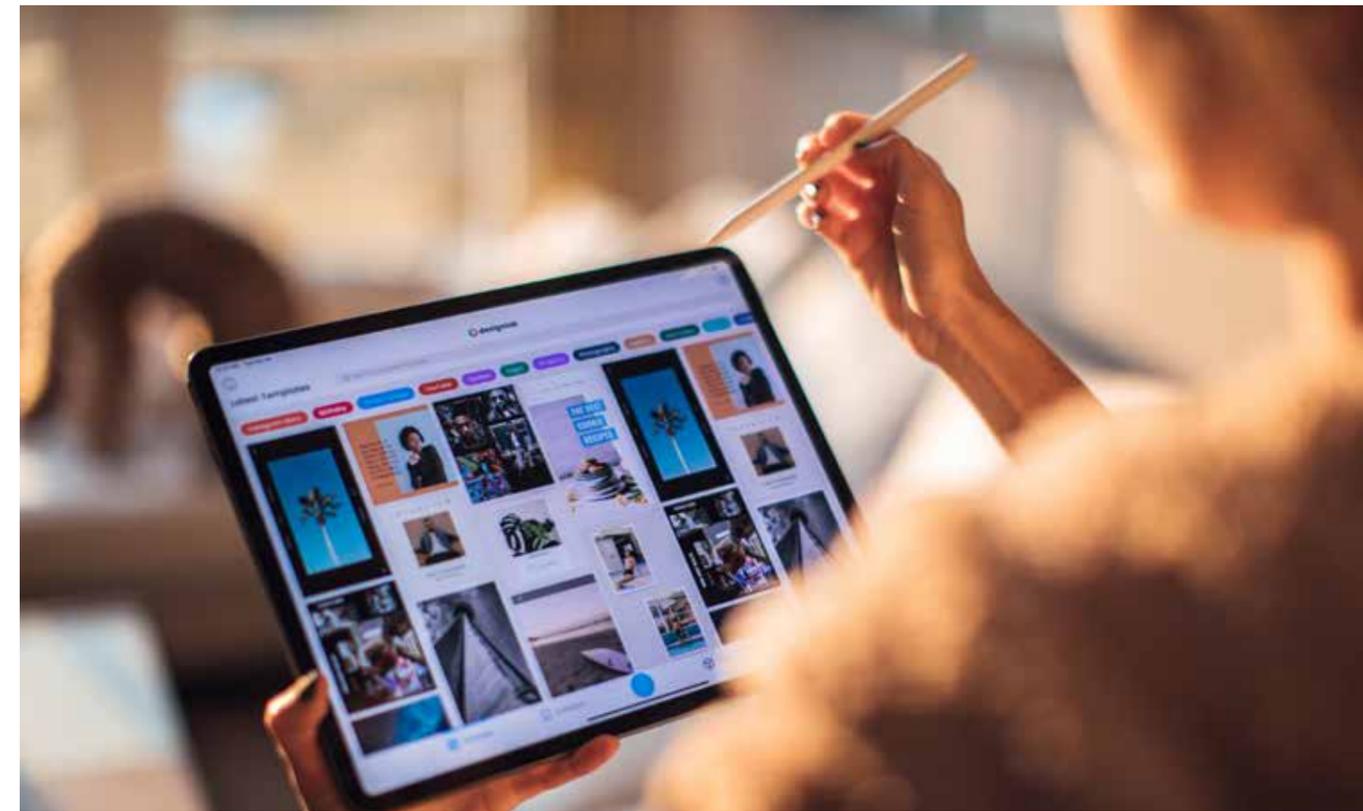
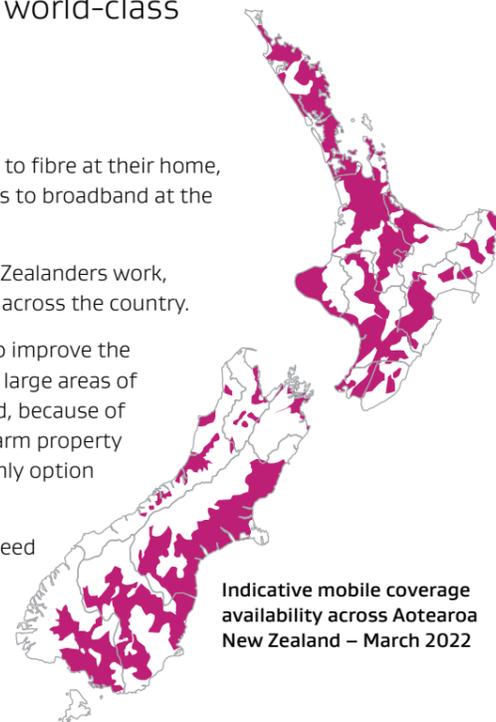
The importance of connectivity in our day-to-day lives means we need to keep focusing on improving broadband and mobile coverage, building on the success of the work done to date. Below we outline the challenges we will focus on in the years ahead to ensure New Zealanders have access to connectivity that meets their diverse needs.

Meeting the needs of people in rural and remote areas

Good connectivity in rural and remote areas is important for productivity and innovation, social connection and community building, health (including mental health) and safety, environmental compliance, and education. Good rural connectivity is also important for attracting and retaining skilled workers.

In addition, overseas customers and the countries New Zealand trades with are increasingly demanding that agricultural, horticultural and other primary produce be ethically sourced and environmentally friendly, including having low greenhouse gas emissions. Aotearoa New Zealand risks losing market access or customers if we fail to meet those demands.

Good connectivity enables the primary sector to make use of a wider range of technologies that assist with domestic and international market success. This includes demonstrating adherence to environmental regulations, meeting animal tracking and welfare requirements, and providing proof of provenance.



Focus areas: There are still large areas in rural New Zealand without quality connectivity options. Remote households within these areas are going to be the hardest to reach, and a variety of technologies may need to be used to meet the needs of these households. As mentioned in the section: building on successful foundations, the Government’s Remote Users Scheme is a \$15 million fund, which will provide bespoke connectivity solutions for remote and rural New Zealanders who have little or no connectivity at their principal residence. This scheme will help our hardest to reach households gain access to connectivity.

Improving network performance in our more populated rural areas

People in densely populated rural areas, including land surrounding our towns and cities, are experiencing increasing levels of network congestion. Network congestion occurs when the capacity of a network is insufficient to handle the total data transmission demand without degrading the performance to customers.

