ROTORUA
LAKES COUNCIL
Te Kaunihera o ngā Roto o Rotorua

2021

MAHERE
TAUHOHE HUARERE

ROTORUA CLIMATE **ACTION PLAN**

Rārangi Take He Ihirangi
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Mihi Purongo Taiao
Environmental Report Greeting

Ka pō, ka pō, ka ao, ka ao.
Takiri mai te ata.
Kōrihi mai ngā manu.
Ka ao, ka ao, ka awatea.
Tihei mauri ora!

E ai ki te kōrero, “Toitū te marae o Tāne, toitū te marae o Tangaroa, toitū te marae o te Tangata.” E kite nei tātau i te panonitanga o ngā huarere, ka tika me rongo nei tātau ki ngā tohutohu o te taiao hai oranga mō te katoa. Pānuihia mai, whakangūngūa tēnei mahere. Homai ō koutou whakaaro kiapakari ai te tū o tēnei kaupapa hirahira.

Tēnā koutou katoa.

Tis night, tis night, tis day, tis day.
The dawn breaks.
The birds sing.
Behold, the day begins.
Tis the breath of life!

As the saying goes, “When the domain of Tāne (the forest) is sustained, and the domain of Tangaroa (the ocean) is sustained, the domain of Humanity will be sustained.”

We are seeing irregular changes in weather patterns. The time has arrived for us to take our guidance from nature herself. Read this plan, take it in. Give us your thoughts to strengthen the effectiveness of this important work.

Thank you all.

Kupu Arataki
Introduction

Human activity has impacted significantly on the Earth's atmosphere. There is evidence of climate change effects, including raised temperatures and sea levels and increased frequency of extreme weather events. The occurrence of these changes is projected to become more pronounced in the future and poses a serious threat to long-term community wellbeing.

How could climate change affect us in Rotorua?

Changes to our climate could mean:

- Higher temperatures
- More heavy rainfall events and more frequent flooding
- Water shortages, reduced water quality and increased risk of wildfires
- Longer crop growing season and fewer frosts
- Increased risk of invasive pests and weeds
- Increase in water-, food- and vector-borne diseases
- Loss of native wildlife, including mahinga kai

What is being done about it?

NZ was one of 195 countries that signed the Paris Agreement in 2016, committing to "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C". To achieve this, the world must transition towards a low-carbon economy by the second half of this century, i.e. a reduction in global greenhouse gas (GHG) emissions of 60 - 80% by 2050. If we don't act, global warming is expected to reach 4.1°C – 4.8°C above pre-industrial levels by 2100. Taking action to cut emissions (mitigation) is the priority to reducing future global warming. However, we also need to take actions to adapt to the impacts of the climate change that is already happening.

The NZ Government has a range of initiatives to help us transition to a low-emissions economy and reduce the impacts of climate change:

- Climate Change Response (Zero Carbon) Amendment Act 2019 sets New Zealand's target net emissions of all greenhouse gases (except biogenic methane) to zero by 2050, and sets target emissions of biogenic methane to 24 - 47% below 2017 levels by 2050. It further establishes an independent Climate Change Commission.
- New Zealand Emissions Trading Scheme (ETS) is a key policy tool to reduce emissions and meet our emission reduction targets. The ETS puts a price on greenhouse gas emissions and creates a financial incentive for businesses to reduce their emissions and landowners to earn money by planting forests that absorb carbon dioxide as the trees grow.
- International Carbon Markets Project builds environmental integrity in international carbon markets under the Paris Agreement, so that the use of these markets does not undermine global efforts to reduce emissions.
- Investment in Research and Development to identify options to reduce agricultural emissions

On 2 December 2020 the NZ government declared a climate emergency, matched with long term actions adding to the above including:

- Transitioning to a low-emissions economy: 'Emissions reduction plan'
- Reducing emissions from agriculture
- Offsetting emissions through forestry
- Adapting to the impacts of climate change
- Climate finance: investing in climate change action

Rotorua Lakes Council (Council) has responsibilities to prepare the community for, and manage the risks of, climate change-related natural hazards. It is our role to assess these risks and how we can best respond to the challenges and opportunities presented by climate change. Mitigation through energy efficiency, emission reduction and other conservation initiatives can help slow the effect of climate change, as well as offer considerable potential cost savings. Adaptation for climate change is already a priority consideration in the planning and management of our infrastructure.

Council committed to the UN Global Compact - Cities Programme in 2015 and developed our Sustainable Living Strategy in 2016 (reviewed 2020). Climate change is a key objective of that strategy.

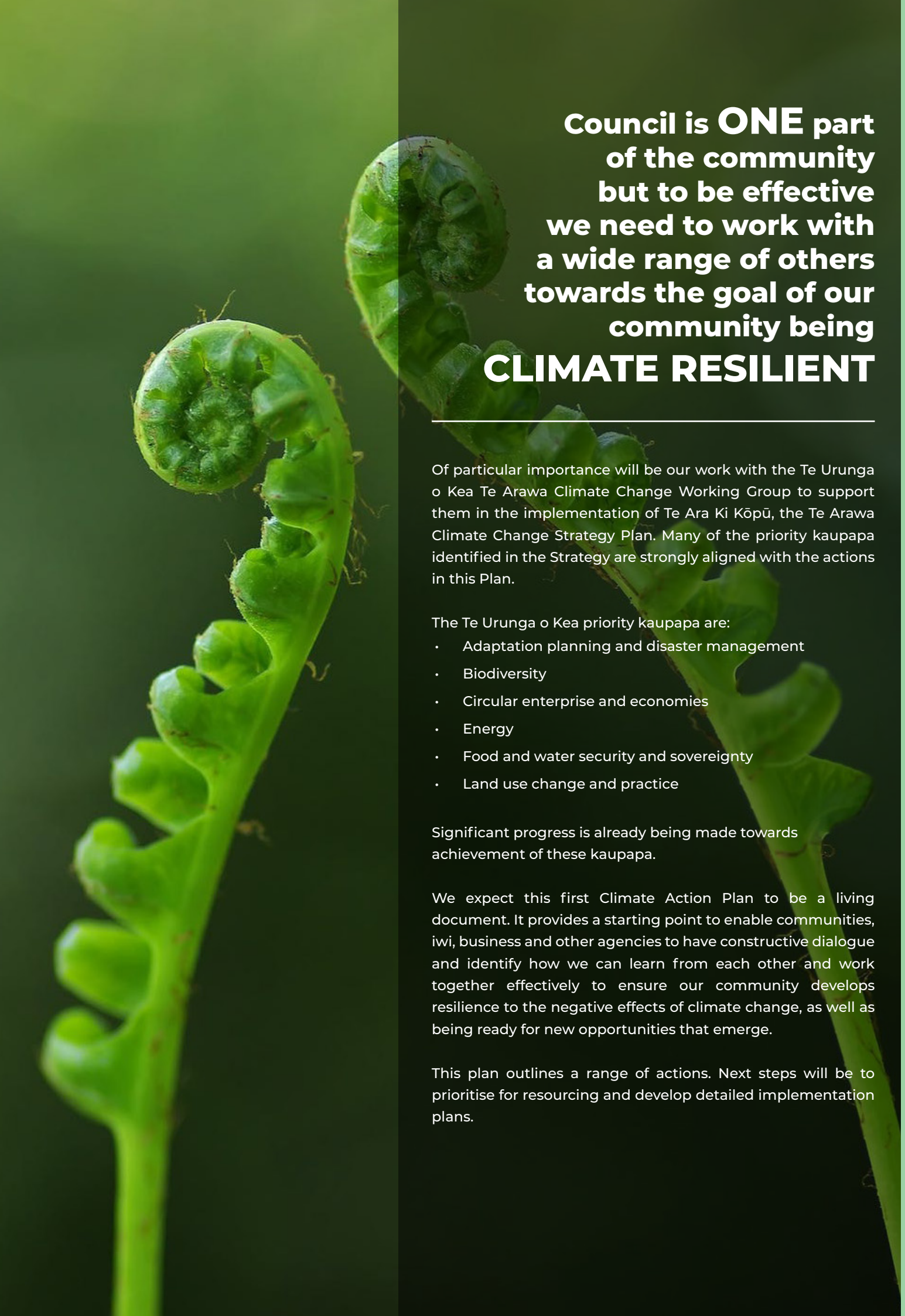
Our goal is for Rotorua to:

- be well positioned for upcoming changes in a low-carbon economy
- ensure a resilient community adapting to the changes in climate, which may be unavoidable, presenting both challenges and opportunities

In 2018 Council committed to the Global Covenant of Mayors for Climate & Energy. Since then Council has undertaken a GHG inventory (carbon footprint) of its corporate GHG emissions and has worked with Bay of Plenty Regional Council (BoPRC) to develop a footprint of the wider Rotorua community's district emissions for 2015/16. The Rotorua Community Footprint was updated in 2020 for the 2018/19 financial year. We have also undertaken a climate risk and vulnerability assessment.

Council is already active in addressing issues around climate change:

- Preparing for and responding to increased severe weather events through Civil Defence
- Designing stormwater systems for increased rainfall modelling
- Reducing energy use and costs through changing the heating of the Civic Building from natural gas to geothermal
- Promoting cycling and walking and developing facilities to support active transport
- Reducing waste to landfill through increased recycling, including kerbside collection
- Upgrading wastewater treatment plant, including increasing holding capacity to better manage inflows during storm events
- Encouraging composting and worm farms for home green and food waste
- Replacing a petrol Council vehicle with 4 e-bikes; purchasing an electric vehicle and installing an electric charge station in the fleet carpark
- Providing households with independent home performance advice through Sustainability Options



Council is **ONE** part of the community but to be effective we need to work with a wide range of others towards the goal of our community being

CLIMATE RESILIENT

Of particular importance will be our work with the Te Urunga o Kea Te Arawa Climate Change Working Group to support them in the implementation of Te Ara Ki Kōpū, the Te Arawa Climate Change Strategy Plan. Many of the priority kaupapa identified in the Strategy are strongly aligned with the actions in this Plan.

The Te Urunga o Kea priority kaupapa are:

- Adaptation planning and disaster management
- Biodiversity
- Circular enterprise and economies
- Energy
- Food and water security and sovereignty
- Land use change and practice

Significant progress is already being made towards achievement of these kaupapa.

We expect this first Climate Action Plan to be a living document. It provides a starting point to enable communities, iwi, business and other agencies to have constructive dialogue and identify how we can learn from each other and work together effectively to ensure our community develops resilience to the negative effects of climate change, as well as being ready for new opportunities that emerge.

This plan outlines a range of actions. Next steps will be to prioritise for resourcing and develop detailed implementation plans.

Te Whakarapopototanga
Executive Summary

This Plan has been developed to meet our responsibility to the community to plan for the expected local impacts of climate change. It also forms an important part of our commitment to the Global Covenant of Mayors for Climate & Energy. We have already undertaken Council's corporate carbon footprint; assisted in the development of a Rotorua community footprint in 2018 and updated 2020; and undertaken a climate change risk and vulnerability assessment for our district.

