CLIMATE CHANGED

2021

AND BEYOND

Reserve Bank
of New Zealand
Te Pūtea Matua

Climate Changed: About the Title

The title refers to the misconception that climate change is a problem for the future. In fact, the climate has already changed and with it we face a new financial, legal, economic and policy climate. Business as usual no longer exists. The challenge of understanding and managing climate-related risks is already here.

Contents

Ki te kāhore he whakakitenga ka ngaro te iwi

Without foresight or vision the people will be lost

Executive Summary

Today's global economy was built on a relatively stable climate and is underpinned by oil, gas and coal. It was built with ready access to cheap fossil fuels for manufacturing, distribution and consumption. It was built with a familiar climatic pattern on which to create our homes and communities, cities, farms, and businesses.

Our climate has changed.

The latest science from the Intergovernmental Panel on Climate Change reports that climate change is widespread, rapid, intensifying and affecting every region.[1] With the 1°C warming already experienced, there are significant impacts. Unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to 1.5°C or even 2°C will be out of reach.[2] Global warming could exceed 4°C by the end of the century in a high-emissions scenario[3] and we are currently on track for around 3°C warming.[4] We all have a role to play – this report outlines what we at the Reserve Bank of New Zealand – Te Pūtea Matua are doing in this space.

Climate change is part of our core business

The physical impacts of climate change, such as floods and drought, and the impacts of transitioning to a low-carbon economy hold risks – but also some opportunities – for the financial system. With the changing physical climate comes a changing financial, policy and market climate. Examples include investors shifting away from emission-intensive industries, stranded assets, legal action and increased scrutiny of countries' emission profiles and trajectories potentially leading to carbon border tax adjustments.[5]

In keeping with our mandate on financial stability, this report is focused on risks. Like many other central banks we are moving to understand and integrate these into our core functions. We join 95 other central banks and supervisors in collaborating internationally on climate change through the Network of Central Banks and Supervisors for Greening the Financial System (NGFS). At the Reserve Bank of New Zealand – Te Pūtea Matua, our vision is that climate change considerations are incorporated into the Bank and the financial system.

We take climate change seriously and this focus is intensifying

Here at the Reserve Bank, our Climate Change Strategy has three components:

1. Get our house in order: Monitoring and managing our own climate impacts
2. Get the settings in place: Mainstreaming climate by understanding and incorporating the impacts of climate change into our core functions
3. Show the way: Leading through collaboration

This report sets out our approach to climate change – our progress and future direction. We want to be transparent: we have made progress but we have a long way to go.

1 Intergovernmental Panel on Climate Change Press Release: Climate change widespread, rapid, and intensifying – IPCC

2 Intergovernmental Panel on Climate Change AR6 Climate Change 2021: The Physical Science Basis

3 Intergovernmental Panel on Climate Change AR6 Climate Change 2021: The Physical Science Basis

4 United Nations Environment Programme (2020). Emissions Gap Report 2020. Nairobi

5 In 2021, the European Commission adopted a proposal for a Carbon Border Adjustment Mechanism which will put a carbon price on imports of selected products to try to ensure that ambitious climate action in Europe does not lead to carbon leakage

Strategic focus	Progress	Future plans
Get our house in order: Operational emissions	Calculated/independently verified using Greenhouse Gas Protocol	Set/implement reduction pathway
Get our house in order: Investment emissions	Engaged S&P Global Market Intelligence to estimate carbon intensity of sovereign bond portfolio Invested US$100 million in Bank for International Settlements' Green Bond Investment Pool	Assess carbon-related portfolio risks Consider how we can incorporate sustainability objectives into our balance sheet, while maintaining our ability to effectively execute our policy objectives
Get the settings in place: Policy Functions	Submissions on other agencies' policies Developing guidance note on climate change risk management	Contribute to the climate risk mandatory disclosures regime by working with lead agencies
Get the settings in place: Financial System Analysis	*Financial Stability Reports* highlight risks Began climate-related stress tests	Stress testing further incorporates climate change Further work to identify gaps for in-depth analysis
Get the settings in place: Supervision	Incorporated climate change into scheduled supervisor engagements with management and boards of regulated entities to assess governance, strategy and risk management frameworks Building climate expertise through training and development to deepen understanding of risks	Further embed climate risk into our supervisory frameworks, data collection and internal training Bilateral engagements with regulated entities' management/boards Repeat Task Force on Climate-Related Financial Disclosures (TCFD) survey in 2022
Get the settings in place: Monetary Policy	Analysing the latest set of NGFS scenarios to highlight economic impacts of climate change	Assess how our approach to monetary policy should account for climate change
Show the way: Leading through collaboration	Leading Council of Financial Regulators' climate workstream to increase coordination/capacity Engaging widely – scientists, researchers, public sector agencies, industry and international collaboration	Continue external engagement Lead by example: develop the building blocks for our own TCFD report

We support an urgent, aligned and collaborative approach

Finally, while central bankers have the responsibility to play a critical role, we recognise it is primarily the Government's role to lead emission reduction and adaptation as part of a collective response including Māori, the private sector, communities, local government and individuals. The response needs to be aligned and at a scale and pace appropriate to the risks.

The longer the delay, the greater the potential for natural, social and financial disruption. The Bank for International Settlements' *Green Swan* book highlighted the potential financial stability risks that stem from climate-related risks.[6]

Beginning now to get on the path to a low-emission, climate-resilient economy as part of the global effort will help reduce the risks to the stability of the financial system and the macro economy.

6 Bank for International Settlements: *The Green Swan* – central banking and financial stability in the age of climate change

Statement from Our Leaders

At the Reserve Bank of New Zealand – Te Pūtea Matua, we are kaitiaki (guardians) of New Zealand's financial ecosystem, tasked with maintaining and enhancing financial stability. We act collectively to promote the prosperity and wellbeing of all New Zealanders. We do this in large part by promoting a sound and dynamic monetary and financial system – a necessary platform for a sustainable and productive economy.

Climate change has affected our environment and our way of living. Here in Aotearoa New Zealand, we don't need to look far to see the vulnerability of our way of life and industries. Extreme events in New Zealand have been shown to have been influenced by climate change.[7] We have experienced drought in Northland this year, and heavy rainfall and flooding have affected many parts of the country – the West Coast of the South Island, the Canterbury region and West Auckland. Around the world there have been even grimmer events – wildfires in Australia, Greece and North America, and flood devastation in Germany, Japan, and China. These stark reminders of the realities and risks of climate change will be exacerbated by chronic impacts such as rising sea levels and higher temperatures.

The latest Intergovernmental Panel on Climate Change (IPCC) report finds that climate change is widespread, rapid and intensifying and that unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting global warming to 1.5°C or even 2°C above pre-industrial levels will be out of reach.[8] Both the physical impacts of climate change itself and the impacts of transitioning to a low-carbon economy hold risks for the financial system.

A key concern for us is the exposure of the financial sector, including banks and insurers, to climate-related risks. Anything that challenges the stability of the financial system and our economy is our core business. We recognise that the key responsibility for driving the journey to net zero lies with the Government as part of a collective response.

We take our role seriously, so in 2018 we launched our Climate Change Strategy to understand and manage our direct impacts on climate change, incorporate climate change into our core functions, and lead through collaboration. In line with our broader vision, our approach to climate change recognises the imperative of working together: Matangirua ki Matangireia – working in unison, to fulfil our ultimate purpose. Across countries and across industries, the mahi (work) must start now and it must come from everyone. Without significant action there will be serious impacts on our economies.

There is more that we can collectively do to integrate climate considerations throughout the financial system. It is encouraging to see national and global progress – for example, progress in setting a framework to disclose climate-related risks and some firms beginning to disclose, the delivery of the Climate Change Commission's first set of advice, and the launch of Toitū Tahua, the Centre for Sustainable Finance.

Internationally we are heartened by collaboration in international groups such as the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) and the Sustainable Insurance Forum (SIF), and the focus on finance at this year's United Nations Climate Change Conference (COP26).

7 Journal of Geophysical Research: Atmospheres Research Article: Investigating event-specific drought attribution using self-organizing maps

8 Intergovernmental Panel on Climate Change AR6 Climate Change 2021: The Physical Science Basis

A key challenge is that financial stability is best maintained when all relevant risks have been identified, priced and allocated to those best able to manage them. Work is underway to increase our global understanding of these risks.

Yet we need to be realistic in measuring our collective global progress against the scale of the risks before us and the transition required. While tools like disclosure and scenario analysis are critical in helping us understand and prepare for climate risks, we cannot let a desire to perfect such analysis paralyse us. We will never have perfect information on climate change, yet the direction is clear: the IPCC says to limit warming to 1.5°C will require global net human-caused emissions of carbon dioxide to fall by about 45% from 2010 levels by 2030, reaching net zero around 2050.[9] In turn this will mean significant changes to economies and significant capital investment.

We consider that beginning now to get on the path to a low-emission, climate-resilient economy as part of the global effort will help reduce the risks to the stability of the financial system and the macro economy. An orderly transition will be better for financial stability than one that is deferred then abrupt, or too late. The longer we delay, the greater the potential for a disruptive transition. It will take courage to move forward in uncertainty as climate change means the past is a less reliable guide to the future. We all need to think about how we can align with a low-emission, climate-resilient future. We can draw courage by grounding our approach in Te Ao Māori with its integrated approach to environmental sustainability and focus on connection and partnership. Ahakoa he moana pukepuke, ka ekea e tō waka. A choppy sea can still be navigated.

Here at Te Pūtea Matua, we are at the beginning of our climate journey. This Report outlines progress on our Climate Change Strategy, while at the same time recognising the need for more action. We hope that in sharing our climate work and plans, we will all learn from each other's progress. We encourage everyone, including our regulated entities, the public and public agencies, to read and engage with this, understand why climate is a core concern for us, and join us as we contribute to a more resilient financial system.

Adrian Orr
Governor

Geoff Bascand
Deputy Governor

Simone Robbers
Assistant Governor

Juliet Tainui-Hernandez
Assistant Governor

Mike Wolyncewicz
Assistant Governor

Christian Hawkesby
Assistant Governor

John McDermott
Acting Assistant Governor

9 Intergovernmental Panel on Climate Change Press Release: Special Report on Global Warming of 1.5°C

Who We Are: The Reserve Bank of New Zealand – Te Pūtea Matua

We are the Reserve Bank of New Zealand – Te Pūtea Matua.

As kaitiaki of the financial system, we enhance the economic wellbeing and prosperity of all New Zealanders by promoting a sound and dynamic monetary and financial system. Our mandates are: maintaining low and stable consumer price inflation while contributing to maximum sustainable employment; promoting and maintaining a sound and efficient financial system; meeting the cash needs of the public; and providing robust payment and settlement services for New Zealand's financial institutions. We approach and deliver on our mandate in a holistic manner by looking at a broad range of challenges and opportunities that impact our effectiveness as kaitiaki – including focusing on the economic impacts of COVID-19, climate change, financial inclusion and other areas where we can have an impact.[10] Our work is grounded on our values of wananga (innovation), tauira (integrity), and taura (inclusion).

Understanding climate change and climate risks is of critical importance to financial stability. Our foremost interest is the exposure of the financial institutions that we regulate to climate-related risks and their strategies to mitigate these risks. Our own activities, both in terms of the impacts of our operations and in collaboration with others, can enhance transparency and reduce market failures such as information asymmetry.

Our Climate Change Strategy is implemented by a cross-Bank Working Group. Our Senior Leadership Team play an active role in promoting a broader understanding of climate-related financial risks and the role of the Bank in addressing climate issues across the global and New Zealand climate finance community, and we report regularly to our Board.

This is a quickly evolving area. Climate change is now the focus of intense public and private sector initiatives and the expectations on us all will continue to increase. Our vision is that climate change considerations are incorporated into decisions across the Reserve Bank and the broader financial system. We aim to foster long-term decision-making with foresight for the needs of future generations of New Zealanders, and work towards a climate-resilient economy.

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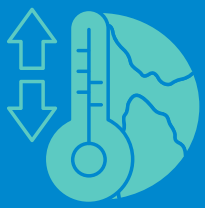
10 Reserve Bank of New Zealand Statement of Intent 2021 – 2024



Climate Change & Te Ao Māori

Our climate work shares a stable with our Te Ao Māori Strategy[11] and a shared focus on connection, collaboration, and kaitiakitanga. They both take a long term perspective on the environment and on collective wellbeing. This kaupapa helps us navigate our climate work through time.

Globally, climate scientists are turning to indigenous communities, partly because they have often been in the same place for centuries.

Looking at the issue of climate change through a Te Ao Māori lens provides a local indigenous perspective that is aligned with the key global definition of sustainable development: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Further, the emphasis on connection in Te Ao Māori is a useful lens to view the externalities often associated with climate change as in Te Ao Māori nothing is 'external' to the system.

The *Te Ōhanga Māori – Māori Economy Report 2018*[12] noted: "Through iwi, collectives, and businesses, Māori support the mauri of land, ecosystems, water, air, waterways, and oceans, providing crucial support for natural capital, and ultimately enabling wellbeing for future generations".