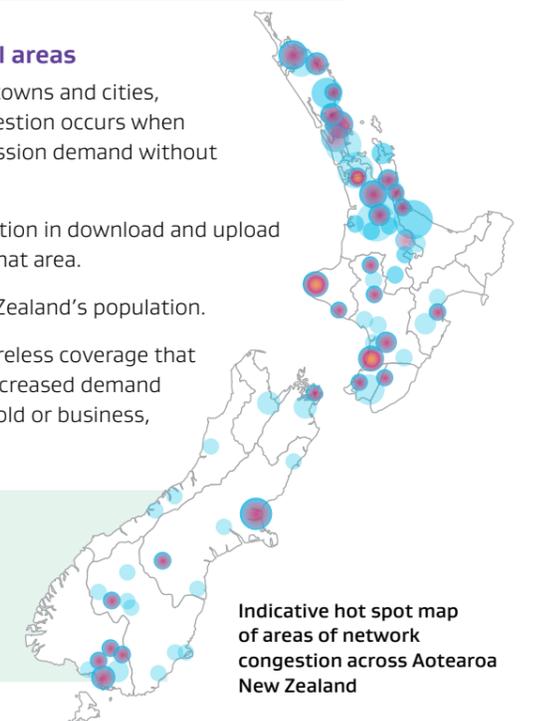
For wireless internet and mobile phone users, congestion can be a reduction in download and upload speeds or complete loss of service due to a lack of capacity available in that area.

It is estimated this issue could be affecting around five per cent of New Zealand’s population.

Typically, the affected areas do not have fibre to the premise, and the wireless coverage that may be available is being outpaced by data demands. This stems from increased demand on the network, for example, larger amounts of internet use per household or business, and additional users moving into the area.



Focus area: In areas where wireless is still the most practical connectivity solution, we will need to determine how we sustainably manage network congestion issues in these areas so that rural communities can rely on a standard of network performance that meets their work, life and study needs.



Growth in urban-fringe areas

At the completion of the government's UFB programme later this year, 87 per cent of New Zealanders will be able to access UFB connections. This large UFB footprint means New Zealand has a high uptake of fibre by international standards, allowing the vast majority of New Zealanders access to connectivity that has the capacity to grow with increasing data demands.

The economics of rolling out fibre are directly tied to population density. The original footprint for UFB was set a number of years ago and population growth has occurred in and around our towns and cities since that time.



Focus area: We need to consider whether technology such as fibre is viable in additional urban-fringe areas, taking into consideration the commercial incentives telecommunications companies already have to roll fibre out to these areas. Some local fibre companies are already rolling out fibre into these areas on a commercial basis.



Ensuring connectivity is reliable and is available in times of need

New Zealand's telecommunications network infrastructure must cover a vast and varied geographic area. Events such as the Kaikōura earthquake of 2016, and recent flooding events, highlight that telecommunications networks can be vulnerable to a range of natural hazards (such as earthquakes, storms, volcanic activity, slips and erosion), human-induced hazards, and their effects. The impacts of climate change, such as increased high rainfall are also leading to more frequent floods in some parts of the country.

The resilience of New Zealand's telecommunications networks is also dependent on the resilience of other infrastructure that carries it (e.g. bridges), along which it runs (e.g. roads or railway corridors) or upon which it depends for electricity.

Providing duplicate and back-up infrastructure is costly. This can leave rural areas more vulnerable as the greater distances involved, lower network density and smaller customer base means it is not viable to provide duplicate or alternative routes and connections.

Quick response and repair times and holding sufficient spare equipment or resources at remote locations are critical where there is no back-up. However, response times can be difficult to meet if the infrastructure affected is remote from the resources required for restoration.



Focus area: The standard and location of Aotearoa New Zealand's connectivity infrastructure, and the approach to protecting and restoring services, must consider the direct and indirect impacts of the risks being managed. The approach to managing risks should complement approaches and measures for managing Aotearoa New Zealand's other critical infrastructure.

Consumer awareness of connectivity options available

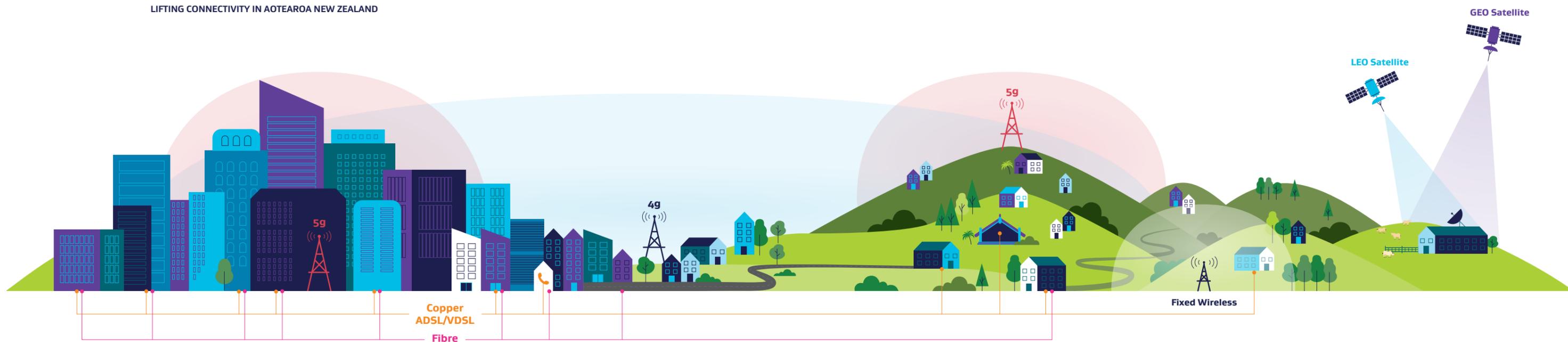
Government regulation of the telecommunications sector focuses on supporting healthy competition. Competition is also supported when consumers are able to make informed choices about the connectivity products that meet their needs.

Broadband Map NZ (broadbandmap.nz/home) is an independent source of information about the availability of broadband in New Zealand, administered by Internet NZ. New Zealanders can use it to check their broadband options before buying, renting or building a property, for finding a different provider in their area, and for learning more about the roll-out of government connectivity programmes, such as when coverage is being extended to particular areas.

The Commerce Commission also has an important role to play in monitoring the telecommunications market and providing information to New Zealanders to support consumer choice. Measuring Broadband New Zealand (measuringbroadbandnewzealand.com) is a project run by the Commerce Commission. It provides consumers with independent information on broadband performance across different technologies, providers and plans.



Focus area: Supporting informed consumer choice of connectivity products enhances competition and a well-functioning telecommunications market. Government will continue to focus on measures to support consumers in making informed choices about connectivity products and services.



Opportunities

Technology opportunities for improving connectivity

New Zealand's telecommunications networks deliver connectivity to New Zealanders through a mix of different technologies. As quickly as our connectivity needs evolve and grow, so do the technologies that can deliver real connectivity improvements for New Zealanders. As we look to the future of connectivity, the right mix of these technologies will help New Zealanders access connectivity with the coverage, performance and pricing they need.

Fibre

Fibre-optic cabling (simply referred to as fibre) is currently available for around 1.8 million homes and businesses.

Fibre is capable of handling high upload and download speeds with low latency. Speeds in New Zealand for fibre range from 50 Mbps upwards (depending on plan and user equipment). Fibre's high speed, high capacity, low latency and comparatively low energy requirements also make it well suited for handling the expected future growth in demand for data and network speeds (including across the backhaul parts of the network).