This Plan uses these findings and draws on evidence and work with partners/stakeholders to identify what we need to focus on to mitigate emissions created in this district and adapt to the changes expected as a result of climate change. There are areas of overlap where actions may support both mitigation and adaptation. The plan proposes emissions reduction targets and sets goals towards meeting these. The list of actions attached has been developed through a series of workshops with stakeholders.

Over the next 70 years we expect climate change to result in:

- more frequent and intense extreme rainfall and extreme wind events
- a greater number of days with over 25mm of rainfall
- more frequent and longer-lasting droughts
- higher than average temperatures with more days reaching a temperature above 25°C
- a greater chance of extreme forest fire danger days, and
- a reduced number of days where temperature drops below 0°C

Proposed emissions reduction targets

We are proposing that Rotorua adopts an emissions reduction target that aligns with the New Zealand national target.
We propose:

- a reduction in non-biogenic emissions, mostly carbon dioxide (CO_2), to net zero by 2050
- a reduction in biogenic methane emissions of 24 - 47% by 2050, compared to our 2015/16 baseline (national baseline set 2017)
- an interim target for 2030, to reduce non-biogenic emissions by 30% and biogenic methane by 10% compared to our 2015/16 baseline.

Mitigation

We have identified five priority themes to help shape our actions for the next 5-10 years, to help achieve our targets and to put us on a pathway to a low-carbon future:

1. Buildings and Energy Systems
2. Transportation and Urban Form
3. Consumption and Waste
4. Leadership, Advocacy and Economic Opportunity
5. Natural Environment and Rural Economy

Adaptation

The following adaptation themes have been identified as key areas where we need to reduce our vulnerability to the impacts of climate change:

- Infrastructure - Our infrastructure can withstand, absorb and adapt to a changing climate
- People and Communities - Communities are prepared to respond and adapt to extreme weather events
- Natural Environment - Ecosystem services and ecosystem health are enhanced and can continue to provide services
- Economy - Businesses are supported to be ready for the physical and transitional risks associated with climate change
- Governance, Leadership and Advocacy - Climate risk and opportunity is integrated into Council decision making

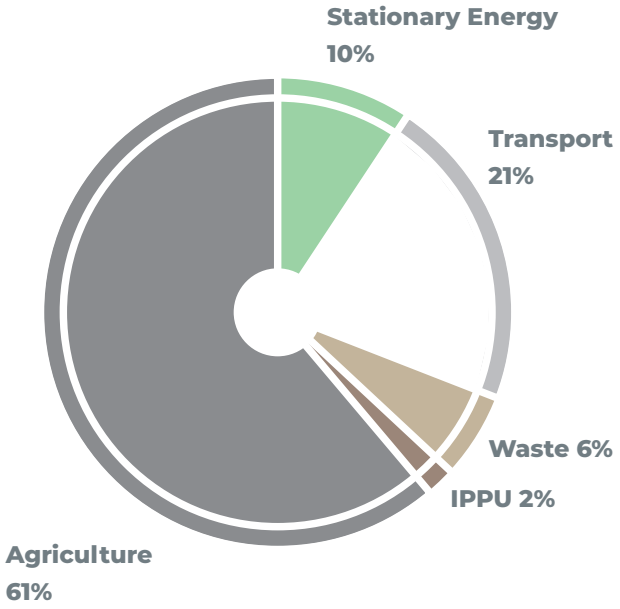
Nga Whakaputanga Haurehu o Rotorua
Rotorua's Greenhouse Gas (GHG) Emissions

Rotorua completed its first district-wide community GHG inventory in 2017, providing a baseline of the emissions associated with various activities within our community - agriculture, forestry, transport, energy and industrial processes. This inventory calculated the GHGs we emitted during the 2015/2016 financial year. In 2020 we updated the GHG inventory for the 2018/19 financial year.

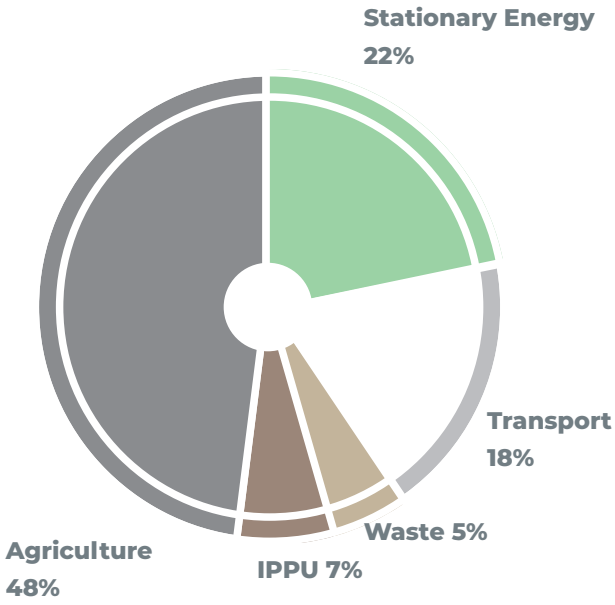
As a district, we emitted estimated gross emissions of 1,389,298 tonnes of carbon dioxide equivalent (t CO2e) for the year (excluding forestry).

Forestry harvesting emissions in the district were 2,225,548 t CO2e, offset by carbon removals of 1,796,330 t CO2e from exotic forestry and 84,521 t CO2e from native forestry. The total net forestry emissions for the district in 2018/19 were 344,697 t CO2e. Thus the total net emissions for the districtincluding forestry were 1,733,995 t CO2e.

Rotorua District Community Greenhouse Gas Inventory 2018/19:



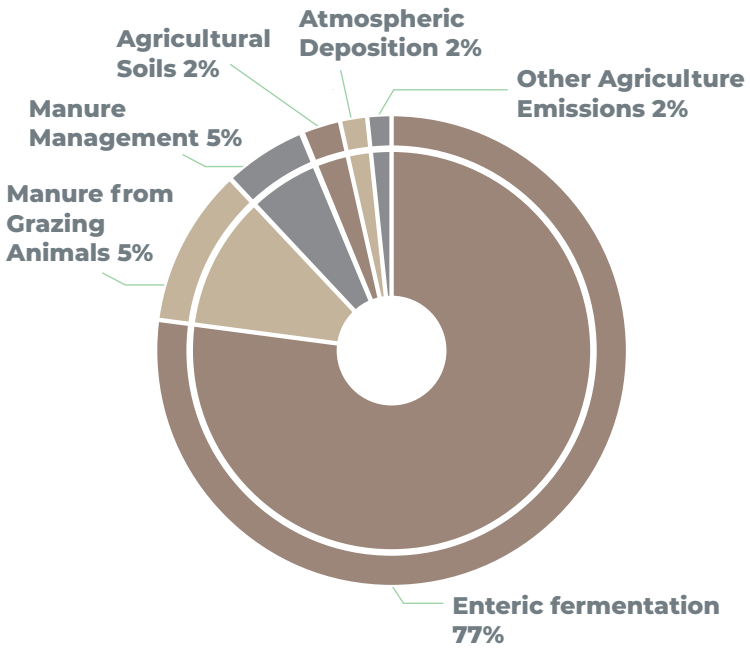
New Zealand Gross Greenhouse Gas Emissions 2018:



As with many other regions in New Zealand, our top two main sources of emissions are our agricultural emissions at 61% (primarily the result of dairy and beef farming activities) and transportation at 21% (emissions mostly resulting from petrol and diesel used in road transport). Although we also have a large forest sink within the region, harvesting cycles mean that the effect on our overall emissions will be relatively neutral over a 50 to 100 - year period.

Rotorua district is predominantly a rural region with 80% of the district's land being zoned rural. 41% of land use is forestry, 43% is agriculture, 8% is lakes. As a result, our carbon emissions for agriculture are proportionately higher than nationally, reflecting the make-up of our district. We acknowledge that a great deal of work is led by the rural sector with central government policy and initiatives having a national not just local impact. In particular we note the Primary Sector Climate Change Commitment (July 2019) and the Draft 5- year primary sector programme of action this outlines.

Emissions Sources for the Agricultural Sector for Rotorua Lakes District:



Challenges of, and opportunities for, reducing our emissions:

Our district-wide inventory was updated in late 2020. This update showed an increase in gross emissions by 1%, but a reduction in per capita emissions by 4% because our population grew by 5%. An increase in forestry emissions demonstrates the cyclical nature of forestry harvesting and planting regimes. A 5% reduction in stationary energy reflected reductions in coal and natural gas energy sources nationally. A 4% reduction in waste emissions is indicative of improved landfill gas capture, and the effect of increased recycling on solid waste volumes.

We know we need to keep moving. The sooner we can reduce our emissions, the better placed we are as a community to limit the costly and negative impacts of delayed action. If we identify what we can do to transition to a low-carbon economy now, we will be able to make the most of opportunities as they arise. The response to climate change will also need to be smart, evolving and changing as we learn more from new research and technology.

