STATEMENT OF PERFORMANCE EXPECTATIONS 2019/20

REANNZ

Research and Education Advanced Network New Zealand Limited

Seamlessly connecting New Zealand researchers, innovators and educators to each other and their global community

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REANNZ is the National Research and Education Advanced Network for New Zealand.
Level 5, Qual IT House, 22 The Terrace, Wellington, New Zealand
engagement@reannz.co.nz
www.reannz.co.nz

Statement of responsibility

This Statement of Performance Expectations is submitted by the Board of Directors of Research and Education Advanced Network New Zealand Limited (REANNZ), pursuant to the Crown Entities Act 2004. It sets out the service expectations for REANNZ for the period 1 July 2019 to 30 June 2020.

The REANNZ Board is responsible for the Prospective Financial Statements and Statement of Performance Expectations contained in this document, including the appropriateness of the assumptions underlying them. It is also responsible for internal control systems, which provide reasonable assurance as to the integrity and reliability of financial reporting.

Janine Smith
Chair

David Skinner
Acting Chief Executive

30 June 2019

About REANNZ

REANNZ is New Zealand's internationally designated national research and education network (NREN).

We are a Crown-owned company under Section 4A of the Public Finance Act, and subject to the Companies Act 1993 and the Crown Entities Act 2004.

We provide a specialist high-performance digital network that enables scientists, researchers, innovators and educators to transfer and share big datasets to connect to, collaborate on and contribute to the key issues we face, nationally and internationally.

We service and support 45 member organisations for New Zealand's universities, Crown Research Institutes, institutes of technology, polytechnics, wānanga and the wider education and research sector.

The REANNZ network is designed and built to meet the unique performance demands of science, research and education traffic. It manages the transfer of massive datasets with low latency and zero packet loss. It is a highly secure service and is available on a 24/7/52 basis.

We are a member of the international research and education community, which is made up of over 120 NRENs. Collectively, these national networks have agreed protocols and settings to provide an international research infrastructure, to enable traffic to transit to or through their countries.

Each NREN develops and maintains the cost of their national infrastructure with the understanding and expectation that it will be used by other NRENs. They send and receive traffic between each other, at no cost to other parties.

Today, a dedicated and high-performance specialist research and education network is a signal of a country's commitment to, and value placed on, data-intensive science.

The New Zealand government now requires all applicants for data science research funding to have access to an advanced network that delivers rapid and high-fidelity national and international transfer of data with minimal packet loss, and also enables data-intensive research activity and collaboration with international researchers.

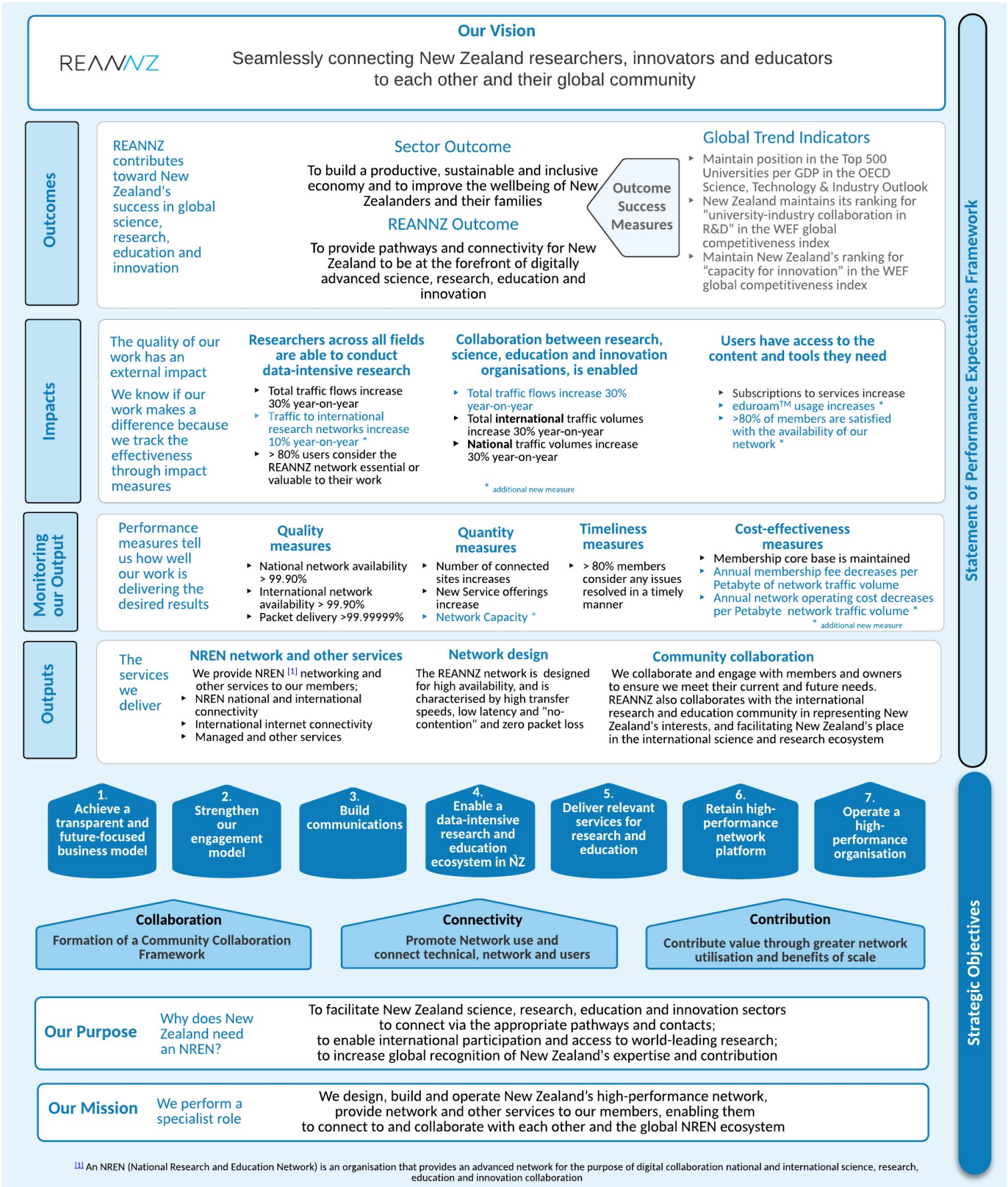
The year ahead – our strategic priorities

Our strategic focus areas – **collaboration, connectivity and contribution** – form the pillars that underpin our strategic priorities for 2019/20 (pages 8 to 10), aimed at achieving the key strategic objectives.

Strategic objectives	We will achieve this through		Our strategic priorities this year
Regain member and shareholder trust and confidence in the value REANNZ provides to the community	Formation of a Community Collaboration Framework (CCF)	Collaboration	Achieve a transparent and future-focused business model ▪ Explain network economics model: platform/product relationships, including marginal and constant cost structure. ▪ Develop, consult and decide on future-focused network development plan. ▪ Align and deploy relevant service structure in collaboration with members.
			Strengthen our engagement model ▪ Create a member representative body to guide strategic investment. ▪ Develop and undertake an engagement framework for consultation on key infrastructure decisions and contract milestones. ▪ Communicate REANNZ's strategic focus, agreed priorities and achievements. ▪ Learn from member survey feedback.
			Build our communications ▪ Increase usage of communication channels with clear messaging on how REANNZ delivers value. ▪ Provide relevant performance reporting of individual member and wider community usage, and the expertise REANNZ provides to enable it.
Enable members to have pathways and connectivity for science, research, education and innovation, for the benefit of New Zealand	Promotion and growth of network use and connectivity of technical community	Connection	Enable a data-intensive research and education ecosystem in NZ ▪ Promote data-sharing practices across research and science end users. ▪ Be an active member participant in the international NREN community, maintaining and improving New Zealand's international reputation as a provider of a specialised, capable and interconnected research and education system. ▪ Provide support and expertise for the government's new eResearch policy development
			Deliver relevant services for research and education ▪ Capture and utilise member feedback regarding development of potential products and services. ▪ Ensure federated identity and access management upgrade and ongoing sustainability, eg, Tuakiri.
Improve REANNZ's future sustainability	Greater network utilisation and scaleability by research, education, innovation and public sectors	Contribution	Retain a high-performance network platform ▪ Review Hawaiki capacity increments to meet demand. ▪ Select international resiliency options in collaboration with members. ▪ Review long-term strategic options in collaboration with members. ▪ Identify business model for long-term international asset ownership.
			Operate a high-performance organisation ▪ Ensure organisation structure is aligned with strategy, and has contemporary people practices in place. ▪ Attract, retain and develop a high-performance, specialist and engaged team. ▪ Continue to improve efficiency and effectiveness of business process and systems through automation, decision-making and monitoring.

Our performance framework

This chart shows the three pillars of our strategic focus areas – collaboration, connectivity and contribution – in relation to the seven strategic priorities for 2019/20, and how the priorities frame our work outputs and measures.