There are likely opportunities to improve the 'highways' of the network by extending fibre networks. No matter what kind of access technology is used to provide service to your home, business and mobile devices, these eventually connect to the rest of the network via backhaul networks. Improving backhaul capacity and coverage by upgrading to fibre for example, can improve the experience for everyone, no matter what technology is used to deliver your broadband service.

Fixed wireless

Fixed wireless access is a broadband service that enables an end user to connect through wireless technology, for example cellular. The service is broadcast through airwaves from towers to receivers installed on the user's property, usually a standard wireless modem, or augmented with an antenna where necessary.

Low earth orbit and geostationary earth orbit satellites

Low earth orbit (LEO) and geostationary (GEO) satellites are increasingly providing a greater ability for users in more remote parts of Aotearoa New Zealand to connect to the internet where other types of connectivity infrastructure are not available.

Geostationary orbit satellites are an established technology with many providers in Aotearoa New Zealand already selling internet service plans to customers taking advantage of the technology. Geostationary satellites remain in a fixed position at a high altitude, which allows each satellite to cover a wide geographic area without the need for an extensive ground-based network.

Low earth orbit satellites are a more recent innovation. They comprise many small satellites (referred to as constellations) that orbit the earth at a much lower altitude than geostationary satellites, with each satellite traversing a much smaller area than a single geostationary satellite. Low earth orbit satellites can offer high speeds and low latency (with some service providers offering speeds of 100 Mbps or more). However, because they move in the sky, their signal can occasionally be temporarily blocked as they 'move behind' hills, trees or structures.

5G Networks

5G technology is the next generation of cellular mobile technology. It is expected to deliver faster and more reliable services supporting innovation and productivity. Compared with 4G technology, 5G offers:

- > much faster upload and download speeds,
- > lower latency (assuming other components of the network are equipped and configured to handle higher speeds), and
- > greater data carrying capacity.

5G can offer a superior broadband experience when compared to 4G, and is capable of supporting the expected huge growth in the number of connected devices.

However, the high frequencies used for most 5G equipment often mean the signals have a shorter broadcast range. These same frequencies are also more prone to being blocked by buildings, trees, hills and other obstacles. This can mean that more towers are required than 3G or 4G to cover a similar land area, which can make building, operating and maintaining a 5G network more expensive (particularly in rural areas where there are greater distances between customers).

In urban areas, the high number of customers within a small area generally makes it economically feasible to build very small radio transmitters for 5G (sometimes called micro-cells) to overcome the shorter range of 5G, and the blocking effects of buildings. The increased use of micro-cells in urban areas means taking a different approach to the location and design of fixed and mobile phone infrastructure.



Internet of Things and local wireless solutions

The Internet of Things (IoT) refers to the growing range of physical objects and devices around the world that connect to the internet and each other to communicate for sharing data. These devices are sometimes referred to as “smart devices”.

Smart devices may come equipped with sensors, cameras, chips for recording and sending data (such as over Wi-Fi, Bluetooth, cellular or Near Field Communications) and GPS. In most cases smart devices connect to a central server or website and require connectivity.

Fixed wireless and Wi-Fi access can be used in rural situations to extend broadband access into the surrounding environment, enabling coverage to IoT devices.

There is expected to be an education role for government to play in raising awareness of the opportunities presented by wireless extension technologies and the options available to maximise its potential and provide cost-effective local solutions.

Local solutions for local needs

The range of connectivity technologies now available means that local communities have more choice in improving coverage or capacity, including from smaller network operators. For example:

- › Smaller communities are often aware of their particular needs and, given options and knowledge can identify innovative, cost-effective solutions for meeting those needs.
- › Wireless Internet Service Providers (WISPs) and similar scale market entrants can often make use of smaller, less costly infrastructure and localised licensing to provide services to a small community.
- › As noted above, at an individual rural property level, a property owner can take advantage of off-the-shelf Wi-Fi technology to extend coverage to other parts of their property. That technology can provide them with internet access or allow them to make voice calls over the internet (VoIP).
- › Iwi or hapū can enter into partnerships with providers or set up their own localised connectivity solutions to meet their needs, or those of their communities.



CASE STUDY

THE OPPORTUNITIES OF ADOPTING NEW TECHNOLOGIES: Green energy for telecommunications infrastructure - WISPs focus

Market players in the telecommunication sector are exploring diverse ways to find long-term energy solutions for their business, which often includes adopting ‘green’ technologies.

Green energy use for wireless broadband

Numerous WISPs have off-grid installations where they cannot get mains power to sites to provide connectivity to an area. WISPs are utilising innovative solutions in such cases, including green energy options.

“Off-grid power solutions account for likely 50-60% of WISP’s network repeater sites throughout New Zealand, large and small. That’s likely to be more than 1500 repeaters nationwide,” says Mike Smith, the Chair of Wireless Internet Service Providers Association.

Solar Panels are widely used by WISPs, and they are trying to adopt new technologies to provide further sustainable power sources, including wind energy generation and lithium battery storage.

A cell tower located approximately 5km from Tai Tapu is providing coverage out to Rolleston, Burnham, Ellesmere and Lincoln. This wireless tower is completely off-grid, using a solar panel as its primary power source. It also runs the latest in lithium battery technology. The owner of the wireless tower, Ultimate Broadband, is also considering deploying a wind generator. This wireless tower provides broadband to nearby farms for automation solutions, such as monitoring water, automating gates, drones, stock trackability and pump operation.



CASE STUDY

THE OPPORTUNITIES OF ADOPTING NEW TECHNOLOGIES: Coverage in remote areas using satellites

Satellite broadband services have been available for many years utilising GEO satellites. GEO satellites orbit over the equator at about 36,000 km. In this position they can travel at the same rate as the Earth's rotation so can appear to remain stationary from below.

New Zealand-based solutions such as those from satellite broadband provider Gravity, have been providing an alternative to terrestrial connectivity solutions for rural and remote locations where terrestrial connection options may be expensive, restrictive or slow.

Ben Monk owns and operates the South Westland Salmon farm and café near Fox Glacier. Frustrated with patchy, slow internet that made things “just about impossible”, the family made the switch from a terrestrial-based wireless service to a satellite service in 2020. “It’s a real lifeline to have good satellite internet,” says Ben. As mobile phone coverage doesn’t reach into the valley, Gravity has set up connections at Ben’s home, his business, his parents’ home, and even at the family whitebait stand, so everyone can keep in touch throughout the day.

Technological advancement and innovation in the satellite and space industries has emerged in the last few years to produce a new generation of LEO satellites capable of providing high-quality broadband services. LEO satellite constellations orbit closer to the surface of the Earth at distances between 250km and 2,000km from the Earth’s surface. This lower orbit significantly reduces the distance to transmit information and therefore the lag between information being sent and received (latency).

Broadband provided by LEO satellites services from international companies such as Starlink are becoming more readily available throughout New Zealand, providing another connectivity option for the most remote parts of the country.