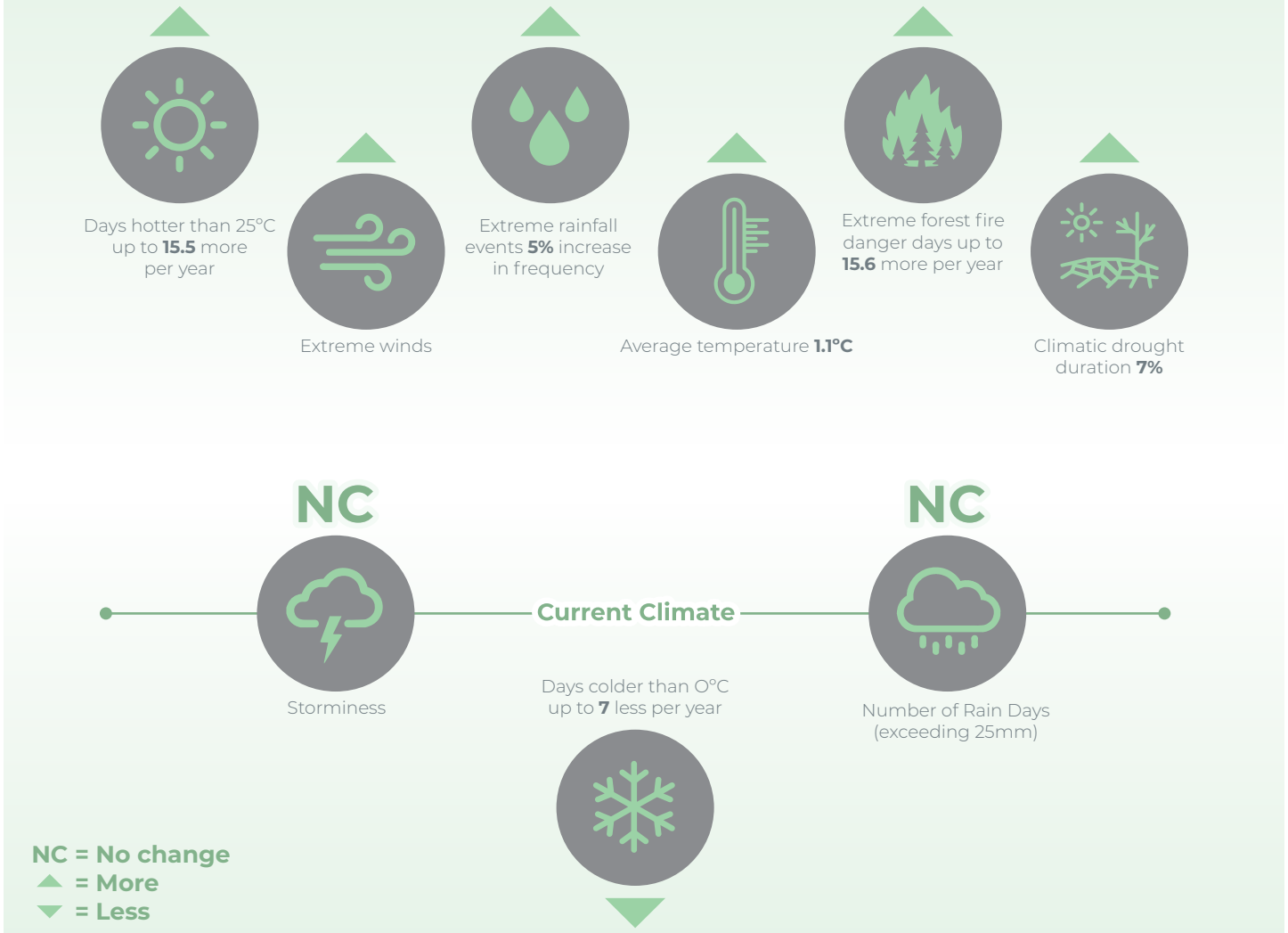
This document contains our proposed goals to help put Rotorua onto a downward emissions path to reach net zero emissions by 2050. It also includes actions towards achieving these goals that have been developed through a series of workshops with stakeholders. Our aim is to confirm and implement actions that will support an early, focused effort over the next 5 to 10 years. Actions further ahead from 2030 are not yet defined and we can shape what those are in the coming decade, through collaboration and innovation across households, businesses, industries and working with neighbouring regions.

This Climate Action Plan will guide our decisions about how we can make Rotorua more resilient, by locking in a lower-carbon way of doing things and making low-carbon choices easier. In addition to reducing our impact on climate change, there are other benefits from mitigation actions, for example health and wellbeing gains from warmer homes, walking and bike riding. Some actions can support cost savings in households and businesses, for example through energy efficiency and affordable public transport services. There are also opportunities to grow the resilience of the Rotorua economy through high-value, low-emissions products and services.

We want to ensure that Rotorua is well-placed to take advantage of the opportunities and to navigate the challenges presented by climate change.

Te Panonitanga o te Huarere
How Our Climate Is Changing

Trends in Rotorua's Climate by 2040:



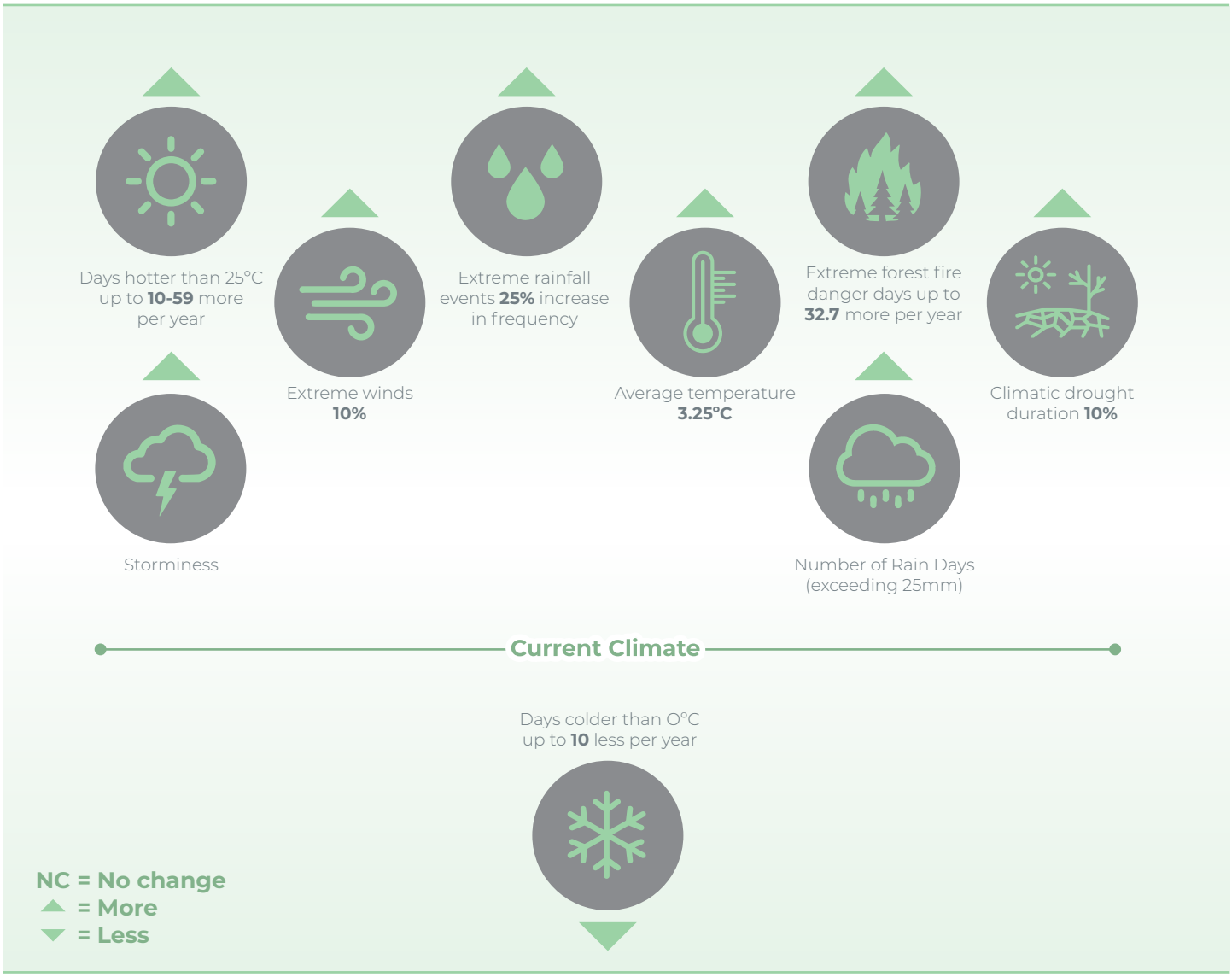
It is accepted internationally that the climate is changing as a result of GHGs already emitted into the atmosphere from human activity. The extent of this change depends on how the planet responds to increased GHGs and to the amount of GHGs that continue to be emitted.

To ensure that Rotorua's climate change action planning is in-line with other national, regional and district-level plans across New Zealand, climate projection data has been drawn from the Ministry for the Environment (MfE) report 'Climate Change Projections for New Zealand'[1] and the National Institute of Water & Atmospheric Research (NIWA) report 'The climate and weather of Bay of Plenty.' [2]

In turn, these reports draw from the global climate models developed by the Intergovernmental Panel on Climate Change (IPCC) in their Fifth Assessment Report (AR5).

The graphics above demonstrate the projected climate changes for Rotorua in two selected timeframes - to 2040 and to 2090.

Trends in Rotorua's Climate by 2090:



Based on these projections, Rotorua's climate will change over the next 70 years as follows:

- more frequent and intense extreme rainfall and extreme wind events
- a greater number of days with over 25mm of rainfall
- more frequent and longer-lasting droughts
- higher than average temperatures with more days reaching a temperature above 25°C
- a greater chance of extreme forest fire danger days, and
- a reduced number of days where temperature drops below 0°C

Data sourced from projections in the climate change risk assessment of IPCC & NIWA (RCP 8.5)

[1] Ministry for the Environment (2018). Climate Change Projections for New Zealand: Atmosphere Projections Based on Simulations from the IPCC Fifth Assessment, 2nd Edition. Wellington: Ministry for the Environment; [2] NIWA (2013). The climate and weather of Bay of Plenty. 3rd Edition.

We need to prepare for the possible futures that could occur because of climate change.

Challenges and opportunities of a changing climate:

A changing climate will present a range of challenges and opportunities, creating a need for diverse and innovative solutions. Identifying these solutions will be important for ensuring that in the long-term the district's wealth of natural assets and strong tourism reputation are protected and our community needs are adequately met.

We need to prepare for the possible futures that could occur because of climate change. We do this by preparing ourselves to adapt better to anticipated and yet unknown future climate manifestations, so that we can reduce our risks. A changing climate may also present us with new opportunities. This document contains themes that will help Rotorua adapt to a changing climate. These adaptation themes are based on a risk assessment undertaken by Council of the impacts that climate-related hazards could have on the district.

No single action or organisation can comprehensively address our climate adaptation needs. We will develop a variety of complementary actions to be undertaken across short and medium timeframes with a focus on collaboration with iwi partners, with stakeholders and members of the Rotorua and wider Bay of Plenty communities.

Te Whakataunga o te Huarere
Climate Mitigation

Climate mitigation is about lowering or removing GHG emissions and enhancing forests and other 'sinks' to remove GHGs from the atmosphere. Mitigation actions thus address the sources of emissions.