"Land and water are fundamental to Māori identity and culture through whakapapa. As such, we recognise that in Te Ao Māori, their true value cannot be reflected on a balance sheet or in numerical values."

The *Te Ōhanga Māori – Māori Economy Report 2018*[13] presented a different approach to describing the economic system – through people, planet and profit, with planet at the centre.

11 Reserve Bank of New Zealand Te Ao Māori Strategy: an evolving and responsible strategy

12 Te Ōhanga Māori – Māori Economy Report 2018

13 Te Ōhanga Māori – Māori Economy Report 2018

The Financial Risks of Climate Change

Our modern global economy was built on a relatively stable climate and underpinned by oil, gas and coal. There was ready access to cheap fossil fuels for manufacturing, distribution, consumption and disposal. There was a reasonably stable climatic pattern on which to create our homes and communities, cities, farms, and businesses.

Our climate has changed.

The latest science from the IPCC states that climate change is widespread, rapid, intensifying and affecting every region.[14] Figure 1 shows the projected changes in extremes are larger in frequency and intensity with every additional increment of global warming.

Unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to 1.5°C or even 2°C will be out of reach.[15] Global warming could exceed 4°C by the end of the century in a high-emission scenario and we are currently on track for 3°C warming.[16]

Like many other central banks and regulators, we see climate change as a risk to the financial stability underpinning the economy. The environment and the economy are interdependent. We see financial stability being best maintained when all relevant risks are adequately identified, priced and allocated to those best able to manage them.[17] But the risks from climate change are material yet often difficult to identify, price, allocate and manage with accuracy. Global understanding of climate risks is evolving along with the understanding of how they impact financial stability. Markets may move quickly once a critical mass of information is available.

Risks of this sort arise when some material costs of our economic decisions are 'externalised' to others, including future generations. Compounding these issues, market participants often take a short-term view in their decision-making. These issues are known respectively as the 'tragedy of the commons' and 'the tragedy of the horizons'.

These risks arise from two main channels: physical risks and transition risks.

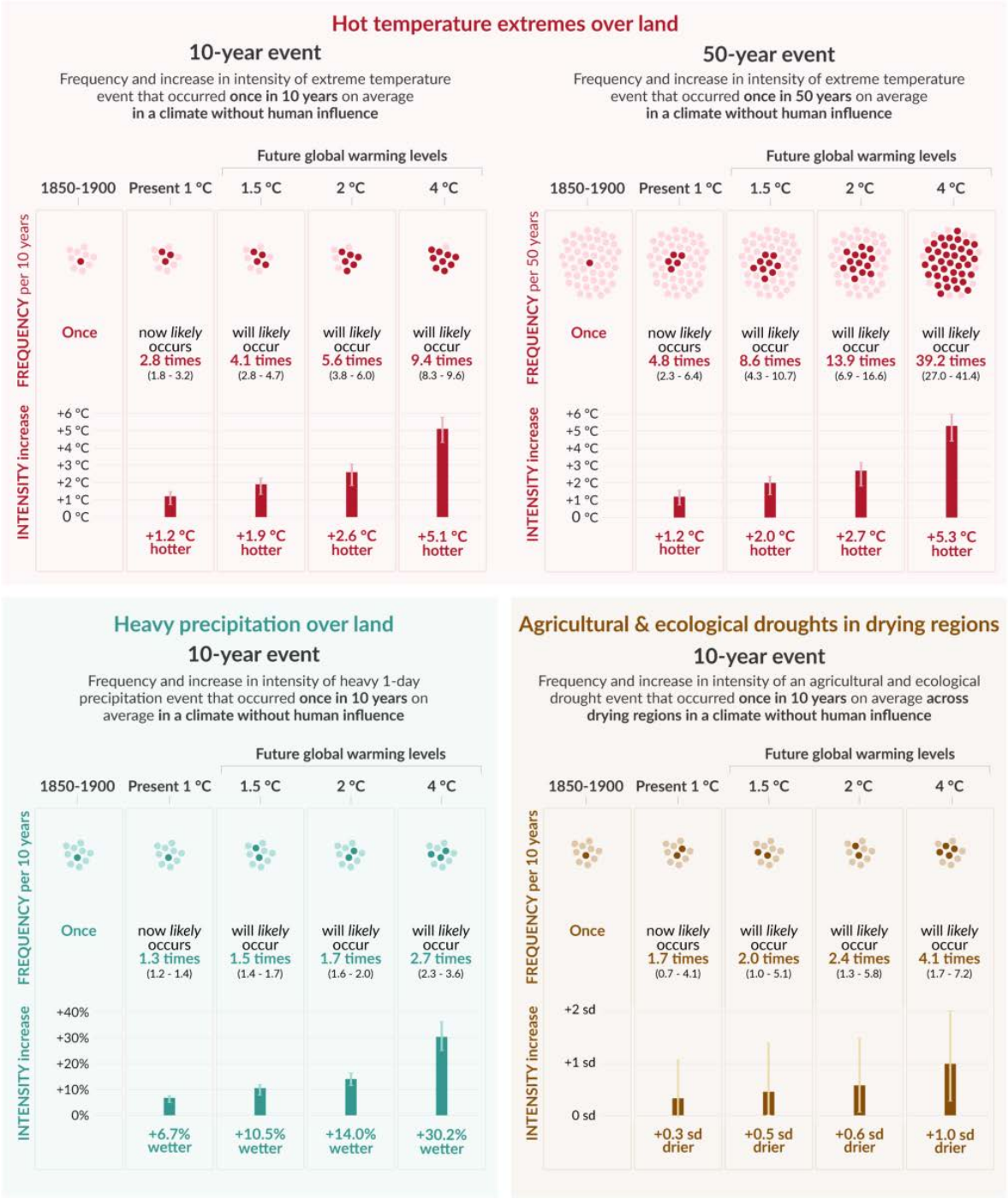
14 Intergovernmental Panel on Climate Change Press Release: Climate change widespread, rapid, and intensifying – IPCC

15 Intergovernmental Panel on Climate Change AR6 Climate Change 2021: The Physical Science Basis

16 United Nations Environment Programme (2020). Emissions Gap Report 2020. Nairobi

17 Reserve Bank of New Zealand: Progressing Climate Action by Driving Transformational Change, a speech by Governor Adrian Orr on 28/10/2020

Figure 1: Projected changes in extremes are larger in frequency and intensity with every additional increment of global warming



Source: *Intergovernmental Panel on Climate Change AR6 Climate Change 2021: The Physical Science Basis*

Photo credit: Sarah Fraser, NIWA

Physical risks: These refer to changes in the climate leading to more frequent flooding, droughts and storms, rising temperatures and rising sea levels, for example. New Zealand's land areas have already warmed, by 1.1°C between 1910 and 2020[18], our glaciers are in retreat, and sea levels are rising at a higher rate than the global average (around 20cm over the 20th century). Research by the National Institute of Water and Atmospheric Research (NIWA), as part of the Deep South National Science Challenge, indicated that 30cm of sea-level rise (which it stated is foreseeable in the next 30 years) may expose $18.49 billion worth of New Zealand buildings, 2,000km of roads, 4,000km of water pipelines, 1,600km^2 of agricultural land and 14 airports[19] to coastal flooding. Further research found that climate change is already contributing to the cost of extreme events. For example, around $800 million of the $4.8 billion that government agencies estimated in lost GDP due to the 2007 and 2013 droughts has been attributed to climate change.[20]

The frequency and intensity of droughts are expected to increase with climate change.

We recognise that an increase in many physical risks is largely baked in for the next few decades. For general insurers this will mean more frequent extreme weather events leading to increasing claims and more large spikes in claims. Over time, the trend could mean some assets become uninsurable. For banks this will mean increased risks to the properties they rely on as collateral. There will also be an increased risk of default, for example by agricultural borrowers dealing with the impacts of increasingly extreme weather such as droughts. Research by the Deep South National Science Challenge and Manaaki Whenua – Landcare Research is looking at the relationship between climate change, drought and financial outcomes on farms.[21] As we adapt, there may also be changes that we can capitalise on such as longer growing seasons in some areas.

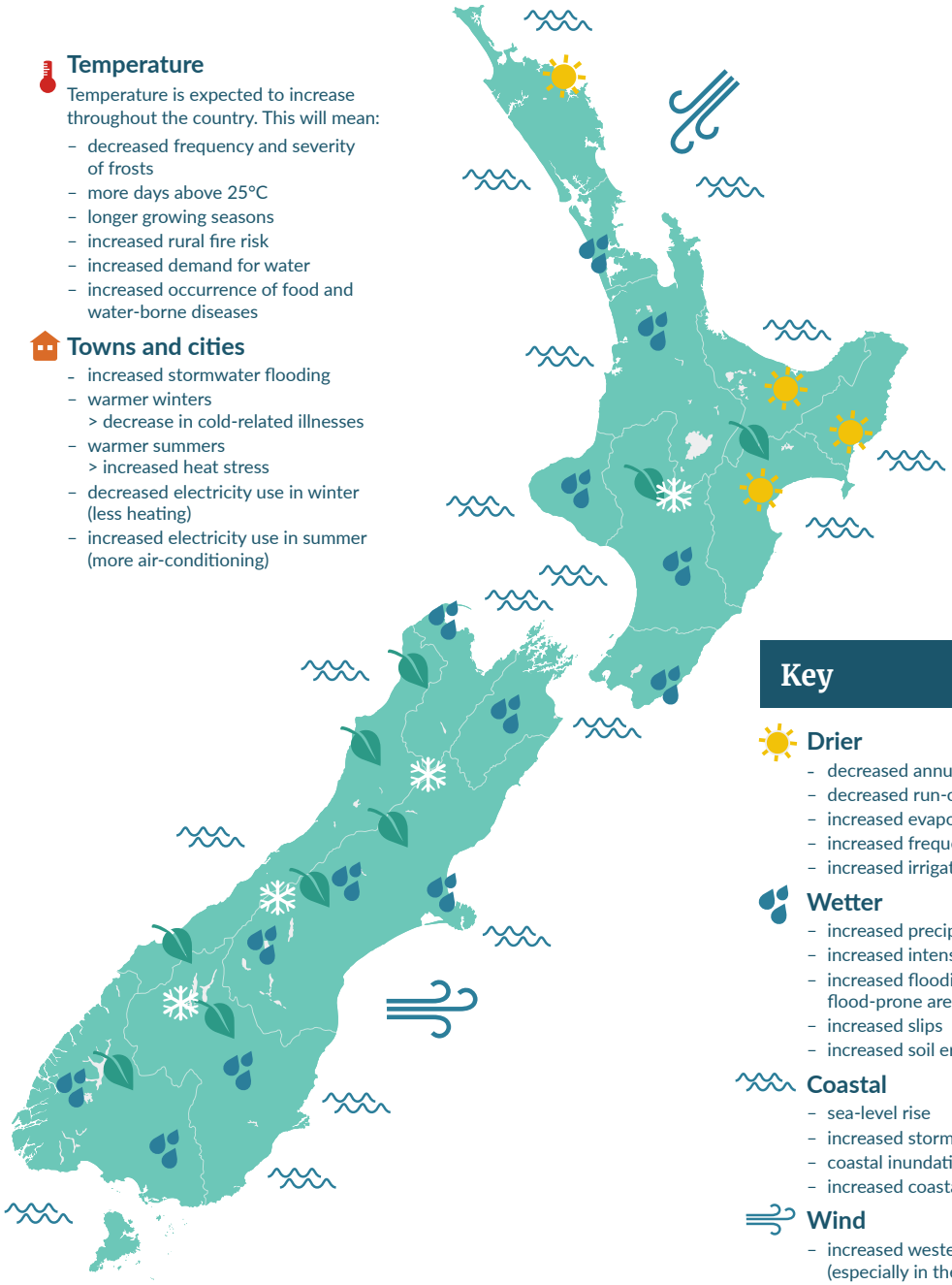
18 Intergovernmental Panel on Climate Change Regional Fact Sheet – Australasia

19 National Institute of Water and Atmospheric Research (NIWA): Coastal Flooding Exposure Under Future Sea-level Rise for New Zealand

20 Climate change attribution and the economic costs of extreme weather events: a study on damages from extreme rainfall and drought

21 Deep South National Science Challenge: Climate change and drought: The future of farms and rural communities

Figure 2: Distribution of projected climate-related changes across New Zealand



Temperature

Temperature is expected to increase throughout the country. This will mean:

- decreased frequency and severity of frosts
- more days above 25°C
- longer growing seasons
- increased rural fire risk
- increased demand for water
- increased occurrence of food and water-borne diseases

Towns and cities

- increased stormwater flooding
- warmer winters
  > decrease in cold-related illnesses
- warmer summers
  > increased heat stress
- decreased electricity use in winter (less heating)
- increased electricity use in summer (more air-conditioning)

Key

Drier

- decreased annual rainfall
- decreased run-off to rivers
- increased evaporation
- increased frequency and severity of drought
- increased irrigation demand

Wetter

- increased precipitation
- increased intensity in weather events
- increased flooding, particularly in already flood-prone areas
- increased slips
- increased soil erosion