Margie Ruddenklau is a sheep and beef farmer at Hokonui, and Southland district councillor. She has been using LEO-based satellite broadband since July 2021 in her day-to-day life – at her house and on the farm. With this new service, she can dial-in to council meetings and virtual quiz nights with friends, not to mention stream video content. Being online also helps with her day-to-day management on the farm, for example identifying any animal health issues on the spot.



CASE STUDY

THE OPPORTUNITIES SUPPORTED BY CONNECTIVITY INFRASTRUCTURE: Opportunities in IoT

In large cities, IoT is most associated with smart buildings and industry. For the agricultural sector, IoT has the potential to unlock precision farming, enabling efficiencies in monitoring livestock and climate, managing farm systems, fuel distribution, improved data collection for compliance reporting and resource optimisation, and reducing waste and cost.

In Aotearoa New Zealand agriculture is a significant contributor to our GDP. IoT adoption represents an opportunity to increase the efficiency and lift productivity of one of New Zealand’s largest export sectors by managing increasingly expensive resources, helping automate the rebate process for taxes, as well as the monitoring and reporting of water tanks and fertiliser application.

Pāmu Farms partnering to explore ‘smart farming’ applications

Pāmu Farms are a State-Owned Enterprise with a nationwide portfolio of farms that produce milk, beef, lamb, wool, venison, wood and much more. Pāmu Farms are recognised as a leader in farming practices in New Zealand, and around the world.

Pāmu partnered with Vodafone on their Rural Connect project to successfully bring fast and reliable connectivity to 125 Pāmu farms around New Zealand. Pāmu continue to partner with innovative companies, such as Shape Technology, to develop and utilise the latest in IoT solutions.

Using a modular approach to designing low-powered wireless hardware and cloud software, Shape Technology have built end-to-end IoT applications for water metering, off-grid energy systems, industrial manufacturing, environmental monitoring, public asset monitoring, transportation safety systems, crop and animal monitoring systems and operational safety systems. Shape have utilised the latest in remote asset monitoring technologies through partnering with Vodafone to access their terrestrial IoT network, as well as using Swarm Technologies to utilise their LEO IoT satellite constellation for connection in very remote locations.

Combining these technologies with low-powered edge computing and cloud data analytics has allowed Shape to deliver revolutionary ways of keeping an eye on remote but important assets for Pāmu.



CASE STUDY

THE OPPORTUNITIES SUPPORTED BY CONNECTIVITY INFRASTRUCTURE:

Telehealth

Telehealth is the use of information and communication technologies to deliver health care when consumers and care providers are not in the same physical location. It provides people flexibility to access the health care they need and was key to supporting the health needs of many New Zealanders during the peak of the COVID-19 pandemic.

Broadband and mobile connectivity infrastructure is crucial for effective telehealth and other digital health care. Although there is still further work to be done to realise the full benefits of telehealth, improvements in connectivity will enable telehealth services to evolve and better help New Zealanders.

The TeleOra service in Canterbury (see the use case below) is an example of how telehealth services, supported by digital connectivity infrastructure, can complement in-person primary healthcare, and more broadly support people's access to the healthcare system.

Telehealth

Canterbury-based primary health organisation (PHO) Waitaha Primary Health has developed a new telehealth application – TeleOra. The PHO received funding for the project from the Ministry of Health's Digital Enablement Programme.

TeleOra will assist people who have difficulty accessing health care, including Māori and Pacific peoples. It is being built to support practices, other health practitioners and whānau to deliver digital care. It includes, for example, the ability for general practitioners to prescribe medication online and send the prescription to their patient's chosen pharmacy for collection.

Waitaha's Māori health advisor/kaihautū Pari Hunt says telehealth reaches more people, improves the quality of healthcare and reduces costs to patients. "TeleOra provides a health service that is equitable for the local community." He says the telehealth approach showed great promise during the COVID-19 lockdown in 2020, and again when practices contacted people about getting their COVID-19 vaccinations.

"During lockdown we saw a significant increase in Māori and Pasifika using telehealth. It was so convenient; not having to find a park, not having to use the car, not having to wait in the waiting room, not sitting with other sick people, not having to take other younger whānau members if you were a single parent – the benefits go on and on."

"And we saw again how well the approach worked when we rolled out COVID vaccines in Ashburton. One of our kaimahi rang people who were eligible, using a whakawhanaungatanga approach. That was really effective, people were very engaged."

Waitaha chief executive Bill Eschenbach says TeleOra is also supporting clinicians to become more confident in using data and digital technology to improve people's health.

PART 2: Government Statement of Intent 2022

Our Vision for 2032: All people in New Zealand have broadband and voice connectivity networks available to them that meet their life, work and study needs

What would 2032 look like if we reached this vision?

A connected and inclusive community

As articulated in the *Digital Strategy for Aotearoa*, being able to participate digitally is essential for inclusion in modern societies and economies, providing a wealth of opportunities to foster learning, innovation and creativity. Having access to a reliable and secure internet connection or mobile data functionality is a foundational component towards achieving the aims of the Digital Strategy for Aotearoa, particularly the Mahi Ake - Growth and Mahi Tahī - Inclusion themes.

Our vision for 2032 is that all people in New Zealand should have broadband and voice connectivity networks available to them that meet their life, work and study needs.

To realise this vision we need to ensure that people can access reliable, secure connectivity infrastructure that serves the needs of the country. Having access to connectivity networks means that people will have the opportunity to conduct business, learn, adapt, and gain new digital skills throughout their lives.





Connectivity supports learning, connection and wellbeing

We know that access to connectivity supports people to stay connected to whānau and the wider community. Even when living or working alone, people can feel connected and included in the community through being able to talk with whānau, friends, colleagues or other members of society online or on their phones. Digital connectivity supports New Zealanders to readily share information, and digitally access health, education, entertainment and other services they need to live enjoyable, healthy and fulfilling lives.

Connected, innovative rural businesses well positioned to sell to the world

Reaching our vision will mean that access to connectivity networks will enable those working in the primary sector to better meet the expectations of more environmentally aware and ethically conscious consumers and trading partners. The use of remote sensors will better enable smart farming, increasing productivity through more efficient use of resources. Better connectivity will also allow for more efficient tracking and tracing of stock, produce and other products domestically and overseas, thereby assisting with Aotearoa New Zealand's domestic and international climate change commitments, animal welfare requirements, country of origin requirements, and biosecurity measures.

The ability to do more online allows those working in rural areas to make more efficient use of their time by reducing the number and length of trips to make contact with suppliers and customers.

Importantly, the use of online technologies further reduces energy use and greenhouse gas emissions.

Innovative, diverse and competitive businesses

Reaching our 2032 vision will also mean that all businesses and organisations are able to use digital technologies and data to improve productivity, innovate and solve problems no matter where they are in Aotearoa New Zealand. Distance from markets or large centres of population will be much less of a barrier to being competitive when doing business relative to the business landscape of today.