[1] An NREN (National Research and Education Network) is an organisation that provides an advanced network for the purpose of digital collaboration national and international science, research, education and innovation collaboration

The quality of our work in designing and providing a high-performance network and other services, in collaboration with our community, are key to enabling data-intensive science, research, education and innovation, which in turn impacts on the provision of a strong research ecosystem and a growing economy.

Our performance framework shows how we measure and monitor success, and the impact we make.

Outputs

Our network is deliberately architected and managed to deliver high-performance to our members. This means we:

- Design and operate the network backbone to manage and accommodate large but unpredictable bursts in traffic, and, as a result, prevent our network becoming congested.
- Focus on transfer performance, managing network equipment to ensure there is no packet loss (which can arise from congestion or poorly configured network equipment), and minimal latency and jitter (the time taken for a packet of data to get from one point to another and the consistency of that experience). This is essential for both transfer speed and quality – moving data fast and in its entirety.
- Design the network to be resilient and highly available, making it extremely reliable.
- Are part of a global partnership of over 120 NRENs in other countries, which have the same commitment to high performance, allowing our users to collaborate with their peers worldwide as part of a global network and ensuring their connectivity experience is seamless from source to destination.
- Collaborate with our members and:
    - Work closely with them to help ensure that high performance is possible from their front door by managing their access connections and devices.
    - Look to provide other services, not available in the open market, to meet the unique needs of research, education and innovation users and their communities.
    - Engage with them in options for future investment and pricing of services.
- Strive to be a high-performance team, so we can provide our members with quality advice, expertise and technology leadership.

Strategic objectives and major initiatives for 2019/20

We have identified the following seven strategic focus areas for 2019/20, in order to achieve our strategic objectives of regaining member and shareholder trust and confidence, enabling pathways to connect data-intensive science, research, education and innovation, and improving REANNZ's future sustainability.

1. Achieve a transparent and future-focused business model

Purpose

- Ensure the choices for the future development of the REANNZ network and service portfolio are based on sound economic and technical principles that primarily focus on the current and future needs of REANNZ customers and stakeholders.
- Ensure that both principles and strategic choices for REANNZ are transparent to members, shareholders and monitoring agencies in such a way that they provide guidance to REANNZ on their requirements. Transparency does not extend to commercially sensitive pricing information.

Goals

- Identify the marginal and constant cost structure of REANNZ on the basis of Total Service Long Run Incremental Cost principles.
- Develop, share and explain the network economic model, product platforms, product relationships and incremental cost structures of the advanced network.
- Consult and collaborate on the development of future-focused network plans.
- Align and deploy a relevant service structure in collaboration with members.

2. Strengthen our engagement model

Purpose

Serve effectively as a stakeholder (member participant and shareholder) focused organisation, to:

- Meet the unique needs of our community.
- Ensure capability and expertise is adequate to customise solutions.
- Formalise our processes for interfacing with our various stakeholders.
- Build the community by bringing people together across sectors and disciplines to solve research and education challenges.

Goals

Build trust and confidence in REANNZ's capability to deliver value, with the member participant and shareholder stakeholder organisations, and:

- Create a member representative body to guide strategic investment.
- Develop and undertake an engagement framework for consultation on key infrastructure decisions and contract milestones.
- Communicate REANNZ's strategic focus, agreed priorities and achievements to stakeholders.
- Learn from member survey feedback.

3. Build our communications

Purpose
▪ Bolster REANNZ's work in significantly improving trust and confidence, through increased transparency and support of the stakeholder engagement model. ▪ Increase understanding and awareness of REANNZ's role in supporting and enabling data-intensive science, research, education and innovation, both nationally and internationally.
Goals
▪ Increase usage of communication channels with clear messaging on how REANNZ delivers value, and its unique value proposition. ▪ Provide relevant performance reporting of individual member and wider community usage, and of the expertise REANNZ provides to enable this.

4. Enable a data-intensive research and education ecosystem in New Zealand

Purpose
▪ Increase membership and access to major resources, which increases the value of the network as a whole (the network effect) and helps foster a productive research and education community. ▪ Enable members to interact more effectively with each other, and to have access to the tools and resources they need to be successful, whether they are located in New Zealand or internationally.
Goals
▪ Promote data-sharing practices across research and science end users in pursuit of their goals for increased efficiency and connectivity. ▪ Actively participate in the international NREN community, to maintain and improve New Zealand's international reputation in providing a specialised, capable and interconnected science, research, innovation and education system. ▪ Provide support and expertise for the government's new eResearch policy development.

5. Deliver relevant services for research and education

Purpose
▪ Refine our service offerings to deliver increased value and better support to our members' unique and developing needs. ▪ Improve our members' efficiency and productivity in achieving their research and education aspirations.
Goals
Refine services for members by: ▪ Capturing and utilising member feedback regarding development of potential products and services. ▪ Upgrading and improving ongoing sustainability of the federated identity and access management, eg, Tuakiri.

6. Retain a high-performance network platform

Purpose

Ensure our network remains high-performance, reliable and robust to manage the demands of data-intensive science, research, education and innovation traffic, through:

- Collaborative capacity forecasting and management.
- Proactive and pragmatic care and maintenance of the network and its assets.
- Maintenance of expertise in emerging technology trends, particularly the activities of the global research and education network community, ensuring we remain recognised.

Goals

Deliver a world-class NREN service to all participating organisations, and, in particular:

- Review Hawaiki capacity increments to meet demand.
- Select international resiliency options in collaboration with members.
- Review long-term strategic options, in collaboration with members.
- Identify a business model for long-term international asset ownership, taking into account regional opportunities in Asia and Hawaii.

7. Operate with a high-performance organisation

Purpose

Foster a high-performance and evolving organisation, attracting and retaining talent to successfully deliver our services and grow trusting relationships with our members, shareholders and key stakeholders.

Goals

Retain our status as a high-performance organisation, by:

- Ensuring the organisation structure is aligned with strategy, and that contemporary people practices are in place.
- Attracting, retaining and developing a high-performance, specialist and engaged REANNZ team.
- Improving efficiency and effectiveness of business process and systems through automation, decision-making and monitoring.

Assessing our performance

In assessing the success of our work outputs, we measure and monitor:	
Our outcomes	**Outcome success measures** report on global trend indicators and are indicative of REANNZ's contribution towards New Zealand being at the forefront of digitally advanced science, research, education and innovation.
Our impacts	**Impact measures** indicate how effective we have been in enabling: ▪ Collaboration of the world's leading research, science, education and innovation organisations. ▪ User access to the content and tools they need. ▪ Researchers across all fields to conduct data-intensive research.
Our performance	**Performance monitoring** tells us how well our work achieves our outputs: ▪ The provision of NREN network and other services. ▪ A network designed for high availability. ▪ An actively engaged community. and so, we undertake performance monitoring, covering: 1. Quality 2. Quantity 3. Timeliness 4. Cost-effectiveness

1. Outcome success measures

REANNZ is one of many contributors to a high-performance and globally competitive science, research, education and innovation system. For this reason, we track trends using external, publicly available indicators of the performance of New Zealand's science, research, education and innovation system, but we do not forecast specific changes in the trend indicators.

REANNZ outcome	Trend indicators
To provide pathways and connectivity for New Zealand to be at the forefront of digitally advanced science, research, education and innovation.	New Zealand progresses its position in the Top 500 universities per GDP, as shown in the OECD's 'Comparative performance of national science and innovation systems', published in the OECD Science, Technology and Industry Outlook every two years.
	New Zealand maintains its ranking for 'University-Industry collaboration in R&D' in the World Economic Forum global competitiveness index.
	An improvement in New Zealand's ranking for 'capacity for innovation' in the World Economic Forum global competitiveness index.

2. Impact measures and forecasts

Impact 1

Researchers across all fields are able to conduct data-intensive research

A number of science initiatives with large data requirements could not occur without the reach, reliability and speed of an advanced network. Examples include high-performance computing applications such as: climate and geological science facilitated by the National eScience Infrastructure project (NeSI); genomics work with international collaborators; and radio astronomy data analysis related to the international SKA project. All of these involve scientific instruments that generate massive datasets. These datasets need to be transported quickly and accurately from the instruments to hosting or processing centres, and then shared across the world with scientists and researchers. Indications of the amount of data-intensive science occurring are represented by the amount of data transmitted across the network. Increases in the total amount of network traffic indicate more research and education services, applications and collaborations are being conducted and supported.

Total traffic flows increase 30% year-on-year

Researchers across all fields are able to conduct data-intensive research	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Forecast 2019/20
Total annual traffic flow (measured in Petabytes, PB)	***18.17PB***	***27.54PB***	***42.38PB***	***52.98PB***	***69.74PB***	***90.66PB***
Increase on previous year (PB)	+8.3PB	+9.37PB	+14.84PB	+10.60PB	+16.76PB	+20.92PB
Increase on previous year (%)	+84%	+52%	+54%	+25%	+32%	+30%

Our forecast

The forecast of 30% annual growth is in line with maturing research and education networks internationally, which are growing at rates between 20% and 30% per annum.