Coastal

- sea-level rise
- increased storm surge
- coastal inundation
- increased coastal erosion

Wind

- increased westerly winds in winter and spring (especially in the South), more north-easterlies in summer and autumn (especially in the North)

Snowlines and glaciers

- changes in length and area of glaciers
- rise in snowline
- reduction in snow days
- decrease in seasonal snow duration and depth

Natural areas

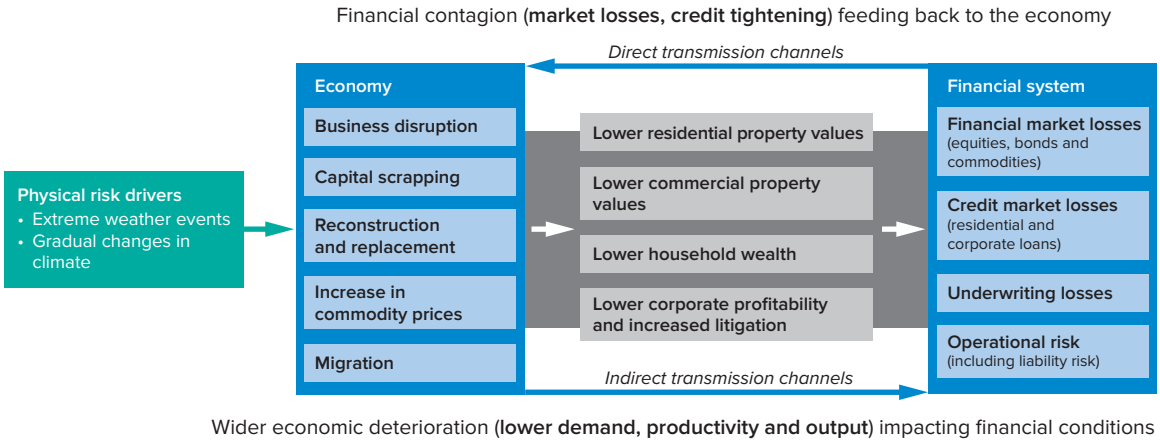
- species distribution changes
- changes to/loss of habitat
- increased pressure from pests, animals, and plants

This map provides an indication of potential impacts of climate change on New Zealand. It is not an attempt to provide a comprehensive summary of all the impacts.

For more information about the impacts of climate change please contact:
info@mfe.govt.nz or visit the website:
www.mfe.govt.nz/issues/climate/

Source: Ministry for the Environment

Figure 3: From physical risks to financial stability risks



Source: Network for Greening the Financial System

Our May 2021 *Financial Stability Report*[22] highlighted that the cost of weather-related catastrophes to insurers in New Zealand has been consistently higher than long-term averages (see Figure 4). General insurers typically rely on years with benign weather conditions to offset elevated claim costs from years with more extreme events, without needing to make significant adjustments to premiums for insured businesses and individuals. With climate change, extreme weather events are becoming more commonplace and the frequency of years with benign weather – from an insurance perspective – will be greatly reduced. The Insurance Council of New Zealand has reported that weather events have hit a new annual record of over $274 million in insurance claims in 2020.[23] While this dollar amount is manageable, the direction of the trend warrants attention, especially given potential non-linearities in physical risks as temperatures rise. Weather-related losses have flow-on economic impacts such as disruptions in business continuity and storm damage cutting access to towns and communities.

The Treasury recently ran a range of simulations of severe droughts and storms.[24] In the median simulation results, these extreme weather events lead to net core Crown debt being 3.77% of GDP higher. Moreover, the simulations produce a significant range of effects, highlighting the importance of tail risks. The Treasury also notes that "these events are highly localised, and so there are likely to be much larger impacts on particular communities".

There is a connection between the soundness of the financial system as a whole and the management of increasing climate risks across the economy. For example, general insurers typically renew property insurance contracts annually, so a withdrawal of cover from properties facing increased risks (of flooding, for example) would be a rational market response once premium increases have gone beyond the point the market can bear. This could result in a step-change in banks' credit risk on mortgage lending in any areas of insurance withdrawal.

Research for the Deep South National Science Challenge stated that many coastal homes that might currently flood only once every 100 years are likely to experience insurance retreat over the next 15 years.[25]

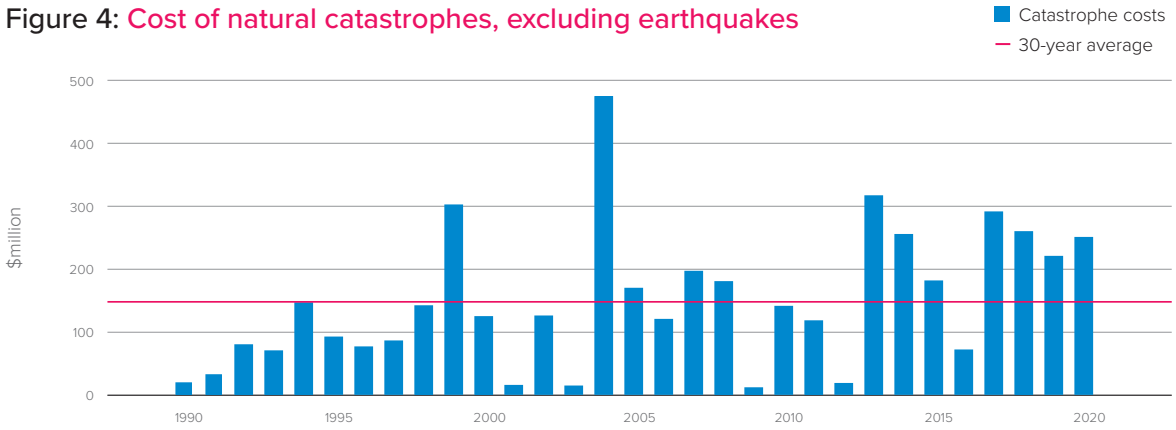
22 Reserve Bank of New Zealand May 2021 Financial Stability Report

23 Insurance Council of New Zealand: Cost of natural disasters

24 He Tirohanga Mokopuna 2021 The Treasury's combined Statement on the Long-term Fiscal Position and Long-term Insights Briefing

25 Deep South National Science Challenge: Climate change and the withdrawal of insurance

Figure 4: Cost of natural catastrophes, excluding earthquakes



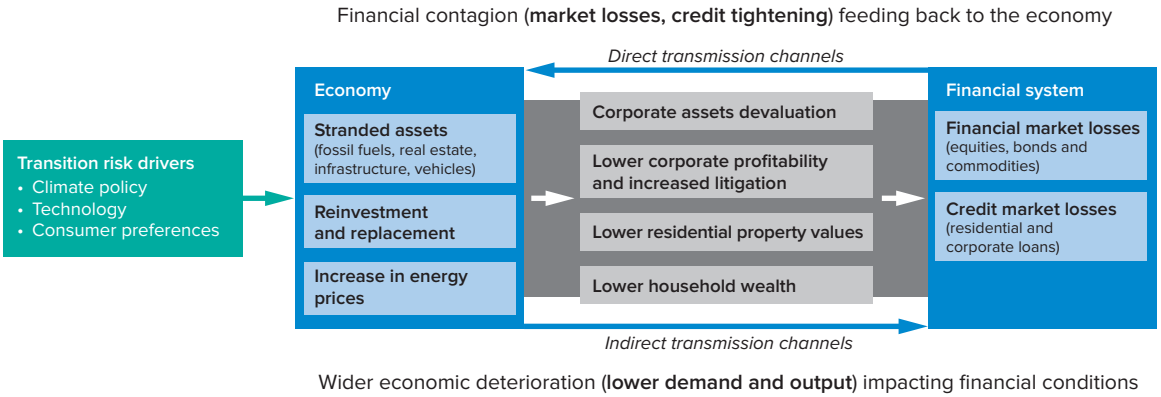
Source: Insurance Council of New Zealand, CoreLogic, Reserve Bank estimates

Note: The cost of catastrophes is adjusted by the CoreLogic total value of housing stock, which is used as a proxy to represent growth in built-up areas and the total value of property protected by insurance.

These risks can affect the safety and soundness of the firms we regulate, the stability of the wider financial system and the macroeconomic outlook. As a central bank we are interested in the manifestation of these risks and working collaboratively to mitigate them. While both the mean and variance of risks are likely to increase, there is an element of predictability to this. This increase in physical risks should plateau over the very long term, provided that the transition to a low-carbon economy is achieved globally.

Transition Risks: The scale and pace of transition to a low-carbon economy can also create risks. These are known as 'transition risks' and could mean significant shifts in asset values or stranded assets, or higher costs of doing business. Scientists estimate that to limit warming to 1.5°C would require global net human-caused emissions of carbon dioxide to fall by about 45% from 2010 levels by 2030, reaching net zero around 2050.[26] Such a transition will require significant changes to global economies.

Figure 5: From transition risk to financial stability risks



Source: Network for Greening the Financial System

26 Intergovernmental Panel on Climate Change Press Release: Special Report on Global Warming of 1.5°C

Global and local understanding of transition risks is less advanced than that of physical risks, because technological progress and social and policy change are less predictable than the large-scale impacts on the climate. Examples of transition risks would be emission pricing pushing up costs in the energy, transport or agriculture sectors, or changes in technology such as synthetic meat or a consumer shift to plant-based protein. Similarly, high-emitting industries may find it harder to attract capital as investors green their portfolios, or face reputation risks or market access issues such as carbon-related border taxes. There are also liability risks; for example people or businesses seeking compensation for losses they may have suffered from climate change.

The impacts of transition risks for financial stability are likely to depend on the pace and timing of the measures taken to move to a low-emission economy. All else being equal, in terms of pace, a coherent, well signalled, sustained, economy-wide approach to managing the path to a low-carbon economy should be much better for financial stability than a disorderly, jarring transition. The Reserve Bank's remit includes the promotion of financial stability, and we recognise that banks and insurers can play an important role in supporting a smooth transition to a climate-resilient economy.

New Zealand has set a target to reach net-zero long-lived gases by 2050 and to reduce biogenic methane emissions by 24-47% by 2050 in the Climate Change Response (Zero Carbon) Amendment Act 2019.[27]

It's important to note that these physical and transition risks can intertwine, intensify and snowball.

It is plausible, for example, that agriculture could face drought, a consumer shift towards plant-based protein, intensified regulation and a carbon border adjustment mechanism in key export markets all at the same time. The transmission of climate risk to the financial system needs to be better understood and is difficult to measure. We need to understand, for example, the interplay of physical risks and policy choices, the risk mitigation activities of different actors, and the potential for climate tipping points.

27 The purpose of the Act is to provide a framework for New Zealand to develop and implement clear and stable climate change policies that contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5°C above pre-industrial levels; and allow New Zealand to prepare for and adapt to the effects of climate change.

Climate Change and Central Banks

As central bankers, we are in the business of understanding and addressing risks to the economy and the financial system. Expectations on us to contribute on climate are also increasing. We have been asked to move quicker and we have. As the systemic impacts of climate change on the economy and the financial system become clearer, the responses of central banks and regulators around the world are evolving rapidly. It is now broadly accepted that climate change poses financial risks.

The role of finance in addressing climate change is increasingly recognised internationally. The importance of finance as an enabler is highlighted in the 2015 Paris Agreement: "Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development".[28] Additionally, finance is one of the key themes at the 2021 United Nations Climate Change Conference (COP26). Access to finance to retune the economy to account for climate risks is critical to an orderly, smooth transition to a climate-resilient economy.

In this context, central banks are taking action on climate change. While there's variation in our individual mandates, at their heart they are about stability. Stability in terms of prices – monetary stability. And stability in terms of the broader financial system – financial stability. Climate change poses risks to the financial system and challenges to monetary policy.

Central banks and supervisors have joined to work together on climate change through the NGFS. At a high level the NGFS has recommended six actions:[29]

1. Integrate climate-related risks into financial stability monitoring and micro-supervision
2. Integrate sustainability factors into own-portfolio management
3. Bridging the data gaps
4. Build awareness and intellectual capacity and encourage technical assistance and knowledge-sharing
5. Achieve robust and internationally consistent climate and environment-related disclosure
6. Support the development of a taxonomy of economic activities.

One of the benefits of international linkages like this is that they can lead to aligned efforts, potentially avoiding loss of ground due to conflicting approaches.

28 Article 2.1.c of the 2015 Paris Agreement

29 Network for Greening the Financial System: A call for action Climate change as a source of financial risk

Our Climate Change Strategy & Our Progress

In December 2018 we published our Climate Change Strategy, which has three components:

Get our house in order: Monitoring and managing our own climate impacts

Get the settings in place: Mainstreaming climate by understanding and incorporating the impacts of climate change on our core functions

Show the way: Leading through collaboration

In this section we give an update on our progress and highlight next steps. While we are proud of our progress so far, we recognise that there is still a lot to be done and that we need to move with even more pace and urgency. Although it will take time and effort, and we need to be flexible to evolve with the developing global understanding of climate risks and methodologies, we are committed to delivering our Climate Change Strategy and continuing to contribute to international efforts to build a climate-resilient economy. Our *Statement of Intent* (SOI) for 2019/20 set out our climate focus areas – raising awareness, contributing to New Zealand's regulatory policy discussions and building our own capacity. Our 2021/22 SOI set out our focus on integrating climate change considerations more deeply across the Reserve Bank and the financial system.