Aotearoa New Zealand's world-class connectivity will enable business and the tech sector to grow and develop a more diverse and exciting range of products, services and intellectual property to sell here and overseas. Increasing sales in the "weightless exports" sector (knowledge, ideas and online software) provide well-paid, fulfilling jobs, less encumbered by the tyranny of distance or concerns of carbon emissions associated with long-distance transportation.

Four priorities support the vision for digital connectivity

Our vision for 2032 is anchored by four priorities. These priorities reflect, and are complementary to, broader priorities and other work programmes across government to ensure Aotearoa New Zealand thrives in the digital era.



Growing the economy through better connectivity

Even before the COVID-19 pandemic, the trend towards an increasing reliance on digital technology to enable businesses to be more productive, innovative, and reach more customers was well underway.

Various local and international studies have demonstrated greater coverage and access to higher speed broadband leads to economic growth, and ultimately growth in a country's GDP. Organisations such as the World Bank have identified that access to internet-based technologies can help workers carry out tasks more efficiently and to a higher standard, while also providing a greater ability to gain exposure to new markets, find new customers, and access a greater volume and quality of information.



Improving the rural connectivity experience for current and future needs

People living in rural and remote areas of Aotearoa New Zealand have significant connectivity needs. The comparative remoteness of rural areas and distance from both neighbours and from the full array of services urban centres enjoy, makes the ability to connect online important.

People in rural areas need to be able to access vital services and carry out activities such as remote learning and access to telehealth services. Improved connectivity will also facilitate the kinds of environmental and provenance reporting that will ensure market premium for our export products. Improving the rural connectivity experience does not mean having the same infrastructure or service performance as urban areas. It means being able to undertake many of the same activities including streaming, teleconferencing, accessing services online, filling in online forms, and uploading and downloading files. Performance similar to that offered at the higher-end of what 4G can provide, could be a sufficient solution for many needs, however it is likely that this could change over time.



Supporting New Zealand's climate change goals

Climate change is a global emergency that goes beyond national borders. It is an issue that requires international cooperation and coordinated solutions at all levels.

To tackle climate change and its negative impacts, world leaders at the UN Climate Change Conference in Paris on 12 December 2015 agreed to substantially reduce global greenhouse gas emissions to limit the global temperature increase in this century to well below 2 degrees Celsius while pursuing efforts to limit the increase even further to 1.5 degrees.

As its contribution, New Zealand has several greenhouse gas emissions reduction targets, including to reduce our net greenhouse gas emissions to below 50 per cent of our 2005 levels by 2030.



New Zealand also has domestic targets of having net zero of all greenhouse gas emissions (other than biologically generated methane) by 2050, and at least a 10 per cent reduction in biologically generated methane emissions (from 2017 levels) by 2030.

Multiple organisations, including the World Bank, World Economic Forum and the Centre for Climate Change and Energy Solutions (C2ES) have reported on ways modern digital connectivity can reduce greenhouse gas emissions. Such means include:

- › Enabling greater use of innovative ‘smart farming’ approaches (such as precision agriculture technology that enables better use of resources such as fertilisers, sensors, better data analytics, and better monitoring and management of animal health, which could enable smaller similarly productive herd sizes)
- › Reducing the number of short journeys taken by carbon-emitting vehicles and increasing the viability of newer, safer and more efficient electric vehicles (potentially including autonomous vehicles, which are likely to be more dependent on 5G-type technologies)
- › Reducing the energy consumption of sending and receiving data, and with it, emissions from non-renewable energy generation sources.



Facilitating a more inclusive Aotearoa New Zealand

In an increasingly digital world, digital inclusion has become essential for participation in our modern society and economy. Being digitally included allows people to connect with friends and whanau, to express their cultural identity, learn, create, and share new ideas, as well as access job and business opportunities, and goods and services.

There are four interdependent elements that are needed for a person (or community) to be digitally included: motivation, access, skills and trust.

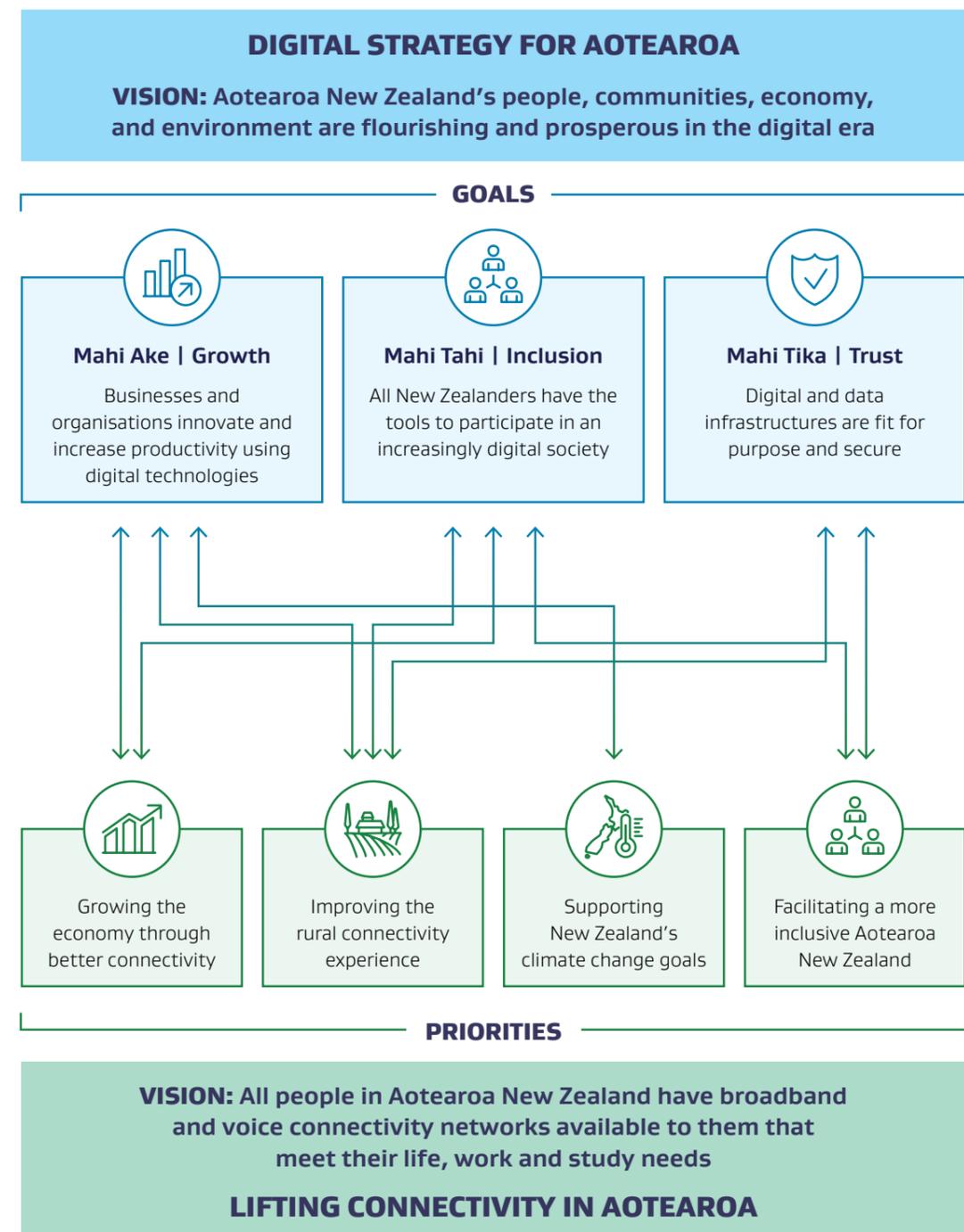
The access component of digital includes suitable connectivity infrastructure being available, so that people and communities can access quality internet and communication services.