Ngā Whāinga Whakaheke i te Whakaputanga Haurehu
Emissions Reduction Targets

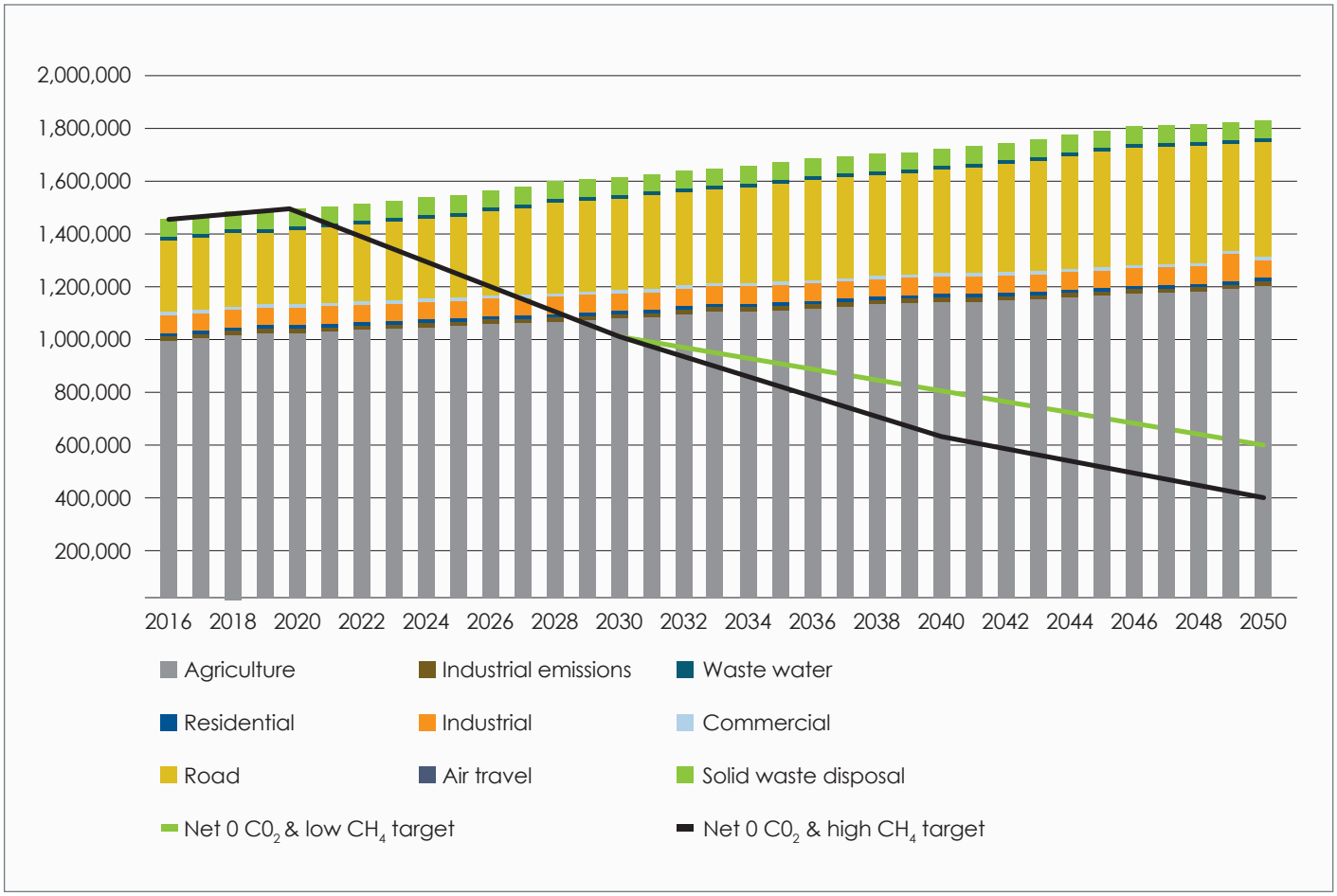
To manage our transition to a low-carbon future, we propose that Rotorua sets an emissions reduction target in line with the government's net zero emissions target (Council's commitment to the Global Compact of Mayors for Climate and Energy requires us to set targets that are at least as ambitious as the national targets). The target would be to reduce non-biogenic emissions, mostly carbon dioxide (CO_2), to net zero by 2050 and reduce biogenic methane emissions by 24 - 47% compared to our 2015/16 baseline.

We also propose setting an interim target for 2030 to reduce non-biogenic emissions by 30% and biogenic methane by 10% compared to our 2015/16 baseline. To put these targets into perspective:

- In 2015/16 our gross emissions were estimated at 1.5 million t CO_2e, of which approximately 800,000 tCO_2e resulted from biogenic methane (e.g. farm animals and waste treatment).
- By 2030 our gross emissions therefore need to reduce to around 1.2 million t CO_2e, and biogenic methane to 720,000 t CO_2e.
- By 2050 we will need to reduce our non-biogenic emissions to net zero, which is likely to require some offsetting through an increase in forest stocks. Depending on the final target set for biogenic methane emissions, our emissions from these sources will need to reduce accordingly (to between 600,000 and 425,000 t CO_2e).
- Without any specific actions to reduce our emissions, these are expected to increase continuously, reaching up to 2 million t CO_2e by 2050.

Current emissions trend and targets

This table shows a breakdown of sector emissions expected without any specific actions, against the high and low emissions reduction targets for 2050.



Ngā Mahi Whakaheke i te Whakaputanga o te Haurehu
Emissions Reduction Actions

With the help of climate change professionals, Council staff and external stakeholders, we developed goals and a list of actions for the next 5 - 10 years, to help achieve our targets and to put us on a pathway to a low-carbon future (see Appendix I).

Goals

M1	Buildings and Energy Systems
M2	Transportation and Urban Form
M3	Consumption and Waste
M4	Leadership, Advocacy and Economic Opportunity
M5	Natural Environment and Rural Economy

M1 - Ngā Whare me ngā Pūnaha Pūngao
Buildings and Energy Systems (Generation)

The built environment is where we spend most of our time for living, work and recreation. Some emissions are locked into existing buildings because of how they were designed and built. However as Rotorua continues to grow there are many opportunities to have a built environment that locks in low emissions for new buildings and reduces emissions through energy efficiency and fuel switching in existing buildings.

Rotorua is fortunate to have abundant renewable energy sources in geothermal, solar and woody biomass. Utilising these will support both district and nationwide efforts to achieve 100% renewable energy by 2035.

Buildings and energy systems represent 9% of overall emissions in the district. Emissions from this sector cover residential buildings, commercial and industrial building energy use and the following fuel types: electricity, biofuel, natural gas, LPG and coal.

Transitioning to 100% renewable electricity generation and more renewable sources for water and space heating, and increasing building energy efficiency, will help us to reduce emissions from buildings by up to 43,000 t CO2e by 2030 and by up to 63,000 t CO2e by 2050.

We propose the following goals:

M1.1	Increase renewable energy capacity in the district
M1.2	Improve building and infrastructure energy efficiency
M1.3	Transition space and water heating to sustainable energy sources
M1.4	Upgrade all public lighting to be energy-efficient

Case study: Red Stag Timber Company

Red Stag Timber is a market leader in product innovation and manufacturing capacity, processing more than one million tonnes of logs each year at Waipa Mill, the largest timber mill in the Southern Hemisphere. Around 100,000 tonnes of wood processing residue – offcuts, bark, sawdust and shavings – is burnt in boilers to create high pressure steam which powers turbines to produce electricity. Low pressure steam leaving the turbines is captured and used in the timber drying kilns which are by far the biggest energy users on the site.

The electricity generated saves the company millions of dollars a year on power costs and this and the heat recovered to dry the timber are both carbon-neutral (no fossil fuel emissions). The burning of woodwaste has the additional benefit of dramatically reducing the need for the disposal of waste to landfill and the associated financial and environmental costs in doing so. Another recent initiative is the beneficial re-use of high-carbon boiler ash resulting from the burning of the woodwaste. This has previously been landfilled but is now sold as a bio-char soil conditioner to the farming sector.

Other sustainability measures Red Stag has implemented include the installation of LED lighting and more efficient air compressors. The Red Stag Timber processing operation is very close to being carbon-neutral thanks to the energy recovery from woodwaste. This fact and the other sustainability initiatives mentioned were recognised by EECA in awarding Red Stag Timber the 2018 EECA Business Large Energy User of the Year award.

M2 - Ngā Waka me te Āhua o te Tāone
Transportation and Urban Form

The transport sector, particularly private vehicle usage, has the second largest GHG impact, with around 21% of total emissions. If we transition some of our trips to walking, cycling and using the bus, we will have an impact on our overall emissions. As Rotorua continues to grow there are opportunities for us to develop our urban landscape to make public and active transport a realistic choice, as well as coordinating future residential developments with transport routes.

Transitioning to more active and public transport, as well as using electric vehicles and buses, will help us to reduce our emissions by up to 130,000 t CO2e by 2030 and by up to 280,000 t CO2e by 2050. We propose the following goals:

M2.1 Achieve modal change to active and public transport

M2.2 Encourage vehicle fuel switch to sustainable energy

Case study: Alsco

One hundred and thirty years ago, Alsco was the first company to introduce linen and uniform rental services to the world. Today, Alsco NZ has a $160m per year turnover; over 1000 employees; and provides services to more than 27,000 businesses. Rotorua is Alsco's processing base for the Bay of Plenty and Taupo regions.

Alsco has bold sustainability goals around waste, water, energy and transport, including converting 30% of its fleet to electric by 2030. Large diesel freighters make up only 4% of the Alsco fleet of 350 vehicles, but account for 33% of its total fuel usage.

In late 2019, Alsco commissioned New Zealand's first long haul electric freighter to distribute goods and services between Rotorua and the regional depots in Taupo and Tauranga. The long-term objective is to replace all 15 diesel freighters, combining battery life technology advancements with operational and handling innovations to improve range.

The Alsco heavy electric vehicle (HEV) is up to 22 tonnes fully laden, with a range of up to 200 kms on a battery charge. It has required the installation of double charging stations at Rotorua and each depot, so the freighter can recharge during operational load and unload times.

This first freighter makes environmental sense, with an estimated reduction of 67 tonnes of carbon emissions yearly. Road user charge concessions for EVs and the reduction in the company's diesel use mean it also makes sense from a business/bottom line perspective.

Alsco is also testing an electric van in its Tauranga depot. Although still in its infancy, with multiple learning curves and teething issues to overcome, this project is a fantastic story of government and business collaboration operating in our own backyard and sets an exciting precedent for future innovation in the heavy transport industry.

Case study: VIP Realty

VIP Realty is a family owned and operated Rotorua real estate company with a deep-rooted commitment to being a low carbon business. For the principals, Dave and Michelle Umbers, becoming a more sustainable business was 'the right thing to do' for them, their staff, their clients and the planet.

In an industry where fliers and glossy advertising are well-used selling tools, the company keeps printing to a minimum by providing electronic documentation, and no longer markets through printed property guides. The move to digital platforms for marketing properties has been well-received by clients and prospective buyers alike. Using state-of-the-art virtual technology, potential buyers can 'visit' houses from the comfort of their armchairs. This was particularly useful during Covid lockdown, allowing business to continue pretty much as normal.

The Umbers' commitment to being a low carbon business comes from a personal commitment to sustainability and reducing their carbon footprint wherever possible. However, it also makes financial sense. The company now has four electric vehicles and a hybrid, which is already saving the business $700 per month on fuel. The office gardens are planted with vegetables, which are given to local food rescue group Rotorua Whakaora; waste is composted and gardening tools are electric, with power sourced from a 100% renewables power company. It is no wonder that VIP Realty are 2020 finalists in the Sustainable Business category of the 2020 Westpac Buisness Awards.

M3 - Ngā Whakapaunga me te Para Consumption and Waste

Waste emissions from the Rotorua landfill and wastewater treatment plant make up 6% of total emissions. Emissions from solid waste constitute the majority of waste emissions, mainly from organic matter such as kitchen and garden scraps that break down in the landfill to produce potent methane emissions. Reducing waste emissions is an easy first-step to take as individuals, families, communities, businesses, schools and as a Council.