Get our house in order: Monitoring and managing our impacts on climate change

Given the urgency of the climate crisis, it is critical to get our own house in order. A key component of our Climate Change Strategy is to measure, report and reduce the Bank's carbon emissions. We have published our carbon footprint since 2019 and continually improve the measurement of our footprint in scope and data quality.

This year we have made significant progress in understanding our carbon footprint. We have increased the scope to include emissions from purchased goods and services and made an initial assessment of the carbon intensity of our investment portfolio that we hold for policy purposes. We have also begun work to understand opportunities for carbon reduction.

Our own operational carbon footprint

We measure our Greenhouse Gas (GHG) emissions using the three 'scopes' defined by the Greenhouse Gas Protocol:

- 'Scope 1' – direct emissions from natural gas combusted in our building
- 'Scope 2' – electricity we purchase
- 'Scope 3' – all other indirect emissions associated with our operations.

We have aligned our measurement and reporting methodology as closely as possible with the Greenhouse Gas Protocol and applied New Zealand-specific guidelines and emission factors published by the New Zealand Ministry for the Environment (MfE). Where specific factors are not available for New Zealand, we apply international factors in our calculation.

Our emission profile, much like those of other service-based organisations, is dominated by Scope 3 emissions. The main source of emissions is purchased goods and services. IT services make up just under half of this, with communication services, management consultancy and property services being the other main contributors. We are working to refine measurement methodologies for purchased goods and services.

Meeting the currency needs of the public is one of our main functions and we include emissions from the production and freight of currency in our footprint. These collectively are the second-highest source of our emissions.

Other components of our footprint relate to our physical environment and the number of people and other resources we employ to perform our mahi.

The number of people working at the Bank has increased materially over the last few years. In 2020/21 that number increased by around 70, from 400 at the end of June 2020 to 470 at the end of June 2021.

We operate from two sites. We own the building at 2 The Terrace, Wellington and occupy approximately half of it, leasing the remaining office space.

Approximately 400 staff are located in Wellington. In addition, we lease office space in Auckland for around 70 staff. Our flexible working environment enables staff to work remotely from home.

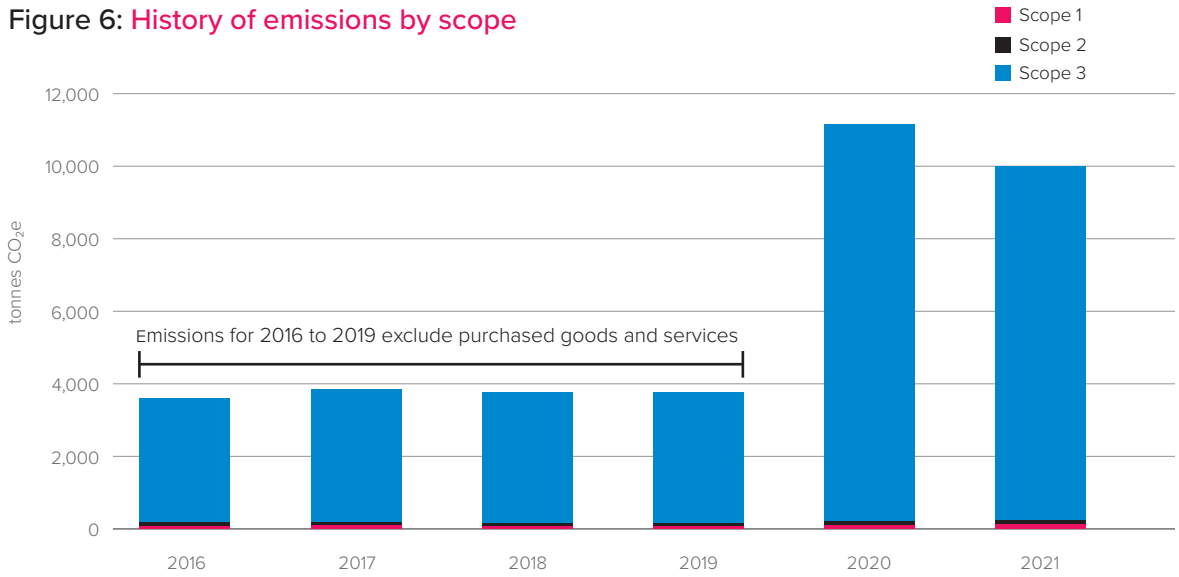
Staying connected with our stakeholders and counterparts requires an element of travel. Prior to travel restrictions due to COVID-19, business travel was the third-highest contributor to our footprint.

Our evolving carbon footprint

This year we have sought to develop a strong baseline for our emissions. A robust carbon footprint is the basis for credible reduction targets and a reduction pathway. We have revised our 2019/20 footprint so that it may be referenced as the base year for our carbon-reduction targets and plans. The revision has added emissions from purchased goods and services, such as IT services, not recorded previously as emission factors were unavailable. The revised footprint is 7,802 tonnes of CO_2e higher than the original, increasing from 3,354 to 11,156 tonnes of CO_2e.

We have engaged Toitū Envirocare to verify both the revised 2019/20 footprint and our 2020/21 footprint.

Figure 6: History of emissions by scope



This year's footprint

Our carbon footprint was 10,014 tonnes CO_2e in 2020/21, 10% lower than it was in the previous financial year. The main reduction drivers were less business travel (COVID-19) and less demand/issuance of banknotes. The main source of emissions was purchased goods and services. IT services made up just under half of this, with communication services, management consultancy and property services being the other main contributors. We are working to refine measurement methodologies for purchased goods and services.

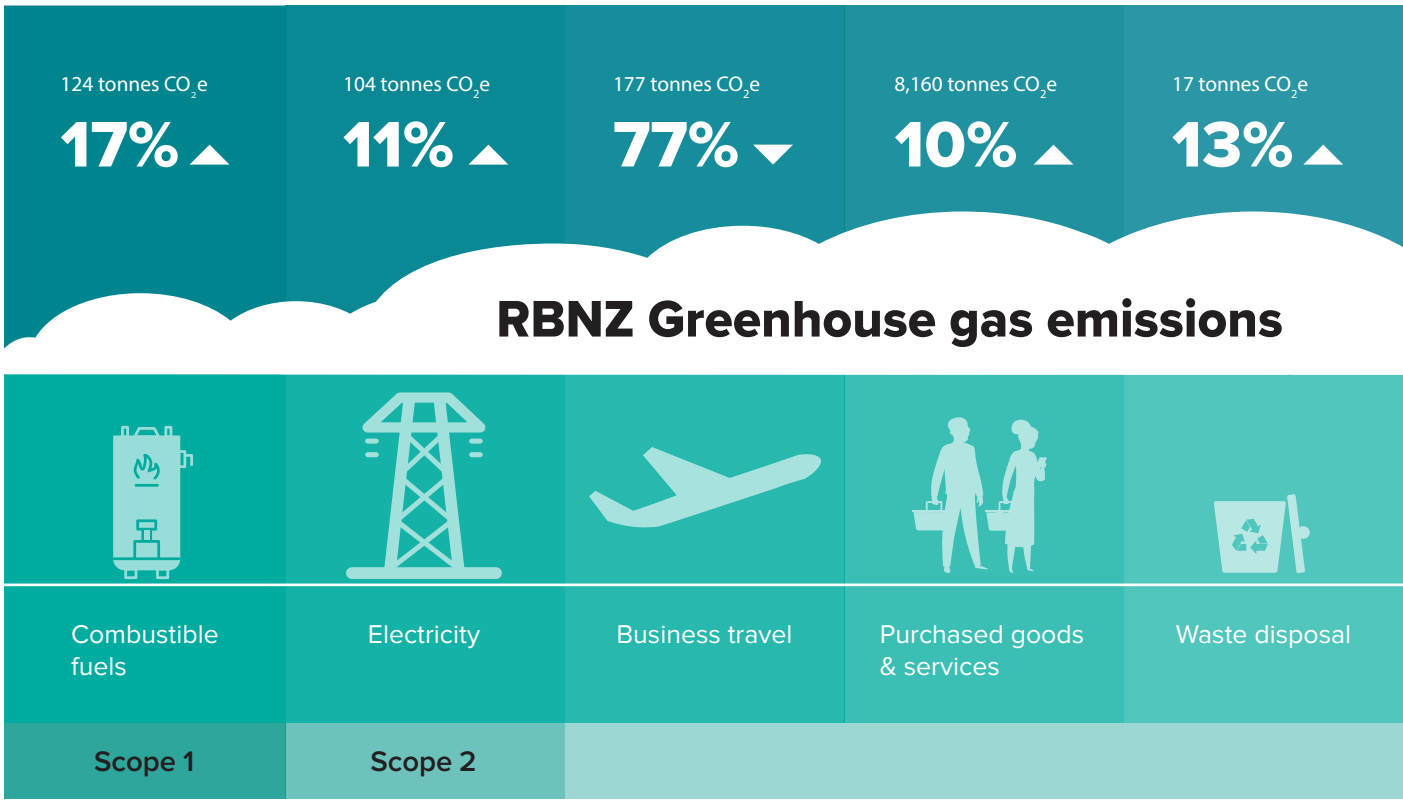
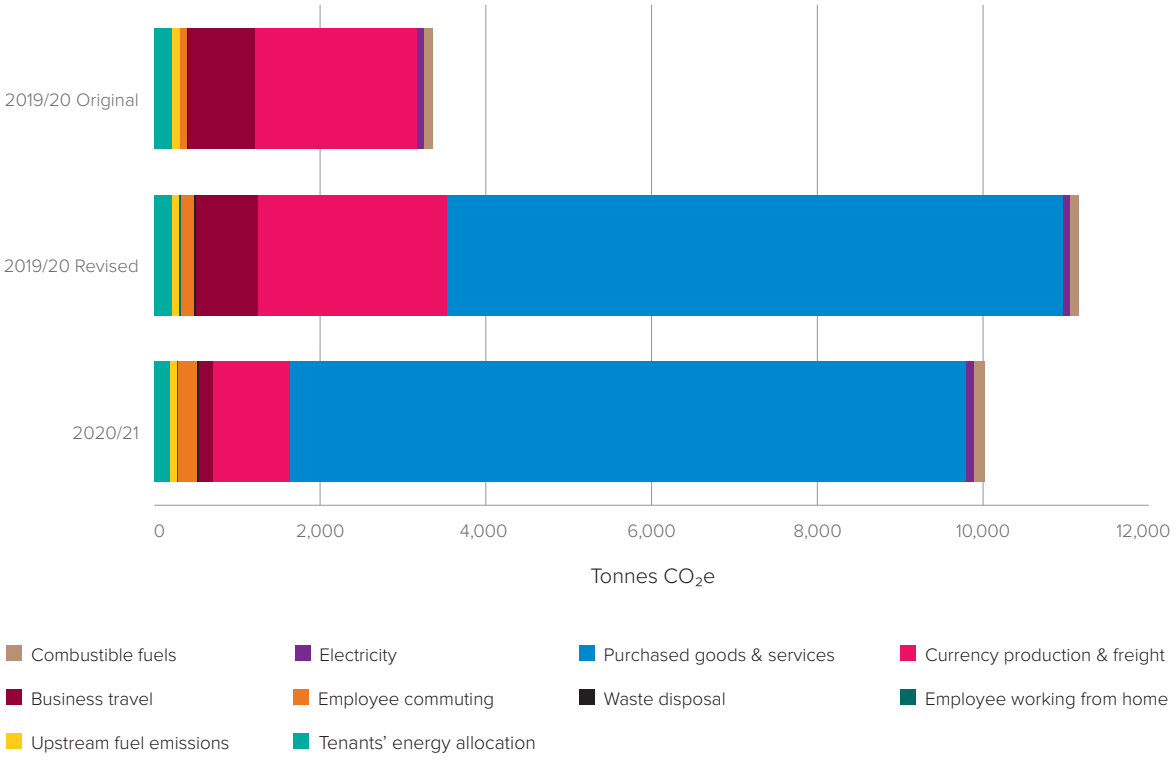
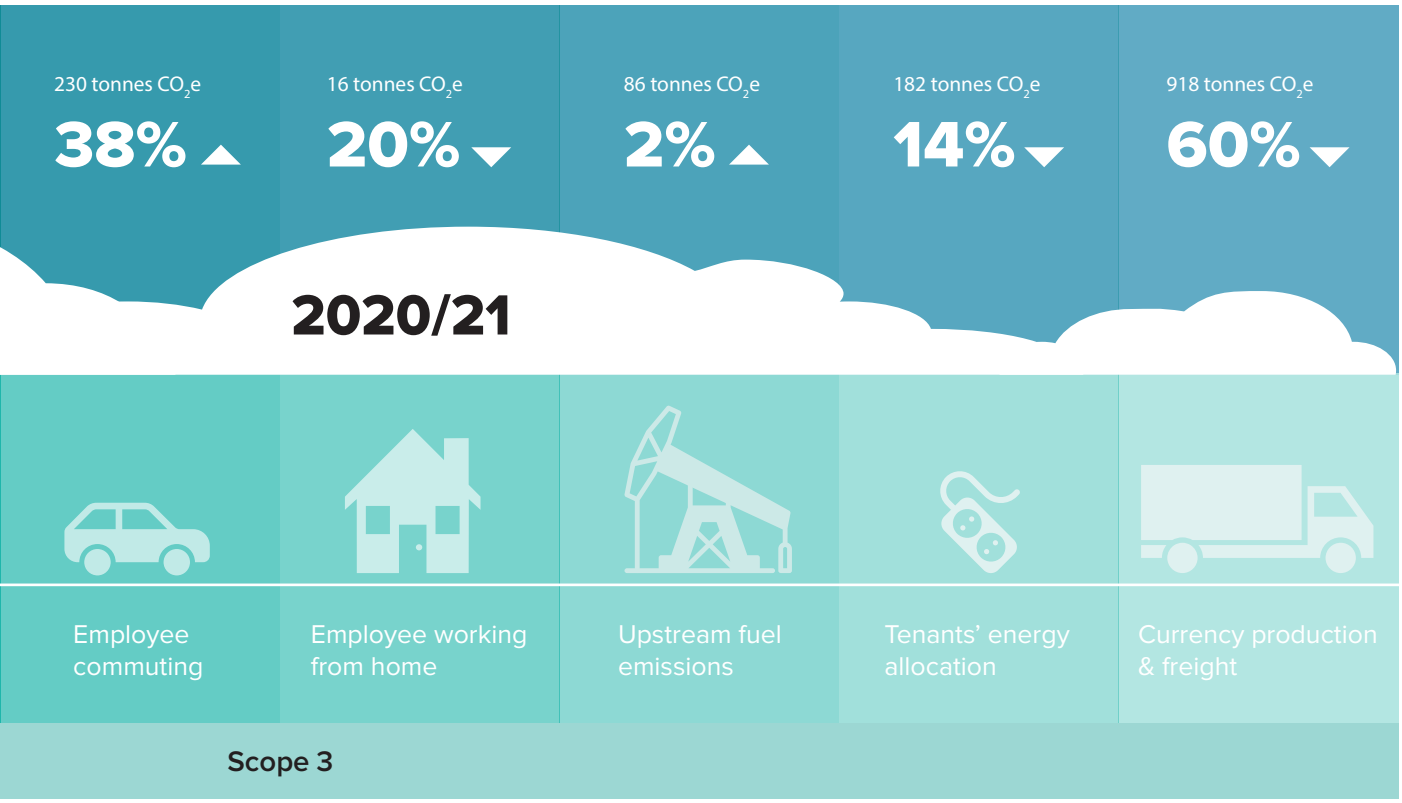