Total traffic destined for international research and education networks increases 10% year-on-year

Researchers across all fields are able to conduct data-intensive research	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Forecast 2019/20
Total annual traffic flow (measured in Petabytes, PB)	***1.04PB***	***1.11PB***	***1.12PB***	***1.80PB***	***2.03PB***	***2.23PB***
Increase on previous year (PB)	+0.28PB	+0.07PB	+0.01PB	+0.68PB	+0.23PB	+0.20PB
Increase on previous year (%)	+37%	+7%	+1%	+61%	+13%	+10%

The table above shows the increased international traffic transmissions between REANNZ members and the members of global NRENs. International research and education traffic coupled with an understanding of the traffic profile, is indicative of the value of our international NREN partnerships and how they facilitate inter-institutional collaboration. Traffic has doubled from **1.04PB** in 2014/15 to an estimated **2.03PB** in 2018/19, and a further projection to **2.23PB** for 2019/20.

The increase in international research and education traffic is directly related to a number of our members making more use of the research and education services, such as the University of Auckland and NIWA.

Other research and education activity utilises other forms of private-sector research and education services, such as Amazon Web Services or Microsoft Azure, which include activities such as computing, storage and analytics. The increasing use of these services is captured in our total international traffic volumes, shown later in this report.

Our forecast

A vibrant research environment produces and shares more and more data with international collaborators and utilises data and services from global repositories and research platforms. We have forecast 10% growth in traffic volumes in the next year. The target takes into account the 61% exceptional international research traffic growth during 2017/18 (particularly from the CRI sector), followed by more moderate estimations of 13% growth in 2018/19.

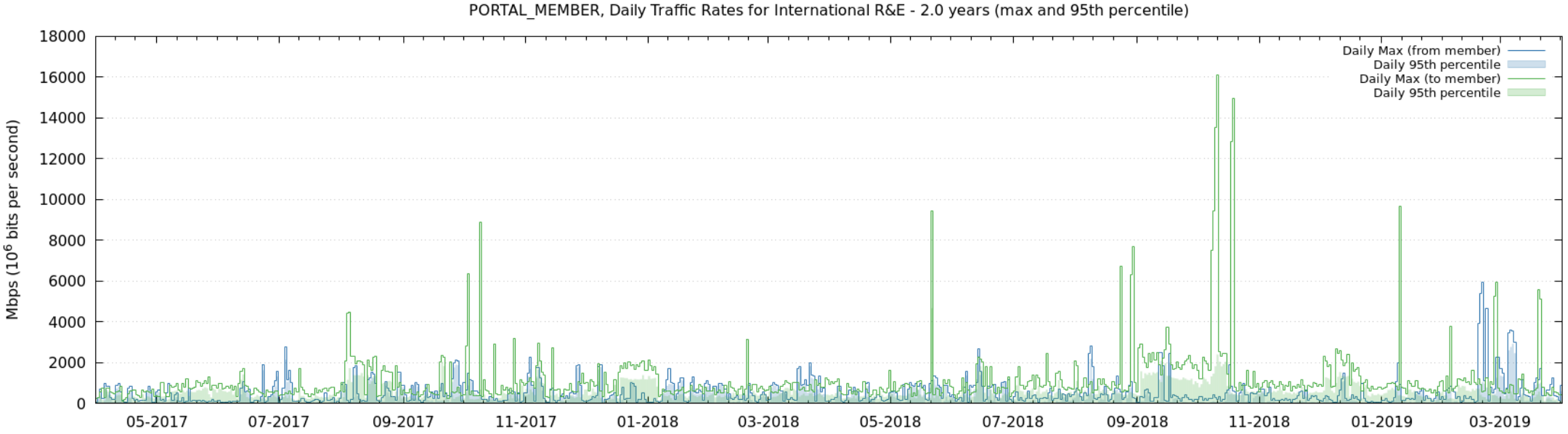
Ongoing growth in research and education traffic growth, is reliant on:

- Drivers that encourage researchers and institutions to undertake data-intensive research programmes with international member participants and/or the use of international research infrastructures.
- The increasing capability of our member organisations, in technology and skills, to support the transfer of data inside their institutions.
- Member investment confidence in data-intensive science and infrastructure on the basis that the long-term future of the REANNZ digital research infrastructure is assured.

The importance of traffic profiles

Total traffic alone does not present the full value of high-performance international connections, because not all traffic is equal. The REANNZ network has performance features that make it possible for large datasets to be transferred over long distances without contention. This means an increasing or decreasing total volume of traffic transferred is not the only representation of the value of the connection. The profile of the traffic being sent is important to fully understand the value and utilisation of this capability – the ability for traffic to be sent all at once is more valuable than the same amount of traffic sent over a longer timeframe.

It is difficult to set performance targets or trends for traffic profiles, so instead we show a trend graph of the traffic profile over time. Below is a graph showing international research traffic from January 2016. The ‘spikes’ are data-intensive research and science activity.


PORTAL_MEMBER, Daily Traffic Rates for International R&E - 2.0 years (max and 95th percentile)
Mbps (10^6 bits per second)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
05-2017
07-2017
09-2017
11-2017
01-2018
03-2018
05-2018
07-2018
09-2018
11-2018
01-2019
03-2019
Daily Max (from member)
Daily 95th percentile
Daily Max (to member)
Daily 95th percentile

More than 80% of users consider the REANNZ network valuable or essential to their work

Researchers across all fields are able to conduct data-intensive research	Actual 2013/14	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Forecast 2019/20
Users consider the REANNZ network essential to their work	69%	74%	80%	81%	N/A	N/A	N/A
Users consider the REANNZ network valuable to their work	25%	25%	16%	13%	N/A	N/A	N/A
Users consider the REANNZ network valuable or essential to their work	N/A	N/A	N/A	N/A	N/A	>80%	>80%

As the capability of our end users to undertake data-driven research increases, and areas that rely on complex datasets or instrumentation also increase, so are the REANNZ services becoming increasingly critical to our users. A growth in the uptake of 'other services' and revenues by members is indicative of how REANNZ services have become more vital to data-intensive research, science, education and innovation.

REANNZ conducts an annual survey and those results show year-on-year increases in survey respondents who say the network is essential to their work. Last year REANNZ did not conduct the survey because of direct work with the Core Member Working Group. However, we expect to maintain our achieved result of over 80% in the coming years.

Impact 2

Collaboration between science, research, education and innovation organisations is enabled

Collaboration takes many forms: it can be as simple as having a conversation over a video conference, or as complex as turning a research project into a commercial product. REANNZ provides the connectivity and tools that enable all types of collaboration, making it easier and more effective.

Up until recent years, the split of traffic into international and national traffic volumes enabled us to understand the impact of our work on domestic and global collaboration. However, over the last two years, to improve response times, international content providers have introduced more and more New Zealand-based content caches. This means New Zealand-cached data, which was previously reported as international traffic, is increasingly being reported as national traffic and year-on-year comparison can no longer be made in the same meaningful way.

For that reason, we are also adding the single impact measure 'total traffic', as an indicator for whether we are enabling collaboration between science, innovative business and educational organisations. The year-on-year increasing levels of traffic flow through our network indicates that national and international member participant collaboration is being enabled.

Total traffic volumes increase 30% year-on-year

Enhanced collaboration	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Forecast 2019/20
Total annual traffic flow (measured in Petabytes, PB)	***18.2PB***	***27.54PB***	***42.38PB***	***52.98PB***	***69.74PB***	***90.66PB***
Increase on previous year (PB)	+8.30PB	+9.37PB	+14.84PB	+10.60PB	+16.76PB	+20.92PB
Increase on previous year (%)	+84%	+52%	+54%	+25%	+32%	+30%

International traffic volumes increase 30% year-on-year

Enhanced collaboration	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Forecast 2019/20
Total annual traffic flow (measured in Petabytes, PB)	***5.83PB***	***10.78PB***	***14.69PB***	***17.12PB***	***16.47PB***	***21.41PB***
Increase on previous year (PB)	+3.43PB	+4.95PB	+3.91PB	+2.43PB	-0.65PB	4.94PB
Increase on previous year (%)	+143%	+85%	+36%	+17%	-4%	+30%

National traffic volumes increase 30% year-on-year

Enhanced collaboration	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Forecast 2019/20
Total annual traffic flow (measured in Petabytes, PB)	***12.34PB***	***16.76PB***	***27.69PB***	***35.86PB***	***53.27PB***	***69.25PB***
Increase on previous year (PB)	+4.87PB	+4.42PB	+10.93PB	+8.17PB	+17.41PB	+15.98PB
Increase on previous year (%)	+65%	+36%	+65%	+30%	+49%	+30%

International traffic growth is estimated to decrease 4% for 2018/19 due to the departure of some core members last year, and the installation of New Zealand content caches, which reduced traffic from major content providers across the international network (and increased national traffic volumes).

National traffic is estimated to increase 49% for 2018/19 as a result of the increased use of the national network by smaller members and the content caches noted above. We have also seen an increase in national traffic from data transfers to and from NIWA's supercomputer and the Measurement Lab nodes hosted by REANNZ for the Commerce Commission for SamKnows[1] testing.