The *Digital Inclusion User Insights* report by the Department of Internal Affairs user insight group noted the performance of internet in rural areas was a barrier to economic development and participation in the digital economy. Participants also noted that improved connectivity could also serve as a useful tool to promote Māori culture and wellbeing.

The provision of suitable connectivity infrastructure is the focus of the Statement of Intent in *Lifting Connectivity in Aotearoa*.

How the vision and priorities support the Digital Strategy for Aotearoa

As illustrated below, the vision and priorities associated with the Lifting Connectivity in Aotearoa Strategy correspond to the vision and goals of the Digital Strategy for Aotearoa.



The roles the government will play in supporting the vision

Good connectivity is increasingly important for everyone, no matter where they work, live or study.

Much of the telecommunications connectivity infrastructure that serves Aotearoa New Zealand is owned and operated privately. However, recognising that there are parts of Aotearoa New Zealand that are not economically viable for private operators to provide services to, and there are some functions that only the government can perform, the government envisages having the following roles:

Supporter

Supporting the private sector to provide infrastructure to areas where it would otherwise be uneconomic for the private sector to build, operate and maintain that infrastructure.

Enabler

Enabling involves the government working to help remove barriers to the provision of connectivity infrastructure. This role can include assisting a faster roll-out of new technologies with significant long-term benefits to Aotearoa New Zealand but that involve a level of investment or risk that is beyond the capacity of private network operators to carry.

Educator

Working with others to:

- (a) raise awareness of innovative solutions that can meet the needs of consumers (such as through the proposed Remote Users Scheme); and
- (b) trial technology or approaches to test, understand, or demonstrate its usefulness to Aotearoa New Zealand.

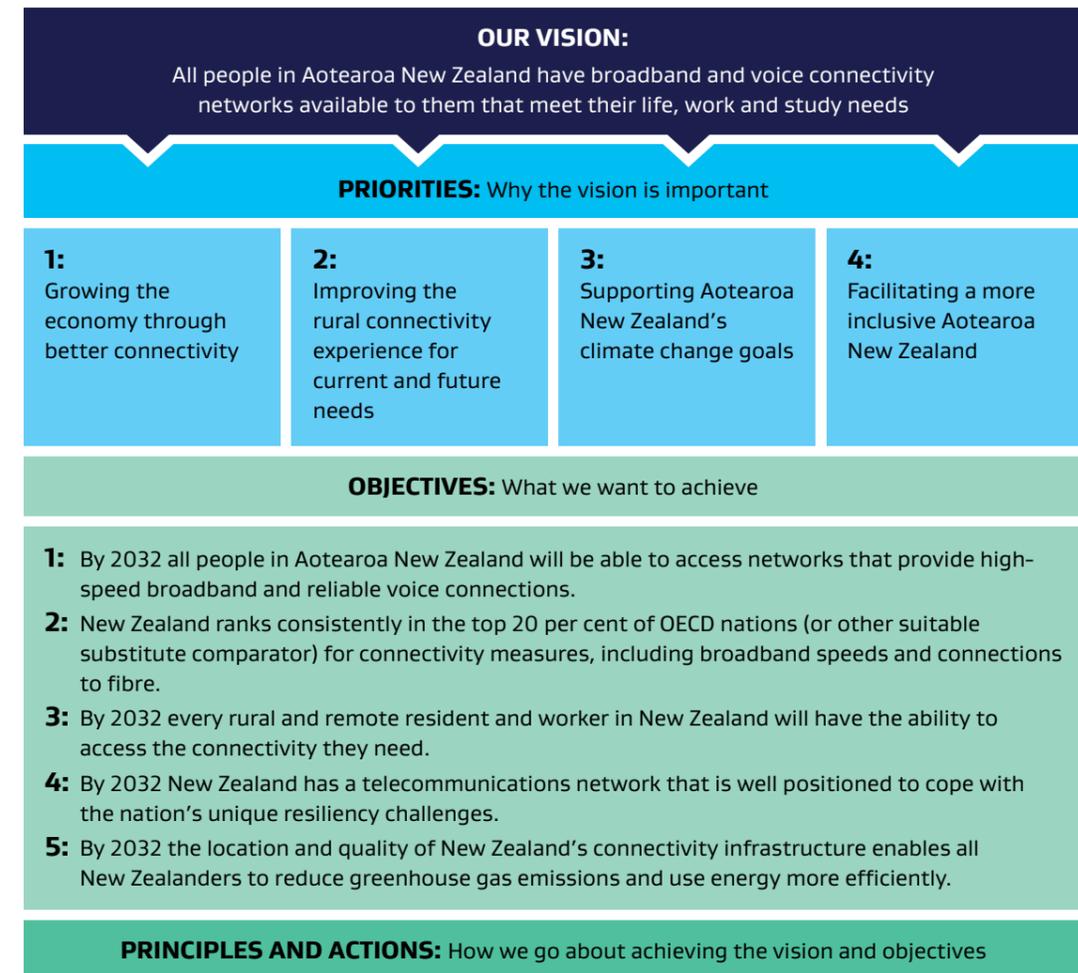
Regulator

Preparing, overseeing and enforcing the laws and regulations necessary for ensuring a well-functioning telecommunications market and to protect consumer interests. The government also has a role to play in reviewing laws, regulations and standards that are no longer fit for purpose and that result in poor outcomes, inefficient processes or unnecessary barriers.

Putting our vision into action

Our overall approach

Our objectives clearly set out what we aim to achieve, the vision sets the future the government wants for Aotearoa New Zealand, and the priorities are the drivers explaining the importance of the vision.



The five objectives



OBJECTIVE A: By 2032 all people in Aotearoa New Zealand will be able to access networks that provide high-speed broadband and reliable voice connections

This objective outlines an ambition for everyone to be able to connect to high-speed broadband where they live, work, study, and where people visit on a regular basis. It is not intended that all New Zealand's territory has network coverage as much of it is unoccupied.

'High-speed broadband' refers to broadband that is, at a minimum, capable of meeting most everyday needs of people, including for streaming, teleconferencing, accessing services online, filling in online forms, and uploading and downloading files.

A reliable voice connection is one that, regardless of mode of delivery, enables all parties on a call to clearly hear each other and does not result in calls dropping out except in unusual or unexpected circumstances.