Figure 7: GHG emissions



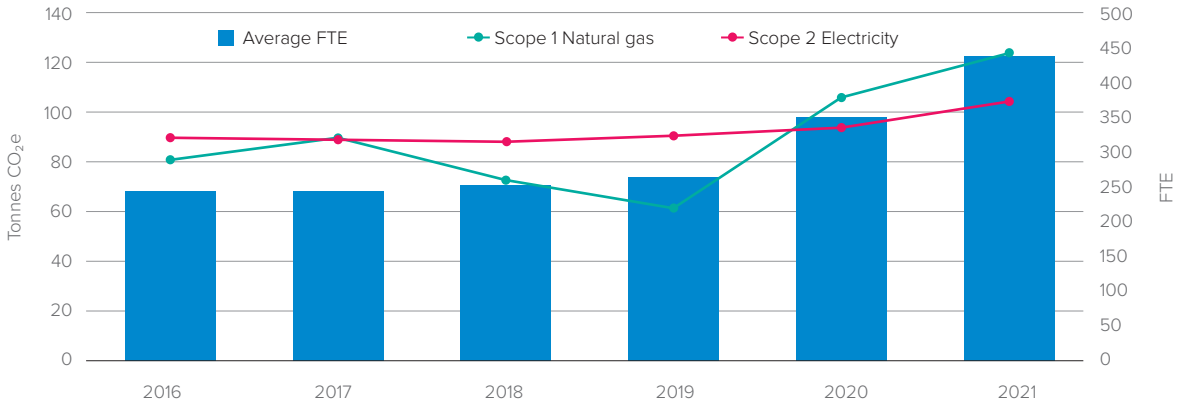



GIVE WAY

Increasing staff numbers have had direct impacts on our Scope 1 natural gas and Scope 2 electricity emissions, illustrated below, as have our more recently included emissions from staff commuting and staff working from home.

Natural gas emissions dipped in 2018 and 2019 due to a shut-down of the boilers at 2 The Terrace while the building was closed for an extended period for asbestos remediation work to be completed.

Figure 8: Scope 1 and 2 emissions influenced by increasing staff numbers



Trends in our emissions from business travel and currency are shown below.

Figure 9: Scope 3 Business travel

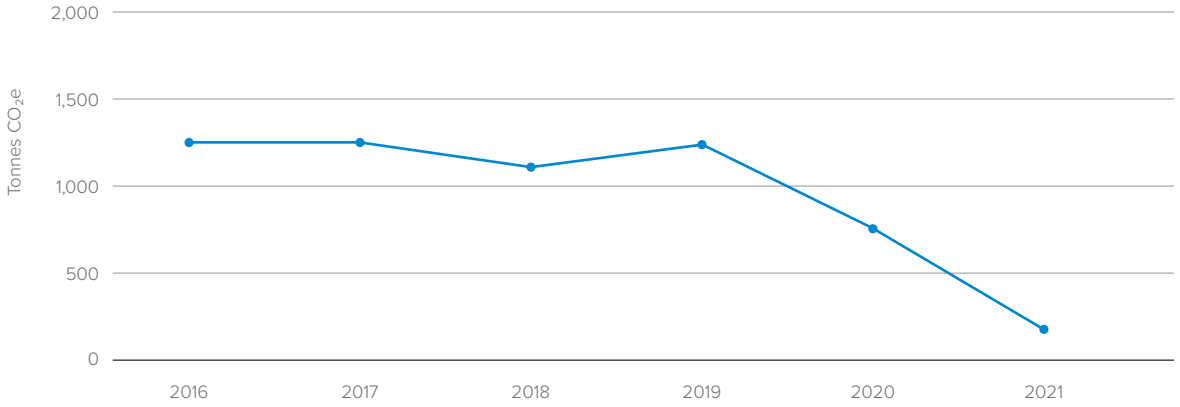
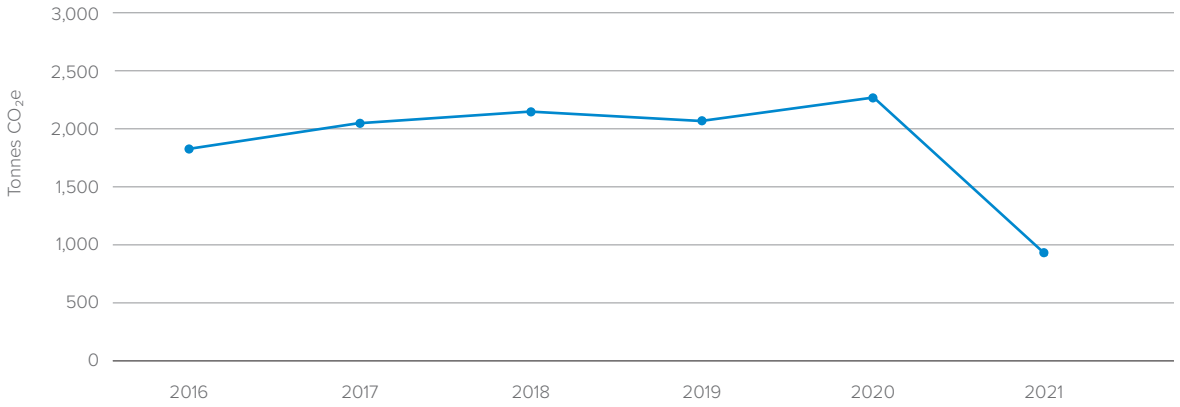


Figure 10: Scope 3 Currency production and freight



Where are we headed?

We are investigating ways to achieve emission reductions based on what the science tells us is required. We are looking at emission-reduction opportunities in areas over which we have control, along with engaging suppliers to improve data quality and encourage emission reductions in their operations.

Our investments and balance sheet

We use our balance sheet to achieve our monetary policy and financial stability objectives. We aim to incorporate our sustainability goals in our balance sheet decisions, to support the transition to a low-emission, climate-resilient economy and the development of a sustainable finance market in New Zealand.

We primarily use our balance sheet for two purposes: implementing monetary policy; and holding foreign reserves to support conditions in the New Zealand dollar market in the event of market stress, if required. To implement monetary policy, we are active in domestic financial markets with operations such as the Large Scale Asset Purchase programme (LSAP), the Funding for Lending Programme and Open Market Operations. Meanwhile, our foreign reserves holdings need to meet strict liquidity and credit quality criteria to ensure they are available in short order in the event that the New Zealand dollar market requires support.

Our ability to operate over a long time horizon will support the steady approach required to incorporate our sustainability goals in how we implement monetary policy. Our journey in this area is in its infancy, but as seen globally, efforts are underway to investigate how to give effect to this goal.

What have we done?

We made a notable contribution to our sustainability goals in 2019, when we purchased US$100 million of the Bank for International Settlements' Green Bond Investment Pool. This investment was small when compared to our total government bond holdings, but we saw an opportunity to begin our journey with confidence, alongside a number of our central banking peers.

This year we have engaged Trucost, a division of S&P Global Market Intelligence and a specialist in measuring the CO_2 emissions of financial portfolios, to provide an independent estimate of the carbon intensity of our government bond holdings.

Trucost used a Weighted Average Carbon Intensity (WACI) metric to assess our holdings of government bonds.[30] The WACI is the weighted average of the carbon emissions of each country in our investment portfolio (normalised by GDP), where the weights reflect the proportions of each country's share in our total investment portfolio.[31] The WACI of our government bond holdings is shown alongside that of the S&P G7 Sovereign Bond Index in Figure 11 below.

30 The WACI metric is recognised internationally as an appropriate way of measuring emissions associated with an investment portfolio more generally. The formula for this WACI measure is as follows:

$$\Sigma_i^n W_i * \left(\frac{Country\ emissions\ (tCO_2e)_c}{GDP_c} \right)$$

Where W_i = the value of holding portfolio weight (%) of sovereign bond 'i'.

Country Emissions $(tCO_2e)_c$ = The greenhouse gas emissions ($(tCO_2e)_c$) of country 'c'.

(tCO_2e) ' $_i$ = Apportioned emissions of sovereign bond 'i' mapped to country 'c'.

n = the number of sovereign bonds in the portfolio.

31 The data measures emissions on a 'territorial + imports basis' – covering all emissions from the goods and services produced and consumed within a country's territorial borders, as well as those produced elsewhere but imported and those exported and consumed elsewhere.

Our government bond holdings include bonds from New Zealand, the United States, Germany, Japan, Canada, Australia and the United Kingdom.[32] We have large New Zealand bond holdings, predominantly as a result of the LSAP. New Zealand's carbon intensity is marginally higher than the average of the S&P G7 Sovereign Bond Index, and as a result the WACI of our government bond holdings is higher. In addition, within our exposure to offshore government bond holdings, we have a greater weight towards higher-emitting countries (e.g. Australia and Canada) and a smaller weight towards lower-emitting countries (e.g. the UK and Japan) than the S&P G7 Sovereign Bond Index. This analysis gives us an indication of the relative climate exposures today rather than targets to aim for. It is important for us to consider climate risks on a forward-looking basis.

We have published a summary of the carbon emission intensity of the countries of our sovereign bond portfolio in our Annual Report[33] this year, taking a proactive step on our sustainability disclosures. This aligns with international efforts, such as those of the Task Force on Climate-related Financial Disclosures (TCFD), to encourage financial institutions to be transparent about the volume of emissions from their investment funds.

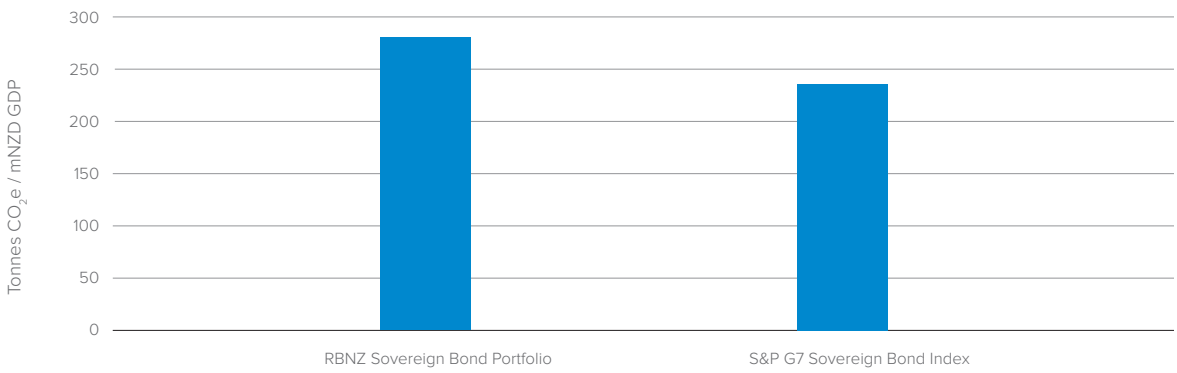
Where are we headed?