Our forecast

Total traffic is estimated to increase 32% for 2018/19 as a result of the increased use of the national network by smaller members.

Member traffic across the REANNZ network has experienced exceptional growth over the last few years, but annual compound growth rates are normalising at around 30% per annum. For 2019/20 we are forecasting 30% year-on-year growth for total traffic volumes. This is in line with research and education networks globally.

[1] Commerce Commission, 'Measuring New Zealand's broadband performance', https://comcom.govt.nz/regulated-industries/telecommunications/monitoring-the-telecommunications-market/monitoring-new-zealands-broadband.

Impact 3

Users have cost-effective access to the content and tools they need

REANNZ continues to develop services to meet the unique needs of our research and education members in the teaching and learning professions, such as:

- Increased network throughput, leveraging network infrastructure.
- Customised solutions for members when none are available in the market.
- Creation of communal resources, creating economy of scale for our member community.

Today, such services include eduroam, Tuakiri identity and access management, security services, technical advisory services, managed network services, high-quality internet, caching, cloud, and data centre connectivity. These additional service offerings help improve the productivity and capability of our members, leveraging our existing infrastructure and talent and creating a stronger value proposition.

Subscriptions to services increase

Users have cost-effective access to content and tools they need	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Forecast 2019/20
Subscriptions to services increase	+75%	+51%	+26%	+10%	+10%	+10%
Number of subscriptions	93	140	177	194	214	235

This measure demonstrates REANNZ's ability to deliver services that are relevant and cost-effective to our members. It compares the number of members subscribed to REANNZ services at the start of the year, with the number of members subscribed to REANNZ services at the end of the year.

eduroam usage increases

eduroam is a service that allows member participants to automatically join the wi-fi networks of any other participating institution, anywhere in the world. Use of this service is another indicator of the quantity of services provided and their value to both our members and visitors to New Zealand from within the global research and education community.

Users have access to content and tools they need	Actual 2016/17	Actual 2017/18	Estimate 2018/19*	Forecast 2019/20
Total visitors – number of device connections in New Zealand made via eduroam	44,536	52,450	61,884	71,884
Total visitors – number of different institutions the visitors came from	1,906	2,122	2,426	2,676
Overseas visitors – number of device connections in New Zealand made via eduroam	31,248	33,766	34,940	37,440
Overseas visitors – number of different countries the visitors came from	62	65	72	75
New Zealand travellers – number of device connections made via eduroam by New Zealand users at other sites in New Zealand or overseas	36,168	52,991	65,719	81,719

* based on 327 days partial-year data, extrapolated to 365 days

Member satisfaction with level of network availability

Users have access to content and tools they need	Estimate 2018/19	Forecast 2019/20
Member satisfaction with level of network availability	> 80%	> 80%

Network availability is vital to the ability of the REANNZ network to carry big bursts of data, as and when required. For packets to flow without loss, our network is designed with a significantly higher level of 'headroom' than a commercial network. For 2019/20 we have introduced a **new measure**, whereby >80% of members are satisfied with the availability of our network.

3. Performance measures – monitoring our output

Output measures: Quality

National network availability > 99.90%

	Actual 2013/14	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Target 2019/20
National network availability (12-month rolling average)	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.90%

International network availability > 99.90%

	Actual 2013/14	Actual 2014/15	Actual 2015/16	Actual 2016/17	Estimate 2017/18	Estimate 2018/19	Target 2019/20
International internet – Australia (12-month rolling average)	99.93%	100.00%	100.00%	100.00%	100.00%	100.00%	99.90%
International internet – US (12-month rolling average)	N/A	N/A	N/A	N/A	N/A	100.00%	99.90%
NREN – Australia (12-month rolling average)	99.93%	100.00%	100.00%	100.00%	100.00%	100.00%	99.90%
NREN – US (12-month rolling average)	N/A	N/A	N/A	N/A	N/A	99.99%	99.90%

National and international network availability measures the reliability of the network. Network downtime includes faults and other connectivity or hardware outages, but excludes planned maintenance outages. The standard for research and education networks internationally is 99.90% network availability. Our goal is to maintain this high level of reliability. REANNZ aims for network reliability to be as high as reasonably possible, given the need to balance the costs associated with each magnitude increase in network reliability.

Packet delivery ratio 99.99999%

	Estimate 2018/19	Target 2019/20
Packet delivery ratio	Greater than 99.99999986% (fewer than 1.4 packets sent per 1,000,000,000)	Greater than 99.99999% (1 packet lost per 10,000,000 sent)

Poorly tuned networks that experience hardware or software faults or network congestion will drop packets – this is referred to as 'packet loss'. Our community, who globally collaborate and participate in research, science, education and innovation, cannot accept packet loss. If they did, the time taken to transmit large datasets would extend from hours or days into weeks and months. The worst case scenario would be if the datasets couldn't be sent at all and the members simply couldn't collaborate.

REANNZ focuses on operating a 'packet loss-less' network. This is because we actively measure packets sent, and if packet loss is found it is minimised or eliminated. Some packet loss (errors) can occur while we're fixing a network segment, but because of our resilient design, traffic will have been diverted to the other side and therefore most packet loss does not impact our community; the majority of the time, our network is without packet loss.

As an example of the impact of packet loss, a 100TB dataset transferred over a dedicated 10Gbps connection with 0% packet loss takes one day to transfer. If it suffered only 0.002% packet loss, the transfer could stretch out to 215 days, which would be catastrophic for a researcher.

This is why packet delivery is a key performance indicator of network quality, and a defining feature of all research and education networks around the world.

We know each additional decimal place has an exponentially positive impact on the ability for data-intensive work to be done and that packet delivery is very important to our community. This is why we have set our packet delivery targets even higher this year, at 99.99999%.

Our target far exceeds those of regular telecommunications providers, who typically offer wholesale ethernet packet delivery targets at 99.90%.

Output measures: Quantity

The capacity of member connections is a calculation based on the number of member connections and their size.
REANNZ has upgraded the national network capacity to 100Gbps during 2018/19, which also enables members to increase the size of their connections even further, to 100Gbps.

Capacity of connected sites has increased over the last financial year as: we continue to implement second connections to our network for resilience; our members increase the size of their connections to meet increasing demand; and new members connect new sites to the network. REANNZ is working with members to develop relevant service offerings. Next year we will be introducing a light Managed Access and Edge service. We also continue to work on improving existing services, such as Tuakiri and eduroam. Our service portfolio is driven by the needs of our members.

Capacity of connected sites increases

Network scale and reach (capacity of member connections)	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Target 2019/20
Year-on-year capacity growth	+66%	+6%	21%	10%
Total traffic capacity	1,075Gbps	1,137Gbps	1,377Gbps	1,515Gbps

Network capacity (speed) increases

Network capacity	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Target 2019/20
Core national backbone capacity (speed)	10Gbps	20Gbps	100Gbps	100Gbps
Core international network capacity (speed)	26Gbps	34Gbps	54Gbps	60Gbps

Services offerings increase

New services added	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Target 2019/20
Service offerings increase	Data Centre Connect services to members	One security service added	Cloud Connect services added	100Gb Managed Access and Edge added	One new service added

Output measures: Timeliness

More than 80% members consider any issues resolved in a timely manner

Member survey of helpdesk users	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Target 2019/20
Users consider reported issues to be resolved in a timely manner	100%	100%	97%	N/A	80%	80%

The speed at which we identify and resolve faults and other network performance issues is not only a measure of the quality of our customer service, but also a measure of the timeliness of our network management activity. We actively manage the network to identify issues before they affect our members, and proactively advise of issues rather than simply being reactive to member calls.

As well as this, the REANNZ helpdesk logs incident reports from users. Although we have target resolution times agreed with our suppliers and can, in most cases, resolve issues ourselves, the true test of our timeliness is our members' opinion of our responsiveness to their challenges.

Our target of 80% of responses resolved in a timely manner represents an appropriate balance between responsiveness and the cost of resourcing to increase responsiveness. Falling below this target would indicate that we had not adequately resourced the helpdesk facility.

Output measures: Cost-effectiveness

REANNZ maintains its core membership base

The cost-effectiveness of the REANNZ network for our members is best demonstrated by our membership base and growing overall membership. If we are not cost-effective in providing valuable networking solutions or able to obtain funding to support our specialist network services at a level that keeps prices affordable for members, our members will make choices about their participation in data-intensive research and membership of REANNZ.

Cost-effectiveness for members	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Forecast 2019/20
REANNZ maintains its core membership base	8/8 universities 7/7 CRIs 1/1 ATI 12/18 ITPs 1/3 wānanga	8/8 universities 7/7 CRIs 1/1 ATI 12/15 ITPs 1/3 wānanga	8/8 universities 7/7 CRIs 1/1 ATI 12/16 ITPs 1/3 wānanga	5/8 universities 7/7 CRIs 1/1 ATI 8/16 ITPs 1/3 wānanga	8/8 universities 7/7 CRIs 1/1 ATI 8/16 ITPs 1/3 wānanga	8/8 universities 7/7 CRIs 1/1 ATI 8/16 ITPs 1/3 wānanga
Total members	37	42	44	38	45	45

REANNZ addresses a niche market that commercial networks cannot: the provisioning of the unique services that meet the needs of science, research and education. Comparisons of cost with commercial telecommunications providers are misleading, as not only is our network designed to support time-sensitive and bursty traffic flows globally, but the network has other performance attributes, such as very low packet loss thresholds and low latency and jitter, which commercial networks are not designed to support.