Consumption of goods produces emissions from waste and from the production and transportation of goods, the impacts of which can be wide-ranging. We have focussed on product stewardship i.e. to make sure packaging and the products themselves are responsibly made and disposed of. Reducing the amount of organic waste sent to landfill and treating our waste more efficiently will reduce landfill-related emissions by up to 17,000 t CO2e by 2030 and by up to 12,000 t CO2e by 2050. The emissions from the recently closed Rotorua landfill are expected to peak around 2020 and will decline after that.

We propose the following goal:

M3.1 Reduce waste to landfill from organic and non-organic sources

Case study: Ecogas

In a New Zealand first, Rotorua Lakes Council district will be home to this country's first commercial scale food waste and organics processing facility. This facility will produce both biogas and biofertiliser for local businesses, capturing not only energy and nutrients but also capturing over 10,000 tons of carbon dioxide annually, this would be equal to planting over 218,400 trees per year.

Since May 2020, when Rotorua Lakes District Council, along with Waikato Regional Council, approved the resource and building consents for the facility, things have progressed at pace.

Construction at the Ecogas Reporoa site has commenced, and most earthworks have been completed with the preparation of the foundations starting. The facility occupies two hectares of land adjacent to T&G Fresh's tomato growing operation, on Broadlands Road. The glasshouses, which have a commercial agreement with Ecogas for energy, will be replacing current energy solutions to support long term sustainability and environmental objectives. The site when fully operational possibly as soon as March 2022, will process up to 75,000 tonnes of organic matter per day. That equates to approximately 24 standard bus loads per day going through the front gate. This volume of product will be recovered from all over the North Island.

Ecogas is a Partnership between community-owned Pioneer Energy Limited and EcoStock Supplies Limited, both 100% New Zealand owned and operated business, with local connections. Pioneer Energy operates the local Aniwhenua Hydro Scheme and WPINZ Biomass Boilers at Ohakune; and EcoStock has been working with local farmers since 2007, and back in 2016 started work with local Crown Research Organisation SCION, to operate its pilot Anaerobic Digestor. Ecogas has now taken over the relationship with SCION and will continue to work with them over the next five years, with an anticipated spend of over $250,000 in sustainable science research.

Anaerobic Digestion (AD) is the term given to the processing of organic materials within a totally controlled system that does not allow air in or out. By constructing a facility capable of capturing the energy and water embedded within what has historically been deemed 'waste', we start to see value in organics and understand the opportunity. This facility has an intended design life of 50 years, thus becomes an inter-generational facility contributing to local and national sustainability goals.

This approach (AD) to dealing with organics has been around for about 2,000 years, now Ecogas are elevating it through the application of modern-day construction materials, bio-technology and processing capabilities. Anaerobic Digestion technology is well proven overseas with over 500 similar plants in the UK, Europe and North America, with a 'sister site' already operating in Perth, Australia. This is about catching up, capturing carbon and sustaining our energy and fertiliser demands using local resources. In doing this, Ecogas is also creating local long-term employment.

The first reaction to the scale of operation is always that we shouldn't be wasting this much food, or disbelief that this amount of product is already being lost to landfill.

However, this is a well-documented fact, it's estimated that over 327,000 tonnes of organic material is lost to landfills annually throughout New Zealand.

Imagine all the orange peel, tea bags, banana skins, burnt toast, coffee grinds, spilt and spoiled food, and then multiply this by New Zealand's population of nearly five million people.

More than 70 people will be involved in building Ecogas Reporoa. The facility is creating a manufacturing facility utilising leading bio-technology and agri-tech, with development in this area of 'green chemistry' seen as an opportunity to further investigate the production of high value sustainable products.

Ecogas Reporoa has been in the planning since 2011, when Partner EcoStock Supplies first visited a facility in England, where there are over 142 similar sites operating today. This will be a world leading facility and the support of Rotorua Lakes Council, local business and locals has been critical in finally bringing this solution to New Zealand.

M4 - Rangatiratanga, Kōkiritanga me te Mātauranga
Leadership, Advocacy and Economic Opportunity

Rising to the challenge of a fair and equitable low-carbon transition will require an increase in our capacity and skills to respond. Council and our Te Arawa partners will play an important role in leading conversations and in 'walking the talk' so others may follow. We propose the following goal:

M4.1 Provide support and opportunities for Council, Te Arawa, businesses and the community to work together to mitigate climate change

M5 - Te Taiao me te Ōhanga Taiwhenua
Natural Environment and Rural Economy

The natural environment and rural economy are both a significant source and sink of emissions in the Rotorua Lakes District. In 2018/19 forest harvesting generated 344,697 t CO2e more than was taken out of the atmosphere by growing forests. Agricultural emissions made up 61% of the total emissions in the district in 2018/ 2019.

Like transport, the rural economy is facing a significant transition. We hear our community when they say the transition is presenting both challenges as well as opportunities as we aim to move to high-value, low-impact practices and end products within our primary sector. It is estimated that initiatives such as the Rotorua Lakes Nutrient Management programme will help reduce agricultural emissions by up to 70,000 t CO2e per year by 2030.

New Zealand farmers are among the most productive and efficient in the world. Over the past 20 years, they have improved the emissions efficiency of production by about 1% a year. They have done this by improving feed and nutrition, animal genetics, pasture management, and animal health. Although total agricultural emissions have grown by 15% since 1990, they would have increased by more than 40% if it were not for the efforts of our farmers.

Forestry will also play a role in helping us transition to a low-carbon economy, offsetting some of our emissions. The more we can reduce emissions in other areas, the less land we will need to set aside for 'carbon forests'. Based on our current projections we will need up to 30,000 ha of additional exotic forest to offset our emissions by 2050 to help us meet our reduction target. If we plant indigenous forest, we will require significantly more land as these forests generally grow much slower, but they provide additional benefits supporting our biodiversity and natural estate. We need to remember that forestry harvesting operations themselves also generate emissions. We cannot rely heavily on off-setting emissions long-term, our focus needs to be on reducing emissions. We propose the following goals:

M5.1 Reduce agricultural emissions in the district
M5.2 Increase exotic and native forestry in the district, and reduce the emissions from forestry operations

Council and our Te Arawa partners will play an important role in leading conversations ...

... ‘walking the talk’
so others may follow

Te Urutaunga o te Taiao
Climate Adaptation

Climate adaptation describes the processes and actions required to adjust to the impacts a changing climate will have on infrastructure, the natural environment, people and their economic wellbeing. Information on the likely climate hazards and related risks, outlined below, will help us prepare for those changes and impacts.

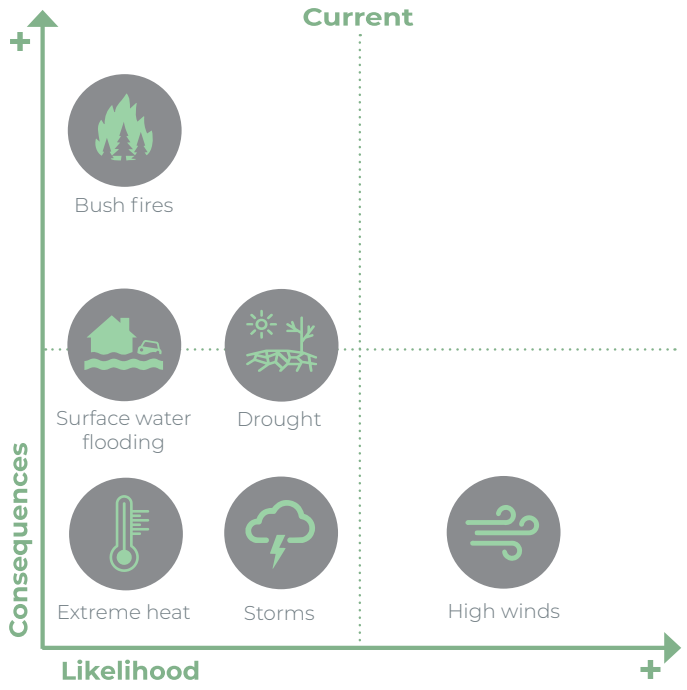
Ngā Mōreareatanga Huarere Matua me ngā Tūraru
Key Climate Hazards and Risks

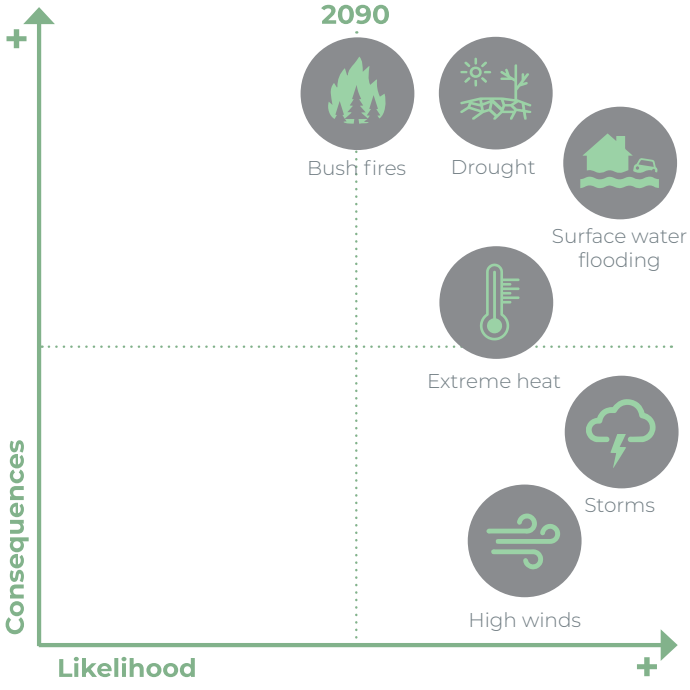
A climate change risk assessment process was undertaken, which used statistical data and key stakeholder input/validation to identify climate hazard-related risks for Rotorua and then allocate a risk rating. Likelihood and consequence ratings were assigned to the identified risks, for scenarios to 2040 and to 2090. These ratings were determined through an evidence-based process, utilising past events, climate projection data and key stakeholder input. For the Rotorua Lakes District we considered climate risks associated with the following climate hazards:

- Extreme heat
- Extreme wind
- Drought
- Extreme rainfall
- Extreme cold

Of the five hazards analysed, extreme heat, drought and extreme rainfall were assessed as having a number of 'high' risks, with extreme cold and wind events displaying 'low' to 'medium' risks. The diagram opposite illustrates the likelihood and consequence ratings of the risks associated with each hazard.

Likelihood and consequence ratings of the risks associated with each hazard currently and in 2090, derived from the climate change risk assessment:





Extreme heat-related risks

Climate change will cause the average, maximum and minimum temperatures in Rotorua to rise, resulting in an increase in the likelihood, duration and intensity of heat-related risks such as heatwaves, forest fires, pests and diseases.