Countries face transition risks as they shift to more environmentally sustainable economies. For example, some fossil-fuel assets could become 'stranded assets' and quickly lose value. Countries also face physical risks from climate change, such as more severe or frequent floods and droughts that can affect their economies. We have begun looking in more depth at the climate-related risks that arise from our government bond holdings.

Possible actions include taking a more holistic approach when making asset allocation decisions in our foreign reserves portfolio, by considering the expanding universe of sustainability-linked investment opportunities. This would allow us to optimally combine our policy objectives with our sustainability goals. We are conscious that the range of investment options will widen over time and we will look to support the development of sustainability-linked markets.

Domestically, we intend to review the types of collateral (e.g. bonds) that we accept in exchange for cash in our operations, and the pricing of these bonds. That said, our journey along this path remains in its infancy, but we remain committed to researching options so we can best contribute to a low-emission, climate-resilient economy and the development of a sustainable finance market in New Zealand.

Figure 11: Weighted Average Carbon Intensity



32 As a comparison, the G7 portfolio comprises the USA, Canada, France, Germany, Italy, Japan and the UK (with no exposure to New Zealand or Australia). The weights in this index are determined by the relative size of each country's sovereign bond market

33 Reserve Bank of New Zealand 2021 Annual Report

Get our settings in place: Mainstreaming climate by understanding and incorporating the impacts of climate change on our core functions

We are working towards fully embedding climate risks into our core functions of financial stability and monetary policy. In conducting these core activities, we must have regard to all relevant risks and operate according to appropriate time horizons.

Policy functions

Climate change will increasingly represent an important risk that we must factor into our decision-making when carrying out our policy functions.

We contribute to regulatory policy discussions such as climate-related disclosures while building capacity and awareness within our organisation.

Understanding climate change and climate risks is of critical importance to financial stability and developing future policy. We are fostering long-term decision-making with the goal of working towards a climate-resilient economy.

Cross-agency collaboration is crucial to address the challenge that climate change poses for financial stability. We lead the Council of Financial Regulators (CoFR) Community of Practice on climate change (see the 'Show the way' section).

We are a strong supporter of increased disclosure of climate-related risks as a way to understand and mitigate financial stability risks. Therefore, we have a close interest in the new requirements for mandatory climate-related disclosure (in the Financial Sector [Climate-related Disclosures and Other Matters] Amendment Bill). Once enacted, this will be supported with reporting standards to be issued by the External Reporting Board (XRB), which will require disclosure from the entities captured under the regime. These requirements will apply to a number of the banks and insurers that we supervise and we are working closely with the XRB and the Financial Markets Authority (FMA) which would have roles in compliance, monitoring and enforcement.

What have we done?

Contributing to Government policy

We actively work to inform Government policy on climate change in areas relevant to our remit. In March 2021 we submitted a response to the Climate Change Commission's *Climate Action for Aotearoa* consultation.[34] Our submission emphasised five points relevant to our remit:

1. Climate change and how it impacts financial stability
2. The role of finance
3. Disclosure as a mechanism to improve the systemic management of climate risks
4. The importance of investment
5. A Te Ao Māori lens and the need for a considered and aligned approach

We also submitted on the Climate-Related Financial Disclosures discussion document jointly published by the MfE and the Ministry of Business, Innovation and Employment (MBIE).[35] We strongly supported the disclosure of climate risks, noting that disclosure can facilitate changes to firms' and investors' behaviour by directing attention to climate-related risks.

34 Reserve Bank of New Zealand Submission to the Climate Change Commission's Climate Action for Aotearoa consultation

35 Ministry for the Environment and Ministry of Business, Innovation and Employment. Climate-related Financial Disclosures Discussion Document

At the same time, we felt that relying on market forces to drive disclosure might not lead to a fast enough response, pointing to the need for some form of public intervention.[36] We also supported disclosure using the framework issued by the TCFD, on the basis that it would provide a clear, consistent and globally recognised approach.

We also made a submission on the Climate Change Response (Zero Carbon) Amendment Bill.[37] We highlighted that robust, credible and durable climate policy frameworks will support financial stability.

Risks to the financial system are likely to increase if there are frequent shifts in climate change policy, if changes are implemented too quickly, or if they are delayed to the point where sudden, more material changes are required. Cross-party political support is a critical aspect in establishing and maintaining this long-term durability.

New climate disclosure legislation and how it impacts prudential supervision

The joint MBIE/MfE discussion document referred to above has led to new legislation, which will make climate-related disclosure mandatory for around 200 of the most significant entities in New Zealand. The Financial Sector (Climate-related Disclosures and Other Matters) Amendment Bill[38], expected to be enacted in 2021, will amend existing disclosure legislation to require climate-related disclosures. It is expected to apply to all registered banks, credit unions and building societies with total assets of more than $1 billion, and all licensed insurers with greater than $1 billion in total assets under management or annual premium income greater than $250 million. We are the prudential regulator of many of these financial entities that will be captured under the new legislation. Note that there are other entities that will also be required to report.

The XRB is developing the standards that will be needed to implement the new disclosure requirements. These standards will align closely with the TCFD framework, which is structured around four thematic areas representing core elements of how organisations operate: governance, strategy, risk management, and metrics and targets. The status of the TCFD framework as the global standard for climate risk disclosure has only increased since 2019, and using it as the basis for New Zealand's requirements will help overseas investors understand New Zealand climate disclosures more easily.

We have long been an advocate of market discipline, which makes up one of the three pillars of our regulatory framework (the other two being self and regulatory discipline). Market discipline works best if it is supported by the disclosure of robust, reliable and comparable information. We place a significant emphasis on disclosure as part of our regulatory framework and, although the mandatory climate-related disclosure regime will not specifically be part of our framework, we are committed to working with our regulated entities and other agencies to ensure that the new disclosure requirements deliver the best outcomes for New Zealand.

While other agencies are in the lead on the design and implementation of disclosure obligations, the matters that the disclosure will cover fall mostly within our areas of concern as a supervisor. Also, our plan to carry out climate stress tests (see the 'Financial System Analysis' section) will be based on selected climate change scenarios, and we aim to do this in a way that is consistent with the TCFD requirement for entities to disclose their strategies for managing the risks across a range of scenarios.

36 Reserve Bank of New Zealand Submission on the Climate-Related Financial Disclosures Discussion Document

37 Reserve Bank of New Zealand Submission on the Climate Change Response (Zero Carbon) Amendment Bill

38 Financial Sector (Climate-related Disclosures and Other Matters) Amendment Bill

Where are we headed?

Later this year we will begin developing a guidance note on climate change risk management for our regulated entities. The Guidance will support the Climate-Related Disclosure plans and will cover governance, risk management, scenario analysis and disclosure. The guidance will not impose new requirements in relation to climate risks; rather it will support compliance with the Bank's existing risk-management and governance requirements, and will provide guidance to assist entities to manage climate risks. Our approach will follow that of other appropriate regulators, for instance the Australian Prudential Regulation Authority (APRA) and the Monetary Authority of Singapore (MAS), and will focus on physical, transition and liability risks.

We believe that it will be crucial to work with our regulated entities to ensure that they are in positions to meet the new reporting expectations. We have heard from industry that key challenges include establishing appropriate scenarios, managing uncertainty, data availability, and capacity. The required disclosure will incentivise regulated entities to make progress on making robust long-term plans for responding to climate change and managing the emerging risks. We aim to support regulated entities by helping to develop a common understanding of what is needed and sharing best practice.

We are engaging closely with the XRB as it develops its standards (and associated guidance) on the TCFD disclosure, to ensure that any guidance or expectations we issue are consistent with what the XRB covers in respect of the reporting of that risk management.

Financial System Analysis

As highlighted earlier, climate change represents a potential risk to financial stability through a number of channels. This section explores how we are increasing our understanding and analysis of such risks.

Lenders are exposed to business and household borrowers who face transition risks, for example from emissions pricing, or physical risks, such as flooding or droughts. Most lending is secured by property, for example houses, farmland, or commercial developments, and the value of some of this collateral is subject to risks from climate change. Moreover, the prices of property or financial assets can change rapidly, even if the underlying risks derive from gradual changes in the climate.

There are a great many unknowns surrounding the financial risks from climate change and how they may play out. There is a lack of relevant historical experience and data on the resilience of lenders' counterparties to climate risks. The role that insurers and the global reinsurance industry will play in managing these risks is unknown.

Additionally, how well lenders will be able to adapt their long-term strategies to mitigate the transmission of climate risks to the financial system has yet to be seen. These all add to the uncertainty, which itself is a major additional source of risk.

However, a number of important steps are underway to reduce the uncertainty around the climate risks faced by the financial system. These include: the evolution of New Zealand's mandatory disclosure regime, as discussed above; the development of the NGFS scenarios, which may form a common and well-grounded basis for vulnerability assessments; and various research projects in New Zealand and abroad aiming to put numbers on risks and transmission pathways. We are actively supporting these developments.

What have we done?

Our bi-annual *Financial Stability Reports* (FSRs)[39] have included information on impacts of climate change on financial stability. In our May 2019 FSR, we provided the results of a survey that showed most banks and insurers expected significant impacts on their businesses, although many were still at an early stage in terms of developing their strategies and risk management systems to respond to those exposures. We plan to repeat this survey in 2022.[40]

This year marked the launch of an annual stress test cycle for banks and our first insurance industry stress test. As part of this we added climate-related events to our stress tests. This year's scenarios featured droughts and other severe weather events to consider the impacts on banks and insurers.

39 Reserve Bank of New Zealand Financial Stability Reports

40 Reserve Bank of New Zealand May 2019 Financial Stability Report. Industry survey on the potential impacts of climate change, page 22

Where are we headed?

Stress testing

We are learning ways to further incorporate the risks of climate change in our stress testing, while also continuing to improve capability.

The plan is to build up gradually over the next 18 months to a full climate change scenario-based industry stress test. There are a number of steps in this process:

1

We are including specific risk types into the current round of stress tests. We explore the physical risks of drought in this year's bank stress test, while this year's general insurance stress test includes severe weather events.

2

The 2022 bank stress test will contain a risk assessment of particular exposures that are important for financial stability in New Zealand. Mortgage, commercial property and dairy exposures are under consideration. This is aimed at assessing the resilience of the most significant bank exposures to climate change risk in New Zealand and identifying any gaps in data and modelling.

3

The third component is our review of the literature on climate change stress testing, learning from other regulators, and an analysis of the NGFS scenarios as outlined in the next section.

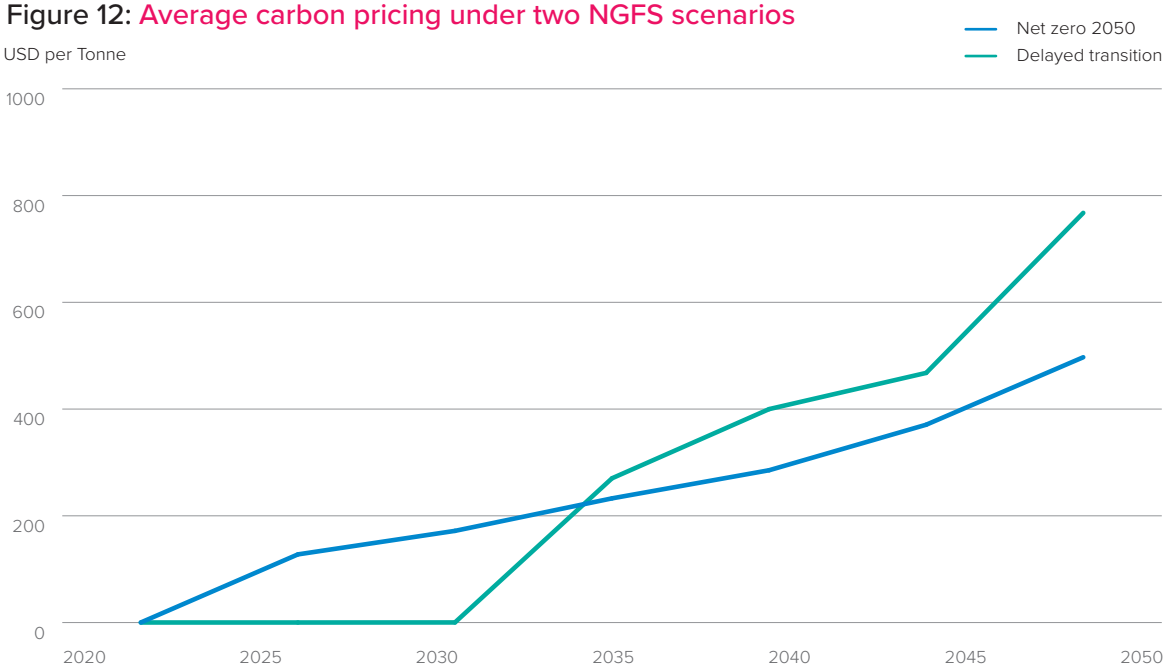
4

The fourth component is to design scenarios based on learning from the three steps earlier, working in consultation with industry.