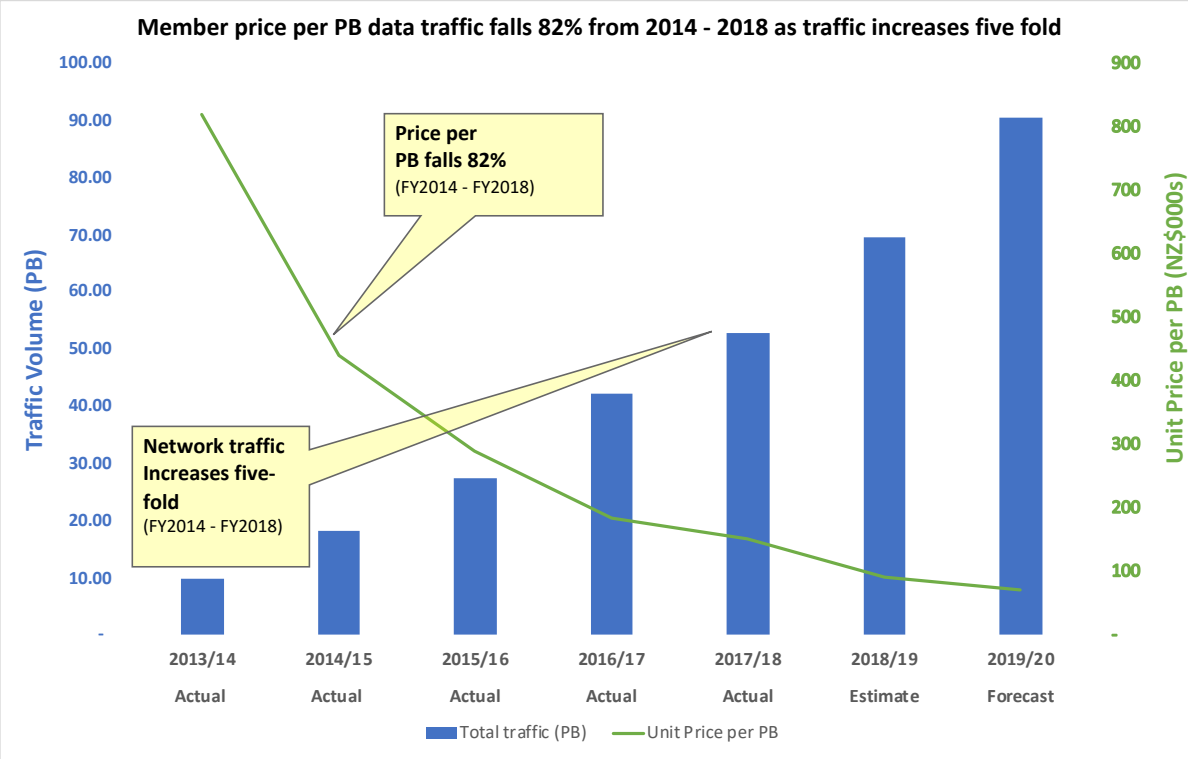
We have forecast a stable membership base during 2019/20, because of the strategic focus on regaining and building the trust and confidence of our core members.

New measure: Annual year-on-year decrease in membership fee per Petabyte of network traffic volume

This new measure shows the cost-effectiveness of the REANNZ services, in terms of the unit membership price per Petabyte of traffic sent each year.

The following graph shows a constant annual membership fee of NZ$8 million between 2013 and 2018, and that traffic in Petabytes for the same period increased five-fold, from **9PB per annum to 53PB per annum**. Member fees have been reduced to an average of NZ$6.4 million over 2019 and 2020, whilst traffic forecasts continue to grow. On average, prices per Petabyte of traffic fell 30% per annum from 2014 to 2019, a total reduction of 284%.

Unit price reduction	Actual 2013/14	Actual 2014/15	Actual 2015/16	Actual 2016/17	Actual 2017/18	Estimate 2018/19	Target 2019/20
Total traffic (measured in Petabytes, PB)	9.87PB	18.17PB	27.54PB	42.38PB	52.98PB	69.74PB	90.66PB
Annual membership fee (NZ$)	$8.1M	$8.0M	$8.1M	$7.9M	$8.0M	$6.3M	$6.5M
Unit price per PB (NZ$)	**$0.82M**	**$0.44M**	**$0.29M**	**$0.183M**	**$0.18M**	**$0.09M**	**$0.07M**
% year-on-year price reduction	**N/A**	**-46.4%**	**-33.4%**	**-36.8%**	**-18.4%**	**-39.9%**	**-20.8%**



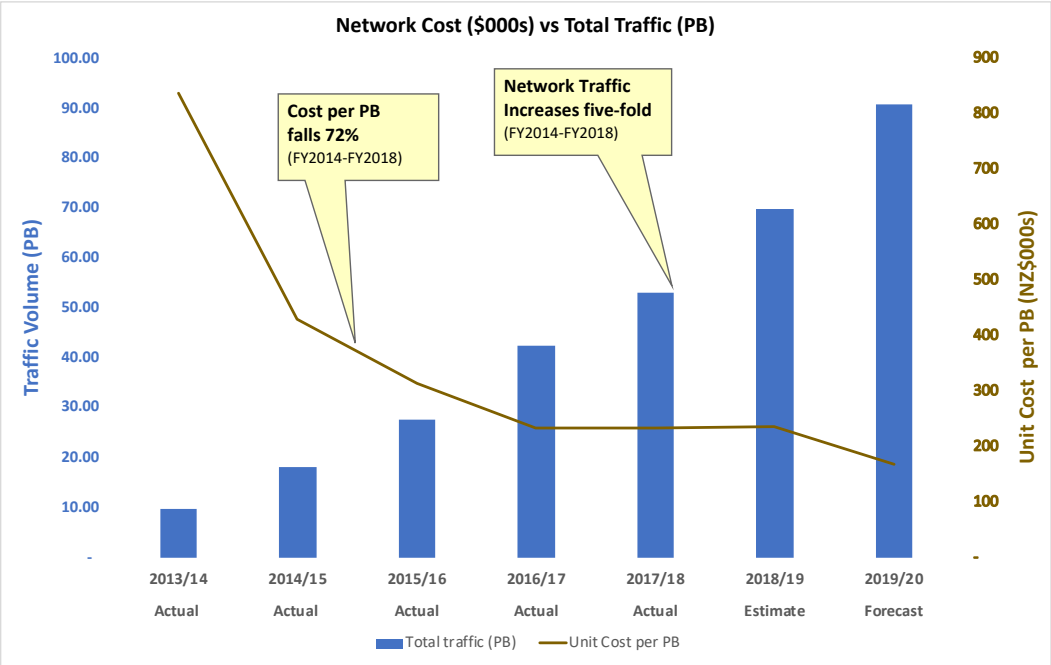
During the five years between 2013 and 2018

- Member fees remained constant at NZ$8 million.
- Network traffic increased five-fold from 9PB to 53PB per annum.
- Price per Petabyte fell on average 34% per annum – a total of 82%.

New measure: Annual year-on-year decrease in network operating cost per Petabyte of network traffic volume

This second new measure shows the cost-effectiveness of the REANNZ operations in terms of the cost of providing network services per Petabyte of traffic sent each year. Through design and increasing network scale, REANNZ has effectively reduced network operating costs by 72% per Petabyte of traffic between 2013 and 2018.

Cost-effectiveness for members	**Actual 2013/14**	**Actual 2014/15**	**Actual 2015/16**	**Actual 2016/17**	**Actual 2017/18**	**Estimate 2018/19**	**Target 2019/20**
Total traffic (measured in Petabytes, PB)	9.87PB	18.17PB	27.54PB	42.38PB	52.98PB	69.74PB	90.66PB
Total network operating costs (NZ$)	$8.3M	$7.8M	$8.7M	$9.9M	$12.4M	$16.4M	$15.3M
Network cost of REANNZ services per PB of network traffic carried (NZ$)	$0.84M	$0.43M	$0.31M	$0.23M	$0.23M	$0.23M	$0.20M
% unit cost per PB annual reduction	**N/A**	**-48.8%**	**-26.7%**	**-25.5%**	**0.2%**	**0.2%**	**-28.9%**



During the five years between 2013 and 2018:

- Network operating costs increased 1.5 times.
- Network traffic increased five-fold from 9PB to 53PB per annum.
- Network operating costs per Petabyte fell on average 25% per annum – a total of 72%.

The rate of decline of unit cost per Petabyte slows during 2018 due to the cost of increased international capacity and core network refresh, and in 2019 due to the cost of the international connectivity crossover.