Our community may face a rise in heat-related illness and stress, with the elderly and very young members of the community being most vulnerable. This has the potential to put pressure on the healthcare system and generate a greater demand for, and therefore cost of, cooling our buildings.

Rising temperatures also pose a risk to our primary industries such as agriculture and forestry. The possibility of a reduction in water quality and soil moisture content brings the risk of a decline in yields and an increase in production costs. In times of extreme heat, outdoor work may also be restricted.

The natural environment will experience a loss of or decline in heat-sensitive species and ecosystems. Native and pest species may shift their range, migrating as climate conditions change. This migration could have knock-on effects to parts of our economy that depend on services provided by the natural environment. It could also impact significantly on mahinga kai.

Drought-related risks

The severity, frequency and consequences of drought are expected to gradually increase for Rotorua by 2040, with an even greater increase by 2090. Prolonged periods of drought result in hard/dry land with a low soil moisture content. This exacerbates the occurrence of surface water flooding, soil erosion and pollution of nearby water bodies.

Drought may significantly affect local biodiversity and ecosystems. Water-dependent habitats such as wetlands, rivers and streams may dry up, severely affecting the species and industries that rely on them. The drying-out of forests and grasslands also increases the risk of wildfires, which have the ability to impact local air and even water quality causing damage to, or the destruction of, infrastructure, local communities and industry.

Our communities will feel the effects of prolonged droughts, with the subsequent reduction in water quality and availability restricting land-use practices and increasing the pressure on water abstraction.

Extreme rainfall-related risks

Rotorua has experienced extreme rainfall events (including flooding and storms) and associated risks on multiple occasions in the past. Climate change is projected to exacerbate these risks, with an increase in the number of days with over 25mm of rain and an increase in the intensity and frequency of extreme rainfall events expected.

The most prominent risk associated with extreme rainfall is flooding in urban and rural areas from lakes, rivers or surface water. This has the potential to impact all of Rotorua's sectors, with some of the more severe risks being dislocation of residents from their homes and communities, service disruptions, costly damage to buildings and infrastructure, the loss of income for business and industry such as tourism and agriculture, and even serious injury or fatalities.

Extreme rainfall also poses a risk to the natural environment, causing an increase in the pollution of water-bodies from sediment and nutrient run-off, degrading natural ecosystems and potentially resulting in a loss of native biodiversity.

Ngā Mahi Urutau
Adaptation Actions - educing our Vulnerability to the Impacts of Climate Change

With the help of climate change professionals, Council staff and external stakeholders, we developed goals and a list of actions to help us prepare for the impacts of climate change and address the risks summarised above (see Appendix 2).

The actions were prioritised and grouped into five themes reflecting the interdisciplinary and wide-ranging nature of adaptation.

By taking action across these areas, we will be better prepared to adapt and respond to the effects of climate change.

Adaptation themes and the desired outcome or focus of the theme:

A1	Infrastructure	Our infrastructure can withstand, absorb and adapt to a changing climate
A2	People and Communities	Communities are prepared to respond and adapt to extreme weather events
A3	Natural Environment	Ecosystems services and ecosystem health are enhanced and continue to provide services
A4	Economy	Businesses are supported to be ready for the physical and transitional risks associated with climate change
A5	Governance, Leadership and Advocacy	Climate risk and opportunity is integrated and prioritised in Council decision making

To help conceptualise which adaptation actions can be implemented, it is worth considering that they typically fall into or across three areas:

1. Investigations: Further specialist assessments/exploration of specific issues and solutions to reduce risk. These investigations may lead to specific infrastructure responses e.g. strengthening embankments, drainage capacity expansion.
2. Policy, procedures and systems: Changes to existing policy, procedures, standards, guidelines and/or procurement specifications.
3. Behavioural: Communication and/or advocacy to encourage more climate-resilient behaviours.

A1 - Te Tūāpapa
Infrastructure

Council is responsible for the planning, investment, operation and maintenance of key infrastructure including water, wastewater, stormwater, roads, parks and recreation and other community facilities. Infrastructure is the backbone of the district and disruption or damage to it can have significant impacts on our businesses and community. Power and telecommunications infrastructure is the responsibility of other organisations.

Water infrastructure systems are particularly vulnerable to climate and extreme weather changes. Droughts could put pressure on our water supply. Increased frequency and intensity of heavy rainfall events will put pressure on stormwater capacity and increase the potential of flooding. As this infrastructure is critical to the health and viability of people, the economy and the natural environment, many of our actions are focused on water management.

Rotorua's 30-year Infrastructure Strategy 2018 - 2048 aims to maximise the resilience of our infrastructure by minimising the impact that natural disasters could have on it, and the time required for its restoration and recovery.

We want to build on this strategy and propose the following goals:

A1.1	Identify climate change risks and potential impacts on infrastructure and plan for resilience
A1.2	Transport Infrastructure Plan identifies climate risks and adaptation measures for a resilient transport system
A1.3	Potable water supply continues to meet the needs of the district
A1.4	Ensure resilience of the wastewater management system
A1.5	Stormwater system is designed and maintained to accommodate climate-adjusted projected flooding
A1.6	Increase resilience of power supply and telecommunications to interruption

Case study: Rotorua Lakes Council

Under the Local Government Act, Council is mandated to maintain or improve public health and environmental outcomes or to mitigate adverse effects on them. These drivers relate to providing clean drinking water; ensuring waste is removed and treated; maintaining safe and functional roads; managing stormwater to protect against flooding; and working to reduce the harmful effects of urban activity on the natural environment. In the face of a changing climate, the resilience of infrastructural assets needs to be balanced with accommodating potential growth in the district.

Council's Infrastructure Strategy is updated every three years, aligning with the Long-Term Planning period. It includes an overview of major issues and trends that will have an impact on Council's infrastructure services over a thirty year period. Climate projections show increased frequency and intensity of heavy rainfall events which will require increased stormwater capacity and increase the potential of transport system flooding. At the same time, they show increased droughts putting pressure on Council's water supply. The Strategy shows how Council proposes to respond to these issues, as well as the risks and costs associated with investment in infrastructure over that time.

A2 - Ngā Hapori
People and Communities

We may experience an increased demand for emergency management services as extreme weather events such as flooding start to occur more regularly.

As the impacts of these events become more hard-hitting, it will be important to provide education and awareness programmes for people and businesses. This will enable the community to prepare themselves better, taking their own action to both mitigate and adapt to climate change.

Although every single one of us will be affected to some degree by climate impacts, some of our community groups are more vulnerable to these impacts than others. We must ensure that we have a special focus on our most vulnerable groups to help them be better prepared for extreme weather or other unpredictable events.

Local civil defence work is guided by the National Disaster Resilience Strategy, and connects with the Bay of Plenty Lifelines Group as part of the regional civil defence network. We propose the following goals:

A2.1	Increase resilience of public space to extreme high temperatures and rainfall
A2.2	Build local resilience to increased price of food and other items related to increased price of carbon
A2.3	Increase sustainability of housing to support health and wellbeing of residents despite changes in climate
A2.4	Increase the ability to respond to a changing employment environment

Case study: Farmers Market

The Rotorua Farmers Market is a weekly event held in Te Manawa every Sunday morning. It provides an opportunity for food growers and artisans to sell directly to the community and out-of-town visitors. Locally sourced products such as free range eggs, honey, bread, pastries and organic fruit and vegetables are sold from handcrafted wooden barrows. The market provides a relaxed atmosphere for visitors to browse and enjoy a leisurely coffee or brunch.

Farmers markets connect people to where their food comes from, showcase local production, support local businesses and help build resilience. The Rotorua market is a strong promoter of sustainability and is working to reduce waste wherever possible. For example, all wrapping and containers are made from biodegradable materials and customers are encouraged to bring their own bags and containers.

The Rotorua branch of the Women's Health League have been regular stallholders since the market started in 2016. The League promotes fellowship and understanding between Māori and European women, with emphasis on health. In addition to promoting home gardening and planting fruit trees, they have been proactive in passing on fruit preservation skills and recipes passed down through Rotorua families. Using excess fruit donated by community group Community Fruit, members of the League produce an abundance of popular jams and preserves which they sell at the market to fundraise.

A3 - Te Taiao
Natural Environment

Our natural environment provides the foundation of our cultural and spiritual identity and our economic wellbeing. Natural assets such as forests, fields, rivers, lakes, streams, wetlands and river banks provide essential 'services' for human activity. These ecosystems services, along with green infrastructure assets such as green roofs and rain gardens, can provide an alternative to hard-engineered infrastructure.

If climate changes occur more quickly than ecosystems can handle or adapt to, the benefits of these ecosystems services to Rotorua may be reduced. We need to make sure that we are protecting and enhancing our natural environment's resilience to climate change. We propose the following goals:

A3.1 Optimise rural land use in a changing climate environment to ensure environmental resilience

A3.2 Support the maintenance and protection of native species, including a healthy conservation estate

A3.3 Urban natural environments support community wellbeing and resilience

Case study: Paradise Valley Catchment Group

The Paradise Valley Catchment Group was formed in February 2018 in response to landowner's concerns ranging from flooding and stream bank erosion, to water quality in the Upper Ngongotaha area. Since 2016, the community has experienced floods, sediment and erosion, a bridge washout and transport/access safety issues.