18
months

The main challenges that other regulators have identified in conducting climate change stress tests are data requirements, scenario design and industry engagement. The preceding three steps should help us address these issues, and place the Reserve Bank and industry in a better position to launch a full scenario-based industry climate change stress test, likely in 2023.

Figure 12: Average carbon pricing under two NGFS scenarios



A note on transition risks

The transition to a low carbon economy can present economic costs and significant risks, and in some cases pursuing more ambitious reductions early on may incur additional costs in the near term. For example, early adopters of technologies to reduce emissions may face higher costs. However, generally a well-signalled and orderly transition will give emission-intensive sectors time to change how they do business, whereas delayed then abrupt climate change policies have the potential to create unplanned disruptions to businesses and impose greater economic costs.[41] [42]

The NGFS modelling results illustrate transition risks under various policy scenarios. Carbon pricing is a widely used climate change policy and is easy to measure. This makes it a good proxy for transition risk. Figure 12 shows carbon price projections under two NGFS scenarios. Under the Net Zero 2050 scenario, a graduated set of climate policies is implemented immediately and carbon-intensive industries have sufficient time to adapt their business practices to a low-carbon economy. In the delayed transition, no action is taken until 2030. To achieve a below-2°C outcome, strong climate policies are implemented abruptly. Carbon-intensive businesses struggle to adapt to these policies and this puts downwards pressure on economic growth.

We can see that in the net zero scenario, carbon prices increase early and at a low rate in contrast to the delayed scenario where carbon price increases come late and strong. The longer we delay climate change policy, the more severe the policy may be to achieve climate targets.

NGFS scenarios

We are assessing the NGFS scenarios[43] for use in our work on the potential impacts of climate change on financial stability in New Zealand. This includes using the data on transition pathways for New Zealand under different climate-risk outcomes to create a narrative explanation of how climate change might affect financial stability. This will feed into our stress test scenario design work outlined in the previous section.

41 He Tirohanga Mokopuna 2021 The Treasury's combined Statement on the Long-term Fiscal Position and Long-term Insights Briefing

42 Westpac NZ Climate Change Impact Report April 2018

43 NGFS Climate Scenarios for central banks and supervisors

The NGFS scenarios present six climate transition pathways, and are categorised into 'orderly', 'disorderly' and 'hot house world', depending on the level of transition or physical risks they pose over time. The scenarios have been created at the global level; however, key macroeconomic and risk variables have been downscaled to the country level, allowing an exploration of the potential pathways for New Zealand's climate transition.

We have already identified some gaps where additional data sources would likely be needed for the scenarios to more accurately project the pathways of the key physical and transition climate risks that New Zealand faces. For example, while there are some agriculture sector variables, there are no variables for the dairy sector specifically, which is a significant exposure for the New Zealand banking system. Other central banks have built on the NGFS scenarios to address these gaps, using supplementary data sourced from other climate models, such as that of the IPCC.

Similarly, we would need to supplement the NGFS scenarios with coastal flood mapping obtained from other sources to fill this gap, as sea-level rise is a particularly important risk for an island nation such as New Zealand.

However, this work programme is still at an early stage. More in-depth analysis is needed to examine the usefulness of the NGFS scenarios for the New Zealand context, and to establish other data sources that may be needed to gain a more accurate assessment of how climate change could affect financial stability in New Zealand.

Supervision

Our supervisory approach has evolved to include relevant climate considerations. Since early 2020 we have been including climate change in our scheduled supervisory engagements with management and boards of regulated firms to understand their climate change governance, strategy, and risk-management frameworks.

Our focus is on identifying the prudential risks and issues, assessing the effort and areas of focus across financial sectors and building our own knowledge and capability.

Supervisory activity will morph into a more assertive communication of expectations based on our knowledge of what supervised firms are doing and informed by wider climate change policy developments, further training, and guidance material.

What have we done?

We are building our climate expertise and awareness through training and development. In particular, we are deepening our understanding of climate-related physical, transition and litigation risks for banks and insurers and discussing their preparedness for climate-related financial disclosures.

Engagement with regulated firms over the past 12 months has revealed differences between sectors. For banks, awareness of climate-related risks has generally increased and attention from boards and management has intensified. For insurers, there is increasing awareness but variations in the extent to which climate change responses are being developed.

We have expanded our climate training programme for supervisors and are integrating climate risks into our supervisory frameworks. Last year we collaborated with the FMA to upskill our supervisors on climate risks and climate-related financial disclosures. The sessions covered an introduction to climate-related risks, the relationship of climate-related risks to traditional financial risks, and the Task Force on Climate-Related Financial Disclosures' risk framework. The SIF has used this training as a case study, highlighting how we are using SIF resources for specialist training sessions.[44]

Work is also underway to assess our current data collection from banks, to consider our future monitoring and needs from climate risk. Our Data Strategy team is working closely with banks to explore Loan Level Data Collection.

There may be an opportunity to collect variables that can assist in assessments of the physical and transition risks related to climate change. For instance, geographical information could help us to assess the impacts of sea-level rising or river flooding on loan collateral. Combining geographical information with industry information would support stress testing of the impacts of drought on credit losses for selected industries, e.g. dairy farms. With climate disclosures becoming mandatory from 2023, banks will have to collect more information related to climate and we expect the Loan Level Data Collection to evolve in line with this.

We note that banks and insurers subject to future mandatory climate-related financial disclosure are self-assessing their climate risk exposure and their capabilities to meet regulatory requirements.

Where are we headed?

We will increase our understanding of the prudential implications of climate change, and further embed climate risk into our supervisory frameworks, data collection and internal training.

We will promote banking sector climate change capabilities by increasing supervisory intensity on entities that are not positively progressing their climate change capabilities.

Our engagement with regulated entities will continue through banking and insurance Directors and Senior Officers workshops. As part of the Reserve Bank's more intensive approach to supervision generally, our bilateral engagements with the management and boards of regulated entities will develop to include the responsibilities, oversight and implementation of their climate strategies and practical steps toward mandatory climate-related disclosures.

44 NZ Insurance Supervisors use SIF resources to hone in on climate risks

Monetary Policy

We operate monetary policy to maintain price stability and support maximum sustainable employment.[45] One of the key roles that we play in our economy is setting the Official Cash Rate (OCR), which influences interest rates.[46] Among other things, the interest rate affects New Zealanders' purchase decisions – when interest rates are low, we might be more inclined to buy on credit because the cost of borrowing is low. Conversely, we might find saving our money more attractive when interest rates are high. By reviewing the OCR seven times a year, the Reserve Bank helps to stabilise the economy throughout the business cycle.

To deliver on our mandate and do our job well, we need to have a strong understanding of the trends in our economy. This means we are always researching these trends and analysing how they shape the risks our economy faces. We use the insights into these risks when making monetary policy decisions.

We refer to the ways that climate change affects our economy as 'transmission mechanisms'. An example is useful to help us understand these 'transmission mechanisms'. As the economy adjusts to the changing carbon price, there will be changes in resource allocation, new investment in some sectors and withdrawals of capital from others. These will affect the economy's growth rate and inflation dynamics.

Climate change could have a large impact on our economy, so we must develop a strong understanding of the impacts it poses to our ability to conduct our monetary policy role effectively.

What have we done?

In 2019, we began to think about the implications of climate change for monetary policy. In particular, we looked at the risk of drought changes with the climate. Our economy relies on agricultural and pastoral farming, so water shortages can pose significant macroeconomic risks. Traditionally our approach to monetary policy has recognised the impacts of droughts on the economy. However, it is also important to think about how climate change affects the likelihood of drought. An initial review of the literature suggested that the variance in soil moisture could increase by as much as 51.91% due to climate change. Presently, our Economics Department is analysing the latest set of climate change projections from the NGFS scenario database. Briefly, this database combines research from a broad range of experts to create a number of climate risk scenarios that describe how our climate and economy might change given a level of CO_2 emissions.

From our initial analysis, the effects on New Zealand's economy of climate change are mixed – differing across sectors and timeframes. For example, there are sectors of our economy that may benefit from higher temperatures and changing rainfall patterns while at the same time facing the costs of transitioning to a lower-carbon economy. The New Zealand economy as a whole will face issues that could reduce the rate of improvement in our wellbeing, like higher risks of flooding and drought.

Where are we headed?

We are currently assessing how our approach to monetary policy should account for the impacts of climate change. Climate change is a complex issue and we must make sure that we understand how it will affect the economy to effectively mitigate the attendant risks. Our approach to climate change is developing and we are continuing our research efforts.

45 Reserve Bank of New Zealand: About Monetary Policy

46 Reserve Bank of New Zealand: What is the Official Cash Rate?

Show the way: Leading through collaboration

Our approach to climate change recognises the imperative of collaboration.

We stress the need for a coordinated and aligned approach. In the context of climate change, leadership means having the courage to face complexity and work through it together. We need to learn quickly from each other to share best practice in understanding and managing climate-related risks.

What have we done?

Global Collaboration and Engagement

We have joined 95 other central banks and supervisors to strengthen the global response to climate change through the NGFS. The NGFS aims to exchange experiences, share best practices, contribute to the development of environment and climate risk management in the financial sector, and to mobilise mainstream finance to support the transition toward a sustainable economy. We are also a proud member of the SIF and contributed to the development of the Group of Thirty report, *Mainstreaming the Transition to a Net-Zero Economy*.[47] These alliances help us develop our understanding of climate-related risks. For example, we use resources from the NGFS and the SIF for training our supervisors in climate-related risks.

We also engage on climate at a regional level through the Executives' Meeting of East Asia-Pacific Central Banks (a cooperative organisation of central banks and monetary authorities in the East Asia and Pacific region) and the Trans-Tasman Banking Council, and bilaterally, for example, with the Bank of England, the Monetary Authority of Singapore, and the Australian Prudential Regulation Authority to learn about and share approaches on climate change.

New Zealand Collaboration and Engagement

To improve our evolving understanding, we regularly engage with scientists and researchers, including universities, NIWA, the Deep South National Science Challenge and the Whakahura Extreme Events and the Emergence of Climate Change programme. We are on the Representative User Group for the Deep South National Science Challenge.

We also engage with industry on climate change bilaterally and in industry workshops, and via groups such as the New Zealand Bankers' Association, the Institute of Directors, the Sustainable Finance Forum, Chartered Accountants Australia and New Zealand, and the Banking and Financial Services Law Association.

The responsibilities and powers of other government agencies intersect with the Reserve Bank's financial stability remit as it relates to climate risks. Cross-agency collaboration is vital to guard against duplication of effort or important work being overlooked. It also ensures different areas of expertise are brought together to collaborate on different aspects of what are multifaceted problems (see Figure 13).

47 G30 Working Group on Climate Change and Finance Special Report: Mainstreaming the Transition to a Net-Zero Economy

The Council of Financial Regulators (CoFR)