Expected revenues and proposed expenses

Output: The advanced research, education and innovation network and related services

For the year ending 30 June 2020	$ 000
Revenues	
Strategic Science Investment Fund grant	3,000
Network revenue	6,320
Other revenue	5,650
Total Revenue	**14,970**
Expenses	
Amortisation and depreciation	2,592
Network expenses	12,743
Operating expenses	4,164
Total Expenditure	**19,499**
Surplus / (Deficit)	**(4,529)**

Prospective Financial Statements
Statement of significant assumptions

This Statement of Performance Expectations reflects projected network revenues based on current committed membership and fee structures, and projected expenditure based on contractual supply arrangements in place and conservative provisions for uncertain costs of likely events.

REANNZ forecasts an equity position at 30 June 2020 of $47M, which includes $35M of accumulated surpluses from prior years. Included in the accumulated surplus is the net revenue recognition of the Crown grant for the Hawaiki initial fee. The revenue received from the grant $15M is fully recognised in accumulated surpluses but the amortisation of payment to Hawaiki is recognised over a longer period of 25 years.

In this budget for 2019/20, and for two more years until 2021/22, the fees from core members are set at lower levels than prior years as agreed with our members.

As stated in the strategic objectives on pages 8 to 10, REANNZ has initiated a process to fully engage with stakeholders on the future network design and investment options for a future strategic funding model and ensuing investment decisions during the three years from 2019 to 2022.

During this period, which leads up to the 2022/23 major national network refresh upgrade, REANNZ is projecting net cash applied to operations to be $1.8M. The operating deficit $1.8M and capital expenditure will be funded from reserves, held in short-term bank deposits.

It is expected that REANNZ will continue to operate in a deficit position until a strategic funding model is agreed.

Budget 2019 $000		Budget 2020 $000
14,025	Operating Revenue	14,544
(16,111)	Less: Expenses	(15,770)
(2,086)	**EBITDA and Other Unusual Items**	**(1,226)**
	Non-Cash Items	
	Depreciation and amortisation	
(2,463)	Depreciation	(2,591)
(750)	Amortisation of Hawaiki cable prepaid initial fee	(774)
3,000	**International cable grant recognition**	-
	Cash Items	
541	**Interest income**	427
	Other unusual items (one-off)	
(4,386)	International connectivity crossover costs	(365)
(6,144)	**Net Surplus / (Loss)**	**(4,529)**

Expenditure highlights

REANNZ owns and operates network infrastructure to deliver its high-performance network services. As with most infrastructure-based businesses, REANNZ operates on medium- to long-term infrastructure investment cycles, and historically REANNZ has saved in advance to fund infrastructure investment from reserves. REANNZ currently remains mandated to save in advance for infrastructure investment.

REANNZ is an anchor tenant on the new Hawaiki submarine cable system. This government initiative supports the government's policy objective of encouraging an alternative international cable to New Zealand for the purpose of telecommunications market competition, and in support of this goal a Crown grant of $15M was provided from Vote Communications for the initial capacity lease fee. REANNZ will also commit its own operational budgets over the term of the contract, to ensure the service meets REANNZ's growing international capacity needs over the long term, at lower unit prices. The additional operating cost of the Hawaiki cable will be offset from cost savings of the current international connectivity supply contract with AARNet, which ends in July 2019.

The $15M grant received from the government was recognised as revenue in the period it was received, and the payment to Hawaiki, including US taxes and duties of $19M, will be amortised over the contract's 25-year term, incurring additional non-cash $0.8M amortisation expenses.

Infrastructure investment highlights

- Planned national network investment: During 2017/18, REANNZ responded to growth in network demand usage and commenced 100Gbps upgrades to the national backbone capacity on some segments. The planned upgrade is expected to be completed during 2019/20. The new infrastructure assets have useful lives of between five and seven years.
- Planned international network investment: None budgeted for 2019/20.
- Unspent 2018/19 planned international network investment has not been carried forward due to uncertainty surrounding the resiliency solutions. REANNZ will engage in a collaboration with members to determine the level of international resiliency required and, until then, investment requirements cannot be reasonably estimated.
- Regional network assets refresh: During 2019/20 allowances have been forecast for a regional asset replacement, as they reach end-of-life. Some of the allowance is deferred expenditure from 2018/19. Provision has also been made for smaller capacity upgrades and server infrastructure replacement, which is essential for network management. Any further deferment of upgrades will put the equipment performance at risk.
- Managed and other services investment is based on equipment requirements from the forecast revenue pipeline. Expenditure will vary based on actual services uptake.
- Planning work will begin on the replacement of the national network, anticipated for 2022/23 as contracts expire and assets reach end-of-life. This major investment is outside the projection shown in this plan.

Comparison of total budget costs 2020 ($19.5M) to total actual costs 2018 ($16.4M)

This plan for 2019/20 shows total operating costs of $19.5M, which are lower than the 2019 forecast total costs of $20.5M. However, as presented, the total budget costs are $3.1M more than 2017/18 at $16.4M. Costs in 2018/19 were higher than the $4.5M planned crossover cost of the two international cable systems.

The reasons why this budget is projecting a $3.1M increase in total costs compared to 2017/18 are:

1. **$1.1M international network costs**

   REANNZ had no discretion on the migration from the previous international network provider to the Hawaiki network, because it was a government-backed initiative. Therefore it has no discretion on the nature of costs incurred, except to the level it can secure benefits from procurement processes. Given that, the direct Hawaiki connectivity costs and other costs for peering, circuits and backhaul, and an allowance for resiliency, meant the total costs of international connectivity with Hawaiki was on par with the annual fees from the previous provider. However, the benefit of Hawaiki is the increase in bandwidth capacity at no extra cost over the 25-year term.

   The reason this year's budget has not returned back to match costs from the prior international provider in 2017/18 is:

   - International cable crossover costs, that fall into 2019/20.
   - Provision for burst capacity on the interim resiliency solution agreed by members in March 2019. The actual burst costs only occur if there is an undersea cable network failure, and so the costs are based on actual need.

2. **$0.5M national core network costs**

   - Telecommunication development levy paid in 2017/18, and not levied going forward.
   - Provision for options on renewal of supply contract pricing.
   - Provision for increase in depreciation from planned regional upgrades.
   - Increase in maintenance support and PoP housing costs.

3. **$0.7M new optional services in managed and other services**

   - From direct cost of sales of new member optional services in managed and other services, projected from the sales pipeline. Costs of new optional services are not cross-subsidised from membership revenues, and expenditure will vary based on actual services uptake.

4. **$0.7M other expenses**

   - Rent, insurance and office-related expenses.
   - Full-year impact of extended Board.
   - Provision for legal, procurement and other external advisors.
   - Provision for external costs for deferred project and systems upgrades.
   - Provision for costs associated with additional travel and engagement activity.

There is no budgeted increase in personnel costs when compared to 2017/18 actual costs.

The 2019/20 budget cost increases show committed costs as well as provisional costs.

There is a degree of provision for possible events in these budgets. For example, the $0.72M burst capacity backup cost is not activated unless there is a Hawaiki network failure. Our approach is to provision for costs in case they occur. This is the major driver of the difference between forecast and actual network costs over the last few years, and will probably occur again this year.

REANNZ will continue to do all it can to reduce the levels of actual costs incurred.

Network expenses

The 2019/20 budget of $15.1M for network expenses is 23% lower than the 2018/19 budget of $18.7M, and 8% lower than the 2018/19 forecast of $16.4M.

- During 2018/19, REANNZ made significant savings in network expenses through the later timing of the Hawaiki cable, but also from lower international PoP establishment costs, a refund of the telecommunication development levy (after a favourable court ruling on eligibility), and equipment maintenance savings.
- The Hawaiki submarine cable system impact on costs:
    1. REANNZ will show cost savings of $4.1M from the non-recurring Hawaiki/AARNet international capacity crossover costs in 2018/19. The full-year $4.5M saving is offset with $0.365M crossover costs that fall into 2019/20.
    2. Under the Hawaiki capacity lease agreement, REANNZ must implement a separate resiliency solution, which has been flagged in our 10-year projections and raised with stakeholders since 2015. In this budget we have shown the interim international internet resiliency solution, including an allowance for burst capacity that was agreed in 2019 with members. The final resiliency solution is yet to be determined and will require a full collaboration with the membership community.
    3. Other costs of the Hawaiki cable are lower than the annual cost of the current AARNet cable. Those costs include the annual capacity lease paid to Hawaiki, a third-party backhaul service from Mangawhai, annual non-cash amortisation of $0.8M of the Hawaiki establishment cost, international PoPs in the US and Australia, and NREN peering and equipment costs.
    4. Under the contract, REANNZ is granted incremental increases in capacity without any increase in the annual capacity fee
- The 2019/20 network costs show a provision for cost of sales from new value-added optional services to members, predominately in the Managed Access and Edge services portfolio.
- The 2019/20 budget for network employment expenses of $2.5M is on par with the 2018/19 budget, and the 8% savings made during 2018/19 are budgeted to be incurred in the cost of backfilling vacant roles that have been on hold for most of 2018/19. It is anticipated that backfilled roles will be filled during 2020 as and when deferred projects are prioritised.