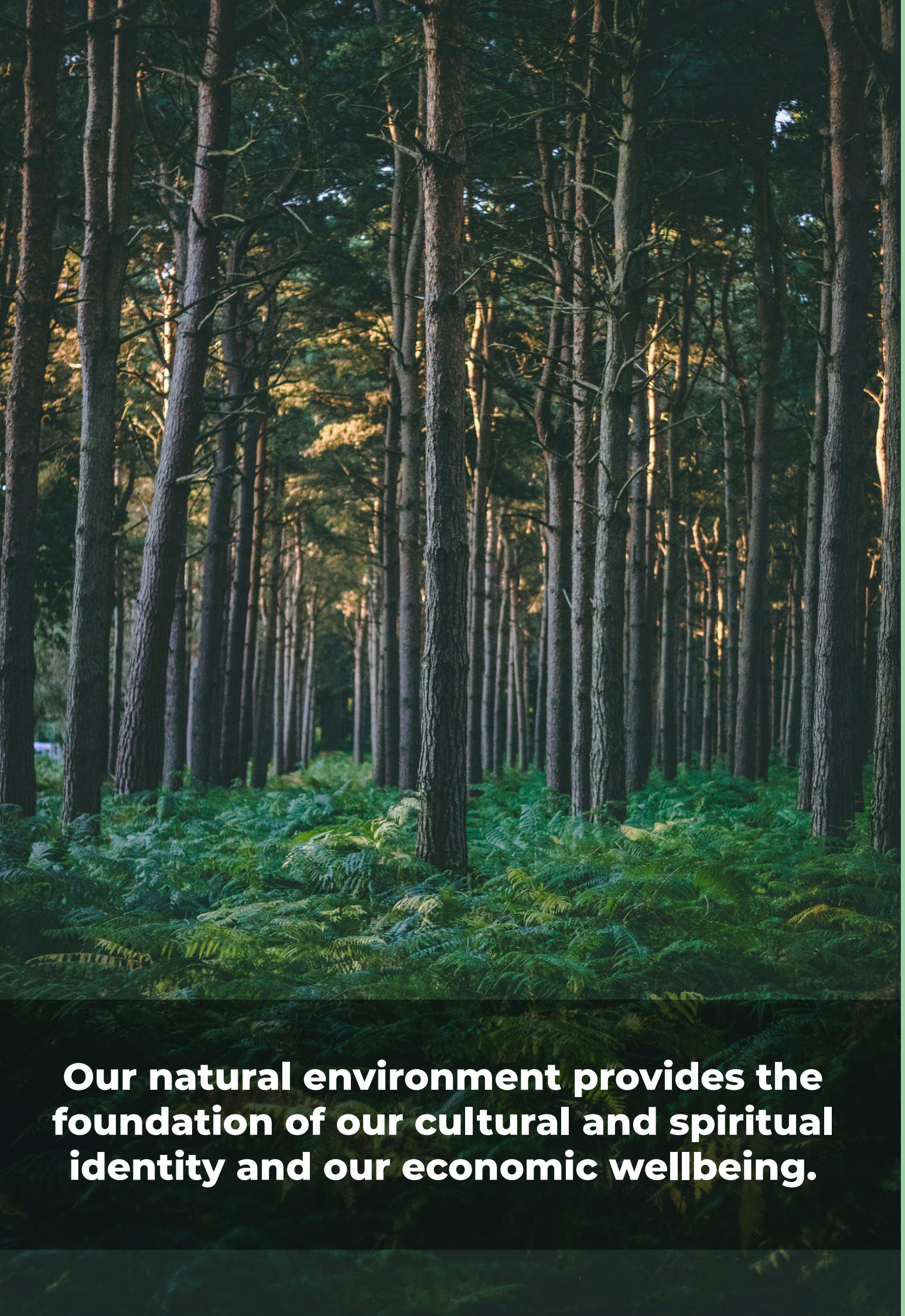
The group called on Janie Stevenson from NZ Landcare Trust to assist with developing a Catchment Group and using feedback from the community, together they created an action plan.

The community has since had regular communication with Rotorua Lakes Council and Bay of Plenty Regional Council to identify issues and work on solutions. This has included the realignment of Paradise Valley Road, remedial works to address washouts, planting days, water monitoring and regular speakers at the quarterly meetings to share knowledge and information.

A rain gauge situated at Relph Rd, Mt Ngongotahā now records rain events live on the BOPRC website which is able to be viewed by the community.

Working together has resulted in a more connected community, with planting working-bees, a regular newsletter and local Facebook residents page which keeps people connected with progress. The sense of community has increased, knowing that landowners are not alone dealing with difficult issues.

There is further benefit to communities downstream of Paradise Valley, improving the safety and quality of water for consumption, collection of mahinga kai, recreation and eventually the overall mauri of Lake Rotorua.



Our natural environment provides the foundation of our cultural and spiritual identity and our economic wellbeing.

A4 - Te Ihu Whakarei (Rangatiratanga)
Governance, Leadership and Advocacy

There are many actions Council can undertake to show leadership and help the district be better prepared for climate change. As well as taking action internally, we want to build on the great work already underway at a local, regional and national level; collaboration and advocacy will therefore be a key focus for our actions. We propose the following goals:

A4.1	Budgeting and investment supports priorities for community adaptation to climate change
A4.2	District planning and processes support implementation of adaptation initiatives
A4.3	Increased community safety, preparedness and resilience to severe weather events
A4.4	Communities are educated and informed and contribute to climate change adaptation actions

Case study: Reporoa Primary School Enviroschools

The Koru Garden was established in September 2017, as an outcome from a successful application for a Treemendous Education grant supported by the Mazda Foundation.

Meandering from the school playground, passing the espaliered apple trees, and entering the garden through a glade, you can choose from two paths that lead into the garden. One crosses a bridge over a small wetland, which follows a koru path, bordered by a raised mound, abundantly planted with native trees and shrubs. Following this path leads to the raised kai gardens and the entertainment stage and fire-pit.

The second path leads to an orchard planted with pear, plum, and apple trees. 'Feijoa Lane, which produced a huge crop earlier this year, runs alongside the orchard boundary and leads to our secret fern garden.

The children learn how to propagate and care for plants and native trees. Next year, we are fortunate to have the 'Garden to Table' programme at our school and this will assist and contribute to having the Environment as our key focus woven through all curriculum areas.

We are working with our Enviroschools Coordinator to gain our Bronze status and using the Enviroschools online resources in Term 4, to support our Inquiry topic of the Global World.

Showing our children how to nurture and treat our living world with aroha and respect, being outside, talking as we work, all contributes to an increased sense of well being and connection between the children and adults. Working with the earth provides an opportunity to bring out another aspect of themselves in a relaxed environment that being in nature affords them.

A5 - Te Ōhanga Economy

We have a diverse economy and a strong tourism brand benefiting from our cultural heritage, upper North Island location, including proximity to the Port of Tauranga, and from our natural environment. We are also a centre for forestry science and industry. We need to support our businesses to identify and act on the risks of climate change, allowing them to be better prepared for both the challenges and opportunities these changes present. We propose the following goal:

A5.1	Opportunities for new low-carbon local businesses are identified
A5.2	Support for businesses to adapt operating models to take advantage of opportunities from changing climate

Case study: Lux Organics

In 2016, Jenny Lux and Richard Gillies established Lux Organics, a certified organic market garden business, with the aim of providing Rotorua with high quality, local produce with a low-carbon and environmental footprint.

Jenny and Richard have transformed their Ngongotahā property, which was largely devoid of vegetation, by planting hundreds of native trees, shrubs and fruit trees to create shelter and habitat, and to sequester carbon. Organic certification requires alternatives to chemically- and mechanically-intensive horticulture on the property.

Permanent beds, compost, cover crops and naturally derived soil amendments are used to promote soil health, stimulate the soil ecosystem to recycle nutrients and grow healthy crops that can fight off garden pests and disease without the need for spraying. Soil disturbance is minimised to retain soil carbon and diverse crop rotations prevent pests and diseases taking hold. Soil organic matter has increased by over 50% in under 4 years.

The Lux Organics approach includes using a range of low-carbon tools to tend the gardens. Large greenhouses extend the growing season, but are unheated to avoid emissions. Any weedmat, shade cloth, frost cloth and clear plastic used is durable, high-quality, UV-stabilised material.

Deliveries of organic vegetables, microgreens and herbs to trade and retail customers are made by electric van. The business partnered with packaging company Convex to help develop a home compostable alternative to plastic packaging for their microgreens and salad greens. The final product EcoClear is made predominantly from renewable, GM-free corn and avoids around 10,000 conventional plastic bags going to landfill each year.

He Kupu Whakamutunga
A Final Word

Mā te taiao tātau e arahi.
Mā te ringaringa ngā tohutohu e whakakiko.
Mā te mahitahi ka whiti anō te rā.

Tēnā koutou katoa.

Nature will lead us.
Our hands will bring it into reality.
Our combined efforts will ensure
the sun rises again to bring in a new day.

Thank you all.

Appendices

Appendix I
Proposed Emissions Reduction (Mitigation) Actions

M1. BUILDINGS AND ENERGY SYSTEMS

GOAL M1.1 Increase renewable energy capacity in the district

	Timeframe		
	Underway	1-3yrs	4yrs+
Set targets for use of renewable energy in Council buildings		■	
Investigate/ trial renewable energy (solar PV or micro-hydro) power generation for water pumping		■	
Identify opportunities to uptake wood-based biofuels from the forestry sector e.g. co-generation	■		
Investigate opportunity to expand geothermal energy use instead of carbon-intense fuels	■		
Support business community to develop partnerships and opportunities for uptake of solar PV			■
Mandate renewable energy capacity in new residential and commercial builds			■
Promote and educate on renewable energies	■		
Develop partnerships with key agencies to deliver solar PV to schools and tertiary facilities		■	
Work with power companies to support micro-generation e.g. micro-hydro		■	

Parties involved: Rotorua Lakes Council (RLC), Bay of Plenty Regional Council (BOPRC) , Energy Efficiency and Conservation Authority (EECA), central government, businesses, education facilities, renewable energy (especially. solar and geothermal) energy businesses

GOAL M1.2 Improve building and infrastructure energy efficiency

Building Energy Efficiency & Conservation	Timeframe		
	Underway	1-3yrs	4yrs+
Adopt low-carbon urban design policy		■	
Investigate opportunities to incentivise high density, low-carbon design through consent and compliance processes e.g. development contributions reduced for lower carbon footprint		■	
Provide information for developers around heating options, insulation, etc. to illustrate carbon reduction and cost savings over building life (LCA tools)		■	
Promote uptake of low-energy building design and performance principles		■	
Provide advice to home owners/ renters to improve home health, including energy efficiency support and incentivise retro-fit of existing buildings to improve energy efficiency and conservation	■		
Investigate feasibility to provide resources to improve the quality of existing owner-occupied and rental housing in low income areas	■		
Monitor and manage building energy use in relation to heating, air conditioning, lighting, etc.	■		

Parties involved: RLC, BOPRC, EECA , Building Research Association of New Zealand (BRANZ), central government, developers and building industry, homeowners

Infrastructure Energy Efficiency	Timeframe		
	Underway	1-3yrs	4yrs+
Upgrade wastewater treatment system	■		
Undertake preventative maintenance and efficiency upgrades of mechanical and electrical equipment e.g. pumps	■		
Develop water conservation strategy	■		
Develop and implement water efficiency guidelines for Council buildings and reserves	■		
Investigate opportunities to reduce water use and wastewater volumes e.g. water efficiency programmes, metering, etc.	■		
Investigate the use of incentives (e.g. rates relief) to support household efficient use of water e.g. greywater and rainwater collection tanks, etc.		■	

Parties involved: RLC, BOPRC

GOAL M1.3 Transition space and water heating to sustainable energy sources

	Timeframe		
	Underway	1-3yrs	4yrs+
Identify opportunities for commercial/ industrial high energy users to switch heating fuels to more sustainable energy types			■
Investigate feasibility to implement a clean heating-targeted rate scheme focused on transitioning away from natural gas			■
Develop guidance for discussion of residential and commercial heating options at consenting stage		■	
Reduce natural gas use for heating and hot water in domestic, school and commercial settings			■

Parties involved: RLC, BOPRC, education facilities, businesses, households

GOAL M1.4 Upgrade all public lighting to be energy-efficient

	Timeframe		
	Underway	1-3yrs	4yrs+
Convert all public lighting and streetlights to LED	■		
Install technology to improve public lighting efficiency and reduce light spill			■