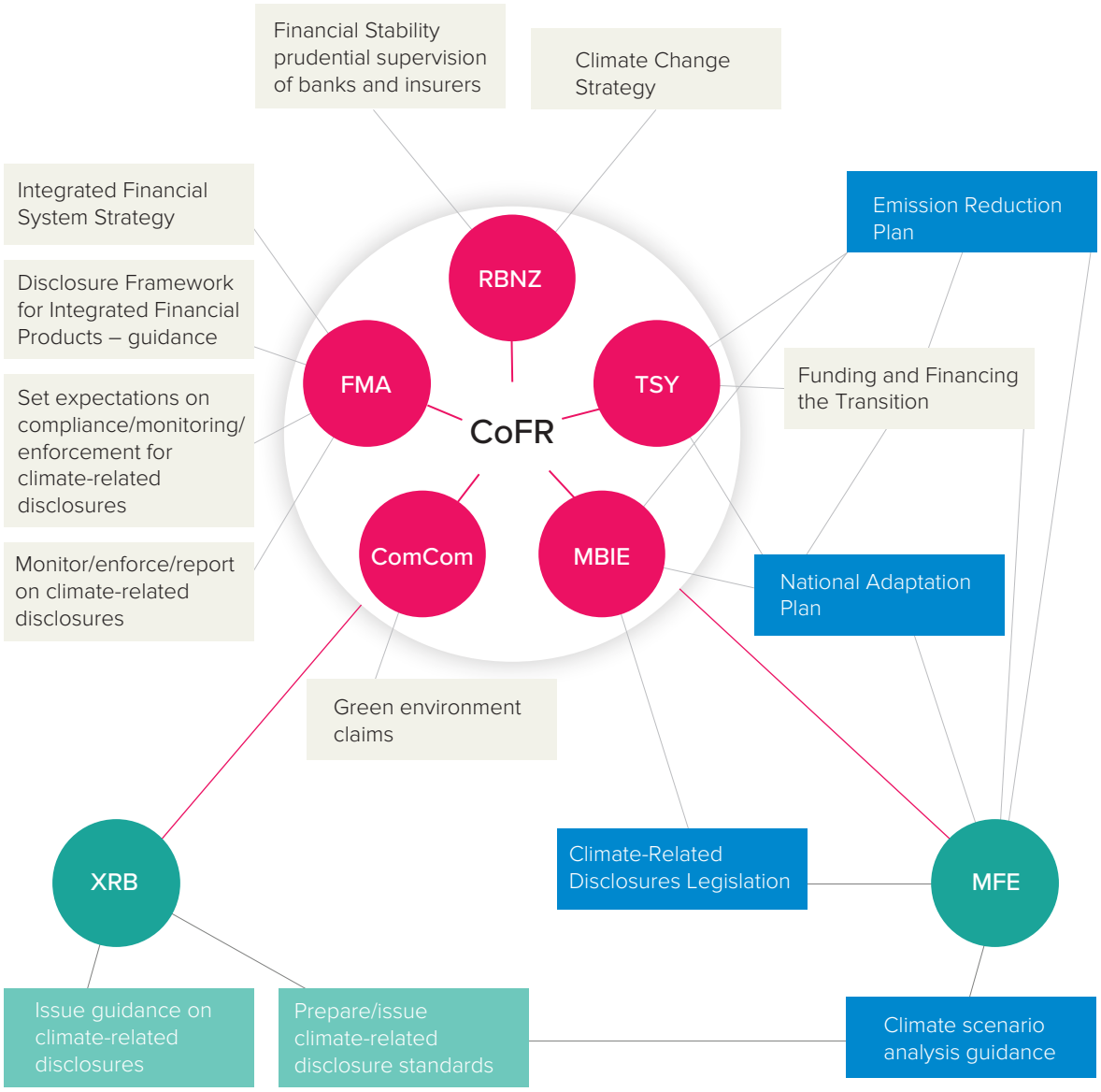
CoFR was established in 2011 to contribute to maximising New Zealand's sustainable economic wellbeing through effective and responsive regulation of the financial system in New Zealand. Members comprise the Reserve Bank, the FMA, MBIE, the Commerce Commission, and the Treasury. CoFR's mandate was strengthened in 2019, and as part of this, five priority themes were agreed on to cover developing issues for financial sector regulation.

Climate risk was an obvious area for one of the priority themes.

CoFR's climate risk priority theme is managed by a community of practice with membership from the CoFR agencies. The group acknowledges that non-CoFR agencies are leading key pieces of work that it wishes to contribute to and support, and in view of this MfE and the XRB are also represented on the working group.

The current priority is to increase coordination, capacity building and knowledge sharing across the CoFR agencies. This will help inform the regulation needed as the financial sector moves towards a more sustainable footing. Through CoFR, we have established a Climate Finance Reading Group with fellow CoFR agencies. These virtual sessions provide an opportunity for us to share information and insights with our CoFR colleagues on climate-related financial risks, and also organise a Climate Korero Seminar Series open to all CoFR staff. Recent presentations have included representatives of the Investment Group on Climate Change and the Climate Change Commission.

Figure 13: CoFR Climate Change Activities



Left to right Toitū Tahua, the Centre for Sustainable Finance Board: John McCarthy, John Duncan, Sir Stephen Tindall, Simone Robbers, Bridget Coates, Fonteyn Moses-Te Kani, Michele Embling, David Woods. Not pictured: Pip Best, David Tikao

Raising awareness of the potential risks to financial stability from climate change was one of our three focus areas set out in our 2019/20 SOI.[48]

To facilitate this, we have increased our engagement and communications through speeches, panel discussions, and op-ed articles. A key highlight was Governor Adrian Orr's participation in a 2020 virtual Climate Change Roundtable discussion with the United Nations Envoy for Climate Action and Finance Mark Carney, and Minister for Climate Change James Shaw. They discussed pathways to transition to a low-carbon future, with a particular focus on the Recommendations of the TCFD. At the 2020 New Zealand Climate Change + Business Conference, Assistant Governor Simone Robbers led a panel discussion on redefining finance.

We are also proud to be contributing to Toitū Tahua, the Centre for Sustainable Finance.[49] Simone Robbers sits on the Board, leading the governance implementation group. Whilst in its early stages, this work stream is focused on better-informed governance – to raise directors' awareness of and capability in relation to sustainability, the impending climate-related risk reporting, and how directors might incorporate Te Ao Māori values to assist with some of this longer-term thinking.

Where are we headed?

Our focus on raising awareness of the financial risks of climate change has helped lay the groundwork for a deeper integration of climate change across our operations and the financial system.

While we will continue to raise awareness, we are increasingly turning to the integration of these risks in areas such as climate-related risk management and disclosure and climate-related stress testing.

Internally, we will make use of training material from the NGFS and others to equip our employees with the necessary skills and knowledge on climate-related risks, with a view to efficiently integrating climate considerations into decisions across the Bank and financial system.

Nationally, we will contribute to the development of New Zealand's first National Adaptation and Emission Reduction Plans, and continue to contribute to other climate-related policy of relevance to our mandate, to highlight the climate impacts on financial stability.

Globally, our approach will be to contribute to the development of international best practice, and to learn from others. We commit to sharing knowledge and developing training materials based on our experience of and expertise in climate-related topics and will make those available to the NGFS, the SIF and others through the Climate Training Alliance (CTA).

We will continue to organise various dialogues and contribute to events on climate change organised by other stakeholders.

48 Reserve Bank of New Zealand Statement of Intent 2020 – 2023

49 Toitū Tahua, the Centre For Sustainable Finance

Our Vision for the Future and Our Evolving Approach

Our Climate Change Strategy, like many of the Bank's core initiatives, is a multi-year programme that is quickly becoming a key part of how we work and think. This Report provides a broad overview of the actions we have taken since introducing our Climate Change Strategy in 2018. We have made considerable progress in building capacity on climate risks within our own operations and our core functions. We have also raised awareness of these risks among the firms we regulate, and the financial system in general, through regular engagement with industry and experts, collaboration with fellow regulators, and capacity building.

We do, however, acknowledge that we are only at the beginning of our journey and that we have only started to gain traction. We, along with other financial regulators and the institutions we regulate, will require further and deeper understanding of how the financial risks of climate will play out in the longer term. We will need to integrate this with our strategies, governance and operations. Our actions and responses will need to evolve to be as transformational as possible.

Our work does not stop here. Our progress, the latest science, and increasing engagement with the international and New Zealand climate finance community give us the motivation to go further and at a faster pace. We expect to gain further momentum in our climate work in the next three to five years. Key areas of our Climate Change Strategy on which we aim to give a sharper focus include:

- Understanding in greater depth the impacts of climate change on financial stability and monetary policy using analyses such as the NGFS scenarios and stress testing
- Intensifying our supervision of climate-related risks, including working with lead agencies on the planned climate-related disclosures
- Encouraging the mobilisation of public and private capital to support an orderly transition – such as by encouraging disclosure and policy coherence/consistency to send a clear market signal
- Incorporating our sustainability goals in our balance sheet decisions, while maintaining our ability to effectively execute our policy objectives
- Understanding the impacts of climate change on our operations and reducing our own emissions
- Pursuing opportunities to further integrate our climate and Te Ao Māori strategies

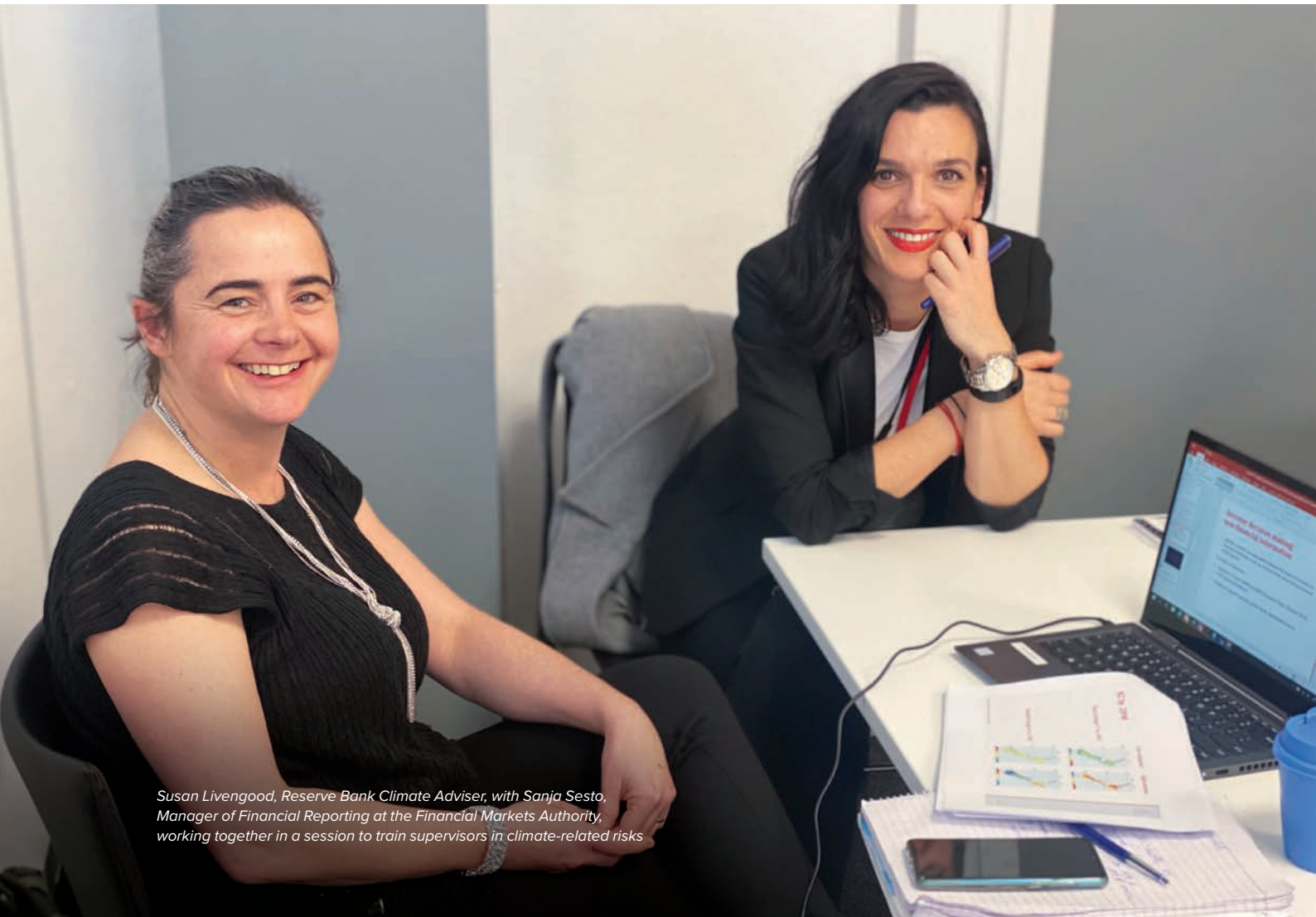
We are committed to continually improving and evolving how we approach climate change. At the same time, we know that integrity and transparency are key – we need to take stock of how things are going and the areas where we can improve and share this information with our stakeholders – hence the release of this Report. Finally, we all know that sustainability goes beyond climate change, so at the same time we need to consider broader sustainability factors – economic prosperity, environmental sustainability and social inclusion. The way we think about climate change and its long-term and inter-generational impacts correlates with our other current priorities that enable social cohesion and financial inclusion, such as our Te Ao Māori strategy, our Future of Cash programme and our Pacific Remittances Project.

All these strategies support and reinforce each other. They are critical for us to fulfill our purpose of enhancing the economic wellbeing and prosperity of all New Zealanders by promoting a sound and dynamic monetary and financial system.

As the world calls for an urgent and stronger response to climate change, Te Pūtea Matua stands ready to play its part, globally and as a leader in the Pacific region. We are committed to strengthening our actions and response to climate risks, based on data and best practices. We encourage you to engage with us, hold us to account on our climate commitments and give us feedback where we could do more, do differently or do better. Our collective action and engagement will help bring us closer to a more sustainable, financially stable future, not just for Aotearoa New Zealand, but more so, for the world in which we all live.

We welcome your thoughts and views on any aspect of our Climate Change Strategy and progress laid out in this Report.

You can email us with your feedback to rbnz-info@rbnz.govt.nz with the subject line 'RBNZ Climate Change Strategy'.



Susan Livengood, Reserve Bank Climate Adviser, with Sanja Sesto, Manager of Financial Reporting at the Financial Markets Authority, working together in a session to train supervisors in climate-related risks

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Climate change impacts the core of the tasks and responsibilities of central banks and supervisors. The question is not whether by acting on climate and environmental related financial risks we overstep our mandate, but that by not acting we would fail to deliver on it. I therefore very much welcome the Reserve Bank of New Zealand's report on its climate change strategy, confirming the dedication of central banks and supervisors worldwide to address this vitally important challenge within their mandates. There is no time to lose.

– Frank Elderson
Chairperson, Network of Central Banks and Supervisors
for Greening the Financial System (NGFS)