Other dimensions of connectivity will also be considered, for example the quantity of data available, and the impact of data caps is important in determining what an end user can do with their connection. Latency is also increasingly important, as video calls and real time IoT applications require very low latency in order to be implemented.



OBJECTIVE B: New Zealand ranks consistently in the top 20 of OECD nations (or other suitable substitute comparator) for connectivity measures, including broadband speeds and connections to fibre

This objective helps ensure Aotearoa New Zealand is internationally competitive. Having a high standard of connectivity is important because of our physical distance from the nations we trade with, or compete with for market share. Our performance against this objective will be influenced by the connectivity investment made by other countries, and as countries invest in their networks, rankings may come down to slim margins. However, as noted this objective guides us in striving towards maintaining a standard of connectivity to remain internationally competitive.

The objective currently envisages Aotearoa New Zealand be compared against other OECD nations (as the data sets the OECD uses are more reliable and the nations more comparable than in some other data sets), but flexibility is built in to accommodate better comparisons should they become available.



OBJECTIVE C: By 2032 every rural and remote resident and worker in New Zealand will have the ability to access the connectivity they need

This objective outlines the need for every rural and remote residence or business to have connectivity 'to the gate' that is capable of supporting a wireless extension network. They will be able to utilise this connection to extend coverage to their wider property, which enables them to make voice calls and access the internet to communicate, connect to the IoT or undertake activities online.

This objective recognises that rural communities need access to connectivity so they can benefit from the social, cultural and economic opportunities that broadband access can provide. Connectivity can also support rural communities with health and safety outcomes, including access to emergency services.



OBJECTIVE D: By 2032 New Zealand has a telecommunications network that is well positioned to cope with the nation's unique resiliency challenges

Reliable and resilient telecommunications infrastructure is important to the health and safety of the community, particularly in times of emergency. It reduces the risk of financial loss through disruption and builds the reputation of Aotearoa New Zealand as a good place to do business.

A resilient telecommunications network is one that has a combination of the following attributes appropriate to location, level of risk and cost:

- › an ability to withstand damage (which could include having a diversity of network routes or duplicate assets that can take over in the event of infrastructure becoming inoperable along a key route, or at a key facility)
- › the ability to restore services quickly following an event that results in services being lost or becoming overloaded.



OBJECTIVE E: By 2032 the location and quality of New Zealand's telecommunications infrastructure enables all New Zealanders to reduce greenhouse gas emissions and use energy more efficiently

This objective signals the potential role that connectivity plays in reducing greenhouse gas emissions. The location of broadband and voice telecommunications infrastructure close to where people live, work and study will enable them to take advantage of digital technologies that will help them reduce the greenhouse gas emissions of their activities (such as through smart farming, more efficient use of resources and reducing carbon emissions from vehicles).

More efficient connectivity infrastructure can reduce the energy it takes to send and receive data or operate transmission equipment (and with it any direct or indirect emissions from non-renewable energy generation sources).

Principles to guide future actions and initiatives

The principles below set how the government intends to meet the objectives. These principles will inform any future action plans and initiatives.

1: Enabling rather than funding connectivity in areas where population density is sufficient to support commercial investment and competition

The government may enable, but will not fund, the market to provide and upgrade connectivity infrastructure where the population is of sufficient size to support delivery of that infrastructure on a commercial basis and competition amongst telecommunications providers.

Supports objectives A and B

2: Taking a long-term comprehensive approach to supporting and enabling infrastructure provision

When supporting and enabling improvement to digital connectivity the government will favour approaches that:

- › provide enduring solutions appropriate to the area, including the ability to meet future growth in demand for increased speed and capacity
- › take into account long-term benefits and costs (including wider social, economic, cultural and environmental benefits and costs)
- › improve the long-term resilience of networks
- › support competition and new market entrants, and provide for infrastructure sharing, where appropriate

Supports objectives A, B, C and D

3: Extending fibre for better performance and resilience

The government will support or encourage the extension of fibre, including backhaul, to improve network performance and resilience in areas:

- › not already served by fibre and where customer density and expected demand is sufficient to make fibre a cost-effective long-term solution, and
- › where the commercial viability of fibre backhaul to support various access modes is the best long-term solution but is not commercially viable for the private sector to provide on its own.

Supports objectives A, B and D

4: Assessing technologies based on ability to help lower emissions and improve energy efficiency

When considering support of connectivity projects, the government will favour proposals that can assist network operators and users to:

- › build and operate the most energy-efficient connectivity option appropriate for the project area
- › provide additional capacity for users to adopt innovative technologies and management practices that reduce greenhouse gas emissions and improve production and energy efficiency
- › increase the ability to work and access services remotely or from home.

Supports objectives C and E

What we are doing now (current actions)

Aotearoa New Zealand's connectivity has come a long way, but we recognise that remote and rural New Zealanders are not always able to access the connectivity they need. That is why we need to continue to focus on the next chapter of New Zealand's connectivity story. In addition to existing government programmes, over \$100 million has been allocated in recent years to increase coverage, capacity and resilience of New Zealand's telecommunications network. This will mean more New Zealanders have access to broadband and voice connectivity that meets their life, work and study needs.

Investing in better connectivity for rural New Zealand

- › **Rural Capacity Upgrade Programme:** To provide improved connectivity to rural communities. \$47 million has been allocated towards the first phase of this programme, delivering improved connectivity for up to 47,000 rural homes and businesses, and \$43 million has been allocated to the second phase for up to 26,000 additional rural homes and businesses.

Delivery timeline 2022-2024

Delivering for our most remote New Zealanders

- › **Remote Users Scheme:** There are some New Zealanders who live in remote, hard to reach areas, who cannot access terrestrial connectivity options. \$15 million has been allocated to a new scheme to extend coverage and offer innovative options for households in these areas.

Delivery timeline: 2022-2023

Supporting the roll-out of 5G for the benefit of New Zealanders

- › Long-term rights to the 3.5GHz spectrum are being allocated to support the roll-out of 5G mobile technology to cities and towns across New Zealand.

Delivery time: 2022 onwards



What we will do next (upcoming actions)

Work has begun on developing policies working towards the vision outlined in the Statement of Intent. At a high level these actions will include:

- › supporting the continued deployment of connectivity infrastructure
- › ensuring that regulatory settings underpinning the market support continued network build and competition in order to deliver quality connectivity services to New Zealand.

Details of specific policies and actions will be released as these are developed. Some initial focus areas are outlined below.

1: Setting and reviewing new measures to define 'high speed'

There is no standard definition for 'high-speed' broadband. The government will define 'high speed', in reference to the expected user needs so that the level of New Zealand's connectivity can be tracked and measured over time to ensure we are keeping up with international standards.

2: Supporting enduring local solutions for local needs

While government connectivity programmes and private investment have delivered a good base footprint across Aotearoa New Zealand, we are aware that communities may be best placed to identify their issues and reach solutions suited for their own situations. We will investigate opportunities for the government to continue to support local community initiatives to improve connectivity to meet their needs.