Operating expenses

The 2019/20 budget for other operating expenses is 16% lower than the 2018/19 budget, and 4% more than the 2018/19 forecast because of some deferred expenses that will be incurred in 2019/20.

- The 2019/20 employment expenses budget of $1.9M is 23% lower than the 2018/19 budget of $2.3M, and 14% less than the 2018/19 forecast of $2.2M. There are net personnel savings from positions that were disestablished during 2018/19. We are progressing to a new flatter structure, which put in place a Senior Leadership Team of all Team Leaders, and removed the prior executive layer. This structural change will have a net saving impact into the next period.
- The 2019/20 travel expenses budget of $0.3M is 18% lower than the 2018/19 budget of $0.4M, and 20% more than the 2018/19 forecast of $0.2M, but we are not expected to repeat the same level of travel cost deferment as in 2018/19 because the strategy to increase community engagement will incur travel. There will be some increase in year-on-year international travel as our new Chief Executive participates in the global NREN community and due to conference travel being on hold during the time a new permanent Chief Executive was being appointed. We still expect savings from lower level inter-office travel (from fewer staff and the establishment of the Auckland office).

- The 2019/20 professional services budget of $1M is 19% lower than the 2018/19 budget of $1.2M, but 19% more than the 2018/19 forecast of $0.8M as deferred expenses from upgrades on hold are expected to be incurred in 2019/20. Professional services (legal and procurement) cost savings in 2018/19 were due to timing delays with core member revenue contracts and the Hawaiki resiliency options. We will not be able to repeat the same level of savings into 2019/20 as there will be legal or other professional service costs from the international resiliency solution and other major contract renewals. During 2018/19, we deferred business system upgrade work after our in-house business systems personnel left during the year and were not replaced. There is budget for deferred system upgrades and external consultancy to support the work from the Strategic Account Management initiative, which is aimed at improving REANNZ engagement with its members.

Prospective Financial Statements

Research and Education Advanced Network New Zealand Limited

Prospective Statement of Comprehensive Revenue and Expense
For the Year Ending 30 June

Budget 2019	Forecast 2019		Budget 2020
$000	$000		$000
		Revenue	
		Grant revenue	
3,000	3,000	Strategic Science Investment Fund grant	3,000
3,000	3,000	MBIE grant for Hawaiki	-
		Network revenue	
6,441	6,250	Membership fees	6,320
4,584	4,478	Other revenue	5,224
541	580	Interest revenue	427
17,566	**17,309**	**Total Revenue**	**14,970**
		Network Expenses	
2,239	2,212	Depreciation and amortisation*	2,413
2,550	2,381	Employment expenses	2,577
13,871	11,801	Network operating expenses	10,167
18,660	**16,393**	**Total Network Expenses**	**15,157**
-1,094	**915**	**Gross Surplus / (Loss)**	**(187)**
		Less:	
		Other Expenses	
35	35	Audit	35
224	195	Depreciation and amortisation	178
129	201	Directors fees	193
2,319	2,160	Employment expenses	1,888
1,204	824	Other operating expenses	1,015
518	237	Professional services	441
258	252	Operating leases	285
363	245	Travel expenses	308
5,050	**4,149**	**Total Operating Expenses**	**4,342**
(6,144)	**(3,233)**	**Surplus / (Deficit) excluding gains / (losses)**	**(4,529)**
	44	Foreign currency gains / (losses)	-
(6,144)	**(3,189)**	**Surplus / (Deficit)**	**(4,529)**
-	-	Other comprehensive revenue	-
(6,144)	**(3,189)**	**Total Comprehensive Revenue and Expense**	**(4,529)**

(9,144)	**(6,189)**	**Total Comprehensive Revenue and Expense excluding MBIE grant for Hawaiki**	**(4,529)**

*Excludes amortisation of prepaid expenses including Hawaiki initial fee of $0.8M pa

Research and Education Advanced Network New Zealand Limited

Prospective Statement of Financial Position
For the Year Ending 30 June

Forecast 2019		Budget 2020
$000		$000
	ASSETS	
	Current Assets	
3,065	Cash and cash equivalents	3,955
2,833	Receivables and debtors	2,903
18,500	Investments	14,000
42	Derivative financial instruments	11
556	Prepayments	394
1,079	Prepaid network expenses	998
26,075	**Total Current Assets**	**22,261**
	Non-Current Assets	
11,313	Property, plant and equipment	10,446
3	Intangible assets	-
11	Derivative financial instruments	-
18,084	Prepaid network expenses	17,285
29,409	**Total Non-Current Assets**	**27,730**
55,484	**Total Assets**	**49,991**
	LIABILITIES	
	Current Liabilities	
1,896	Accounts payable and accrued expenses	821
229	GST payable	315
151	Employee entitlements	151
2,075	Revenue in advance	2,117
17	Deferred lease incentive	17
4,367	**Total Current Liabilities**	**3,421**
	Non-Current Liabilities	
31	Deferred lease incentive	14
31	**Total Non-Current Liabilities**	**14**
4,397	**Total Liabilities**	**3,435**
51,086	**Net Assets**	**46,557**
	EQUITY	
16,001	Contributed capital	16,001
35,085	Accumulated surplus / (deficit)	30,556
51,086	**Total Equity**	**46,557**

Research and Education Advanced Network New Zealand Limited

Prospective Statement of Cash Flows
For the Year Ending 30 June

Forecast 2019		Budget 2020
$000		$000
	CASH FLOWS FROM OPERATING ACTIVITIES	
	Cash was provided from (applied to)	
3,000	Strategic Science Investment Fund	3,000
6,099	Network revenue	6,320
4,121	Other revenue	5,205
799	Interest received	427
344	Net GST	276
(13,476)	Payments to suppliers & employees	(14,586)
(6,865)	Prepayments for network connectivity	(2,380)
(5,977)	**Net Cash Flow from Operating Activities**	**(1,738)**
	CASH FLOWS FROM INVESTING ACTIVITIES	
	Cash was provided from (applied to)	
(670)	Purchase of plant & equipment	(1,872)
4,026	Funds transferred from escrow	-
500	Term deposit investments	4,500
3,856	**Net Cash Flow from Investing Activities**	**2,628**
	CASH FLOWS FROM FINANCING ACTIVITIES	
	Cash was provided from (applied to)	
-	**Net Cash Flow from Financing Activities**	**-**
(2,122)	**Net Increase / (Decrease) in Cash Held**	**890**
5,187	Cash at beginning of year	3,065
3,065	**Cash at End of Year**	**3,955**
	Represented by:	
3,065	**Cash at Bank**	**3,955**

Nature and purpose of Prospective Financial Statements

The Prospective Financial Statements have been prepared to the best of our knowledge and belief as an indication of REANNZ's future financial performance. Actual financial results achieved for the period covered may vary from the information presented, and potentially in a material manner.

The purpose of the Prospective Financial Statements is to inform readers of this Statement of Performance Expectations of REANNZ's best estimate of its future financial performance at the date of publication, and to comply with REANNZ's specific reporting and disclosure obligations. The statements may not be suitable for other purposes.

Notes to the Prospective Financial Statements

The reporting entity is Research and Education Advanced Network New Zealand Limited ('REANNZ'), a Crown entity as defined by the Crown Entities Act 2004 and a New Zealand incorporated company. As a Crown entity, REANNZ's ultimate parent is the New Zealand Crown.

REANNZ's primary objective is to establish, own and operate a high-speed data network for the research and education sector. As such, REANNZ's aim is to provide services for the ultimate benefit of the New Zealand public, on a not-for-profit basis.

Accordingly, REANNZ has designated itself as a Public Benefit Entity ('PBE') for the purposes of PBE accounting standards with reduced disclosures.

Basis for preparation

Statement of compliance

The Prospective Financial Statements have been prepared in accordance with the Crown Entities Act 2004, and with generally accepted accounting practice in New Zealand (NZ GAAP).

These Prospective Financial Statements comply with PBE accounting standards, that include PBE FRS 42 Prospective Financial Statements.

REANNZ elected to report in accordance with Tier 2 PBE accounting standards with reduced disclosure requirements and is eligible to report as a Tier 2 reporting entity on the basis that it does not have public accountability and is not large.

Presentation currency and rounding

The Prospective Financial Statements are presented in New Zealand dollars, rounded to the nearest thousand ($000). The functional currency of REANNZ is New Zealand dollars.

Early adoption of standards

PBE IFRS 9 Financial Instruments is effective for reporting periods beginning on or after 1 January 2022.

The Crown has elected to early adopt PBE IFRS 9 for periods beginning on or after 1 January 2018. As a Crown-owned entity, REANNZ has elected to early adopt the standard from 1 July 2018.

The standard updates the principles for recognising and measuring financial assets, liabilities and some contracts to buy or sell non-financial items. The effect of the standard will be a change in the approach to the impairment of receivables from a loss-incurred model to an expected-loss model. The impact of the change is not reasonably estimable. There is no change in the recognition and measurement of investments in bank term deposits.