Working together

While the implementation of the Statement of Intent primarily focuses on work led, co-led or commissioned by the government, we will not achieve the vision or its objectives for better broadband and voice connectivity across Aotearoa New Zealand alone. Partnership with others will be essential.

In implementing the Statement of Intent, the government envisages working with:

- › existing and future network operators such as local fibre companies, mobile network operators, and wireless internet service providers
- › iwi, hapū, and other Māori organisations, particularly where issues are best addressed through "by Māori for Māori" approaches and solutions
- › communities, and non-government organisations that have details and knowledge of local needs, and innovative local solutions for how those needs could be best met.

The government also acknowledges the importance of collaborative work across government agencies and Crown entities. The Statement of Intent set out in *Lifting Connectivity in Aotearoa* complements other government initiatives including (but not limited to):

- › the Government's response to Rautaki Hanganga o Aotearoa, the New Zealand Infrastructure Strategy (in particular in relation to recommendation 9) developed by Te Waihanga New Zealand Infrastructure Commission
- › Fit for a Better World – Taiao Ora, Tangata Ora developed by the Ministry for Primary Industries.

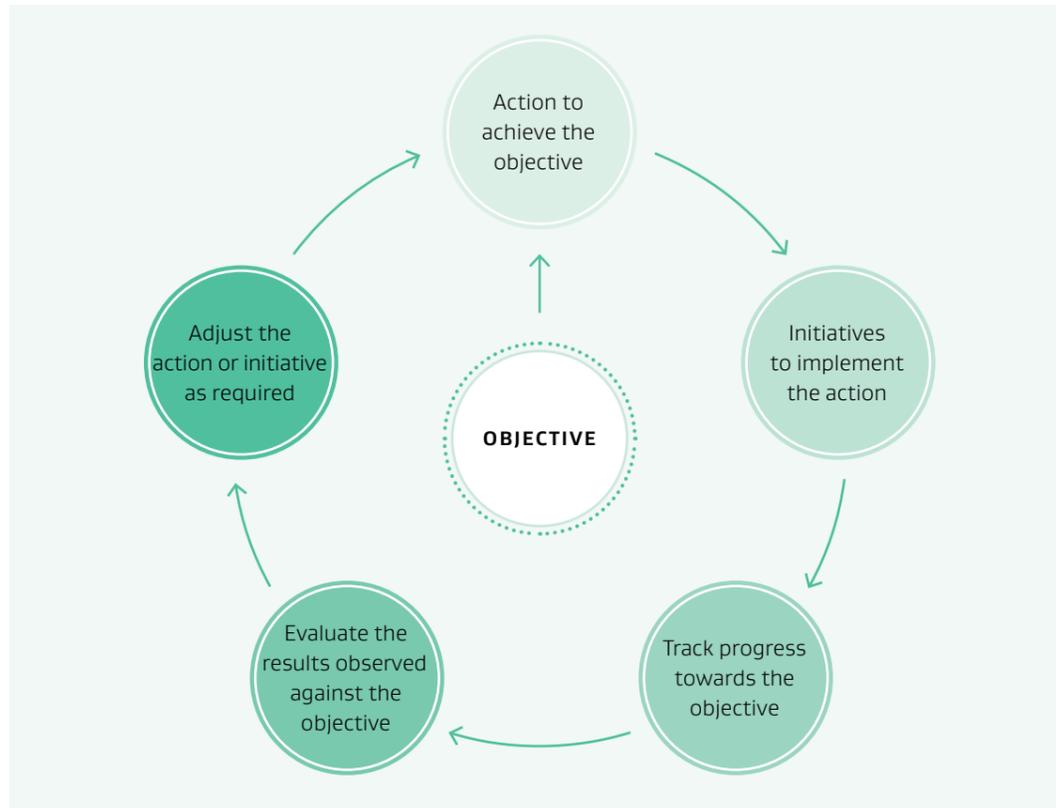
We will also keep abreast of international standards and the advent of new telecommunications technologies to meet international frameworks or goals.

How will we know we have succeeded?

Measuring success

To understand how well we are tracking towards the 2032 vision we need indicators of progress.

Tracking progress against the indicators will allow us to know whether the actions we are taking are having the positive effect we want and, if not, whether adjustments or a different course of action are needed. As shown in the diagram below, such tracking, evaluation and adjustment of settings needs to be seen as part of an ongoing cyclical process that ensures we stay on course to meet the objectives.



The table below sets out the indicators we will use to evaluate progress towards the objectives:

OBJECTIVE	EXAMPLES OF INDICATOR(S)
A By 2032 all people in New Zealand will be able to access networks that provide high speed broadband and reliable voice services	<ul style="list-style-type: none"> › Average broadband speed (in rural and urban areas) › Number of end user locations without broadband access › Number and distribution of end users experiencing network congestion
B New Zealand ranks consistently in the top 20 per cent of OECD nations (or a similar suitable substitute comparator) for connectivity measures, including broadband speeds and connections to fibre	<ul style="list-style-type: none"> › New Zealand's ranking in OECD or other suitable international data sets
C By 2032 every rural and remote resident and worker in New Zealand will have the ability to access the connectivity they need	<ul style="list-style-type: none"> › The proportion of end user locations on broadband and mobile connectivity across New Zealand
D By 2032 New Zealand has a telecommunications network that is well positioned to cope with the nation's unique resiliency challenges	<ul style="list-style-type: none"> › Number, scale and length of network outages, damage reported, and time spent to restore the damage › Compliance with any applicable resiliency standards
E By 2032 the location and quality of New Zealand's telecommunications infrastructure enables all New Zealanders to reduce greenhouse gas emissions and use energy more efficiently	<ul style="list-style-type: none"> › The proportion of areas where people live and work where infrastructure or coverage enables them to access connectivity

The Statement of Intent as a living document

The Statement of Intent will be reviewed in five years

Changes in digital and telecommunications technology, and international and domestic circumstances take place rapidly. It is not uncommon for technology to be superseded within five years.

To ensure it remains relevant to current issues and technology, and therefore useful, the Government Statement of Intent will be reviewed at least within five years.

Earlier reviews if circumstances change rapidly

The Government Statement of Intent may be reviewed in full, or in part, earlier than the five-year review to:

- › respond to emerging issues, opportunities or changes in other circumstances that have significant impacts on connectivity in Aotearoa New Zealand, and thereby require a change to priorities or objectives
- › re-align or adjust actions and initiatives against objectives if the indicators used to measure progress suggest a change of approach is required to meet an objective (or speed up the achievement of the objective)
- › reflect any changes in approach or priorities that may be required as projects or initiatives are completed or objectives met.

Administrative responsibility for *Lifting Connectivity in Aotearoa* sits with the Ministry of Business, Innovation and Employment.
For any questions that you have in relation to this document, please direct them to CommunicationsPolicy@mbie.govt.nz



**MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT**
HĪKINA WHAKATUTUKI

Te Kāwanatanga o Aotearoa
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