Significant accounting policies

Accounting policies are selected and applied in a manner that ensures that the resulting financial information satisfies the concepts of relevance and reliability. REANNZ accounting policies, therefore, are designed to report the substance of the underlying transactions undertaken by the entity.

The following significant accounting policies have been adopted in the preparation and presentation of the Prospective Financial Statements.

Revenue

The specific accounting policies for significant revenue items are explained below.

Grant revenue

REANNZ is funded in part by the Crown. Where a grant is provided to partially fund the operation of a high-speed communication network for the research and education sector, and REANNZ considers there are no conditions attached, the grant is recognised as revenue at the point of entitlement.

Other grants are recognised as revenue when they become receivable unless there is an obligation in substance to return the funds if conditions of the grant are not met. If there is such an obligation, the grants are initially recorded as deferred revenue in the Statement of Financial Position, and recognised as revenue when conditions of the grant are satisfied.

Network and other revenue

Revenue is measured at the fair value of the consideration received or receivable. All transactions are exchange transactions.

Interest revenue

Interest revenue is recognised by accruing the interest due for the investment on a time proportion basis.

Foreign currency transactions

Transactions in foreign currencies, including those for which forward foreign exchange contracts are held, are translated to New Zealand dollars (the functional currency) at the spot rate on the date of transaction.

Foreign exchange gains and losses resulting from the settlement of such transactions and from the translation at year-end exchange rates of monetary assets and liabilities denominated in foreign currencies are recognised in the Statement of Comprehensive Revenue and Expense.

Operating leases

An operating lease is a lease that does not transfer substantially all the risks and rewards incidental to ownership of an asset to the lessee. Lease payments under an operating lease are recognised as an expense on a straight-line basis over the lease term.

Lease incentives received are recognised in the Statement of Comprehensive Revenue and Expense as a reduction of rental expense over the lease term.

Where the leased items are not in use, the operating lease payments will be treated as a prepayment in the Statement of Financial Position. Once the items begin to be used in deriving revenue, these prepayments are released to the Statement of Comprehensive Revenue and Expense on a straight-line basis over the period of the remaining operating lease term.

Finance leases

A finance lease is a lease that transfers to the lessee substantially all the risks and rewards incidental to ownership of an asset, whether or not title is eventually transferred.

At the commencement of the lease term, prepaid finance leases where REANNZ is the lessee are recognised as an asset in the Statement of Financial Position at the fair value of the leased item.

The amount recognised as an asset is depreciated over its useful life. If there is no reasonable certainty as to whether REANNZ will obtain ownership at the end of the lease term, the asset is fully depreciated over the shorter of the lease term and its useful life.

Receivables

Accounts receivable are recognised at their face value, less a provision for expected losses. When the receivable is uncollectible, it is expensed in the Statement of Comprehensive Revenue and Expense.

Investments

Bank term deposits

Investments in bank term deposits are initially measured at the amount invested. Interest is subsequently accrued and added to the investment balance.

Derivative financial instruments

REANNZ enters into derivative financial instruments, including forward foreign exchange contracts, as part of its normal operations to manage its exposure to foreign exchange rate risk. REANNZ does not hold or issue derivatives for trading purposes. REANNZ has not adopted hedge accounting.

Derivatives are initially recognised at the fair value on the date a derivative contract is entered into and are subsequently revalued at each balance date, with the resulting gain or loss recognised in the Statement of Comprehensive Revenue and Expense.

A forward foreign exchange derivative is classified as current if the contract is due for settlement within 12 months of balance date. Otherwise the full fair value of forward foreign exchange derivatives are classified as non-current.

Property, plant and equipment

Property, plant and equipment assets fall into six classes, which are measured, at cost less accumulated depreciation and impairment losses, as follows:

- Leasehold improvements
- Routers, switches and optical equipment
- Information technology equipment
- Office equipment
- PoP equipment
- Fibre and fibre housing.

Additions

The cost of an item of property, plant and equipment is only recognised as an asset when it is probable that future economic benefits or service potential associated with the item will flow to REANNZ and the cost of the item can be measured reliably.

Work in progress is recognised at cost less impairment and is not depreciated.

In most instances, an item of property, plant and equipment is initially recognised at cost. Where an asset is acquired through a non-exchange transaction, the asset will be recorded at fair value at the date of acquisition.

Costs incurred subsequent to initial acquisition are capitalised only when it is probable that future economic benefits or service potential associated with the item will flow to REANNZ and the cost of the item can be measured reliably.

The costs of servicing property, plant and equipment are recognised in the Statement of Comprehensive Revenue and Expense as they are incurred.

Disposals

Gains and losses on disposals are determined by comparing the proceeds of disposal with the carrying amount of the asset. Gains and losses on disposal are included in the Statement of Comprehensive Revenue and Expense.

Depreciation

Depreciation on property, plant and equipment (excluding work in progress) is calculated on a straight-line basis, from the time the asset is in the location and condition necessary for its intended use. This basis allocates the cost or value of the asset, less its residual value, over its estimated useful life.

The depreciation method, estimated useful lives and residual values of property, plant and equipment are reviewed annually to assess appropriateness.

The following estimated useful lives are used in the calculation of depreciation:

Leasehold improvements	6 years
Routers, switches and optical equipment	3–8 years
Information technology equipment	3 years
Office equipment	5 years
PoP equipment	8 years
Fibre and fibre housing	20 years

Leasehold improvements are depreciated on the basis of estimated useful life or the remaining lease term, whichever is shorter.

Intangible assets

Software is a finite-life, intangible asset and is recorded at cost less accumulated amortisation and impairment. Amortisation is charged on a straight-line basis over the estimated useful life of the intangible asset.

Costs associated with maintaining computer software are recognised as an expense when incurred.

Staff training costs are recognised as an expense when incurred.

Costs associated with the development and maintenance of the REANNZ website are recognised as an expense when incurred.

The useful life and associated amortisation rates of major classes of intangible assets have been estimated as follows:

Software	3 years

Impairment of property, plant and equipment and intangible assets

REANNZ does not hold any cash-generating assets. Assets are considered cash-generating where their primary objective is to generate a commercial return.

Non-cash generating assets

At each reporting date, assets are reviewed to determine whether there are any events or changes in circumstances that indicate that carrying amounts may not be recoverable. An impairment loss is recognised as the amount by which the asset's carrying amount exceeds its estimated recoverable amount.

If the carrying amount of an asset exceeds its recoverable amount, the asset is impaired and the carrying amount is written down to the recoverable amount. The impairment loss is then recognised as an expense in the Statement of Comprehensive Revenue and Expense.

Where an item of property, plant or equipment has been revalued, any impairment loss is recognised against the revaluation reserve for that class of asset. Where this results in a debit balance in the revaluation reserve, the balance is recognised in the Statement of Comprehensive Revenue and Expense.

Any reversal of an impairment loss is recognised in the Statement of Comprehensive Revenue and Expense. Impairment losses can only be reversed to the extent that the carrying amount of the asset matches the carrying amount as calculated under the cost less accumulated depreciation method.

For items of property, plant or equipment that have been revalued, any reversal of impairment loss is credited back to the revaluation reserve. However, to the extent that an impairment loss for that class of asset was previously recognised in the Statement of Comprehensive Revenue and Expense, a reversal of impairment loss is also recognised in the Statement of Comprehensive Revenue and Expense.

Payables

Short-term payables are recorded at the amount payable.

Employee entitlements

Employee benefits due to be settled within 12 months after the end of the year in which the employee provides the related service are measured based on the accrued entitlements at current rates of pay. These include salaries and wages accrued up to balance date, and annual leave earned but not yet taken at balance date.

A liability and an expense are recognised for bonuses where there is a contractual obligation or where there is a past practice that has created a constructive obligation and a reliable estimate of the obligation can be made.

Cash flow statement

The Prospective Statement of Cash Flows is prepared exclusive of GST, which is consistent with the method used in the Statement of Comprehensive Revenue and Expense.

Definitions of the terms used in the Statement of Cash Flows are:

- 'Cash' includes coins and notes, demand deposits and other highly liquid investments readily convertible into cash used by REANNZ as part of its day-to-day cash management.
- 'Investing activities' are those activities relating to the acquisition and disposal of long-term assets and other investments not included in cash equivalents.
- 'Financing activities' are those activities relating to changes in equity of REANNZ.
- 'Operating activities' include all transactions and other events that are not investing or financing activities.

Goods and services tax (GST)

These Prospective Financial Statements are prepared on a GST-exclusive basis except for accounts receivable and accounts payable, which include GST.

The net GST paid to, or received from, Inland Revenue, including the GST relating to investing and financing activities, is classified as an operating cash flow in the Statement of Cash Flows.

Commitments and contingencies

A schedule of commitments and contingencies is not separately disclosed in these Prospective Financial Statements.

Income tax

As a public entity under Section CW 38(2) of the Income Tax Act 2007, the company is exempt from income tax. Accordingly, no provision has been made for income tax.