Parties involved: RLC

M2. TRANSPORTATION AND URBAN FORM

GOAL M2.1 Achieve modal change to active and public transport

Integrated Transport Strategy	Timeframe		
	Underway	1-3yrs	4yrs+
Develop/ expand public transport and active transport in an integrated transport strategy	■		
Establish monitoring framework/ targets for active and public transport activities	■		
Quantify and promote co-benefits of modal change to active and public transport		■	
Develop methodologies to integrate GHG reduction potential into growth management decisions and transportation assessments		■	
Develop behaviour change campaign/ programme around active and public transport e.g. use of public influencers	■		
Understand barriers and costs to uptake of active transport and public transport		■	
Investigate potential to implement a public EV-sharing scheme			■

Parties involved: RLC, BOPRC, Waka Kotahi (NZ Transport Authority), education providers, Toi te Ora (Public Health)

Walking and Cycling	Timeframe		
	Underway	1-3yrs	4yrs+
Expand and maintain bike and walking paths for work and recreational trips	■		
Increase bike facilities e.g. racks, secure undercover parking, bike kitchens	■		
Run cycling education programmes starting from a young age	■		
Implement employer-subsidised electric bike (e-bike) purchase programmes	■		
Implement district walking strategy		■	
Establish CBD bike or scooter-share system e.g. Lime		■	
Promote cycling and walking	■		
Develop e-bike charging network		■	

Parties involved: RLC, BOPRC, Waka Kotahi, schools, businesses, Sport Bay of Plenty, education providers

Public Transport	Timeframe		
	Underway	1-3yrs	4yrs+
Improve bus reliability and coverage/ frequency to key work and recreational areas		■	
Upgrade bus facilities to be safer, more comfortable and easier to use	■		
Investigate technological advances that could facilitate bus patronage		■	
Identify opportunities for mass transit/ freight linking Rotorua to the wider region e.g. rail, solar ferry			■
Look at opportunities to support high-occupancy vehicles and buses e.g. bus priority measures			■
Promote & incentivise use of public transport	■		
Provide infrastructure to support public transport and active mode shift	■		

Parties involved: RLC, BOPRC, Waka Kotahi

Other Sustainable Transport Initiatives	Timeframe		
	Underway	1-3yrs	4yrs+
Enable/ promote co-working/ working from home	■		
Investigate demand for special parking zones for ridesharing		■	
Encourage car-free days		■	
Investigate potential for a local carpooling app			■
Create green fleet management plans for businesses			■

Parties involved: RLC, BOPRC, businesses, communities

Urban Development	Timeframe		
	Underway	1-3yrs	4yrs+
Require new residential developments to use Travel Demand Management (TDM) principles including requiring cycle and pedestrian linkages where appropriate		■	
Provide guidelines for developers to design sustainable transport features in proposals and consent applications		■	
Support implementation of TDM plans in existing communities or retrofit building projects		■	
Develop a Rotorua urban development strategy, considering land use and transportation infrastructure		■	
Investigate and facilitate higher-density urban development		■	
Undertake inner city transport review	■		

Parties involved: RLC, BOPRC, developers

GOAL M2.2 Encourage vehicle fuel switch to sustainable energy

Fleet Uptake Of Electric Vehicles (EVs)	Timeframe		
	Underway	1-3yrs	4yrs+
Adopt procurement policy of public-funded fleet purchases and renewals to be electric for passenger vehicles and biofuel blend (B20+) for light to heavy trucks e.g. buses, waste trucks		■	
Investigate opportunities for EV sharing across organisations		■	

Parties involved: Central Government, RLC, BOPRC, businesses

Fuel Switching	Timeframe		
	Underway	1-3yrs	4yrs+
Review EV infrastructure provision and identify opportunities to extend and standardise the EV charging network		■	
Identify and implement incentives to increase uptake of EVs within the Rotorua district e.g. free parking for EVs		■	
Investigate potential for conversion of bus fleet to electric		■	
Investigate potential for local biofuel provision			■
Look at financial incentives for low carbon transport and disincentives for high carbon transport			■

Parties involved: RLC, BOPRC, EV charging infrastructure businesses

M3. CONSUMPTION AND WASTE

GOAL M3.1 Reduce waste to landfill from organic and non-organic sources

Organic Waste	Timeframe		
	Underway	1-3yrs	4yrs+
Investigate feasibility of kerbside organic waste collection		■	
Promote residential food waste reduction initiatives e.g. composting	■		
Support set up of local food/green waste collection and processing		■	

Parties involved: RLC, BOPRC, communities, households

Other Waste	Timeframe		
	Underway	1-3yrs	4yrs+
Subsidise e-waste recycling and ban e-waste from landfill			■
Look at options to use waste e.g. remanufacturing; pyrolysis; methane capture for electricity generation			■
Continue to operate and optimise the Rotorua Landfill flare	■		
Provide kerbside recycling	■		
Increase recycling bins in town		■	
Raise awareness of alternatives to disposable nappies and encourage optimum disposal methods	■		

Parties involved: RLC, central government, businesses, general public

Product Stewardship	Timeframe		
	Underway	1-3yrs	4yrs+
Investigate opportunities to mandate producer responsibility at the district level, including local product stewardship programmes		■	
Develop and implement zero waste event guidelines for council and community events	■		
Support repair-shop initiatives			■

Parties involved: central government, RLC, BOPRC, business, producers

Education	Timeframe		
	Underway	1-3yrs	4yrs+
Educate around conscious consumerism e.g. using/buying less; local sourcing	■		
Educate on waste reduction	■		
Educate on urban food gardening and composting	■		
Educate on efficient use of water to reduce energy required to pump		■	
Support initiatives that reduce single-use items	■		

Parties involved: RLC, BOPRC, Waikato Regional Council (WRC), education providers

M4. LEADERSHIP, ADVOCACY AND ECONOMIC OPPORTUNITY

GOAL M4.1 Provide support and opportunities for Council, Te Arawa, businesses and the community to work together to mitigate climate change

Council Leadership	Timeframe		
	Underway	1-3yrs	4yrs+
Identify opportunities within Council to apply ethical investment criteria that include not investing in fossil fuels		■	
Council to 'Walk the Talk' on climate change and sustainability	■		
Council to review sustainable procurement policy and increase provisions for low carbon procurement, including carbon assessment of significant capital works	■		
Show leadership with Council buildings e.g. wood; passive building design; sustainable energy; etc.	■		

Parties involved: RLC

Advocacy and Collaboration	Timeframe		
	Underway	1-3yrs	4yrs+
Collaborate with and support youth climate action groups in Rotorua	■		
Enviroschools programmes rolled out across the district	■		
Design programme to support community-led low-carbon initiatives			■
Set up climate forum to facilitate communication of all learnings between sectors/businesses and advocate to central government	■		
Co-design emissions reductions opportunities with vulnerable and low socio-economic groups, and key support agencies		■	
Develop a communication/ education plan and implement to educate community around climate change and engage with the community on climate adaptation	■		
Identify additional funding opportunities to support implementation of mitigation actions		■	

Parties involved: RLC, BOPRC, WRC, Te Arawa, businesses, communities

Economic Opportunity	Timeframe		
	Underway	1-3yrs	4yrs+
Tourism sector develops environmentally responsible and low-carbon tourism opportunities and eco-tourism		■	
Investigate and promote opportunities to reduce GHG emissions from existing tourism		■	
Investigate low-carbon, new business opportunities e.g. food technology	■		
Investigate opportunities for local waste handling facilities for organic waste, recycling, aluminium, soft plastics, batteries		■	
Investigate new technologies/reusable products (circular economy), e.g. replacing plastics with wood products	■		
Implement Wood First policy and use wood for construction	■		
Promote local horticulture and food production		■	
Advocacy for low carbon and circular economy principles	■		

Parties involved: RLC, Rotorua Economic Development (RED), businesses, tourism industry, construction industry, Scion, agriculture sector, Te Arawa

M5. NATURAL ENVIRONMENT AND RURAL ECONOMY

GOAL M5.1 Reduce agricultural emissions in the district

Agricultural Emissions	Timeframe		
	Underway	1-3yrs	4yrs+
Support rural sector to take advantage of opportunities through nationally led research and new practices for GHG emission reduction	■		
Support farmers to identify actions that co-benefit reduction in GHG emissions as well as improving water quality through Rotorua Lakes Programme and in the Waikato Regional Council area		■	
Resource and distribute carbon emissions tool/OVERSEER to help agricultural sector report on farm emissions in farm management plans	■		
Provide training and information for rural landowners e.g. soil carbon, wetland restoration	■		
Investigate role of high value-added plant protein agriculture		■	

Parties involved: Ministry for Primary Industry (MPI), Federated Farmers, Beef and Lamb NZ, BOPRC, WRC, agriculture sector

Land Use	Timeframe		
	Underway	1-3yrs	4yrs+
Support fora to facilitate ongoing, long-term farming and forestry discussions		■	
Review land use policy to identify opportunities to implement stronger protections for the natural environment e.g. District Plan			■
Look at opportunities to expand greenbelt (converted from agricultural use to native bush/public open space)			■
Consider rates relief for land use change		■	

Parties involved: RLC, BOPRC, WRC, MPI, agriculture sector

GOAL M5.2 Increase exotic and native forestry in the district

Forestry	Timeframe		
	Underway	1-3yrs	4yrs+
Investigate opportunities to undertake afforestation on Council owned/public land		■	
Investigate opportunities to incentivise native forest regeneration and afforestation	■		
Support community initiatives to plant trees	■		
Look at opportunities to reduce forestry emissions e.g. erosion control, use of fertilisers, harvest operations	■		

Parties involved: RLC, BOPRC, WRC, DOC, MPI, forestry sector, Te Arawa

Natural Urban Environment	Timeframe		
	Underway	1-3yrs	4yrs+
Encourage residents and community organisations to produce food locally e.g. community gardens	■		
Consider use of reserves for growing food e.g. allotments	■		
Initiatives to enhance and protect local ecosystems e.g. community plantings and clean-ups	■		
Local organisations partner to support community pest trapping initiatives	■		
Reserves/open spaces plantings consider carbon/energy e.g. reduce mowing		■	

Parties involved: RLC, BOPRC, Department of Conservation (DOC), households and communities

Appendix II
Proposed Adaptation Actions

A1. INFRASTRUCTURE

GOAL A1.1 Identify climate change risks and potential impacts on infrastructure and plan for resilience

	Timeframe		
	Underway	1-3yrs	4yrs+
Undertake natural hazards mapping	■		
BOP Lifelines Group collaboration to mitigate hazards and reduce risks to regional infrastructure	■		
Climate risk assessment undertaken for all new capital, renewal and improvement projects		■	
Prioritise additional funding to address future infrastructure requirements		■	
Long-term planning takes projected climate changes into account e.g. Infrastructure 30-year Plan, District Plan	■		
Multi-disciplinary and cross-Council approach to planning future infrastructure requirements		■	

Parties involved: BOP Lifelines Group, BOPRC, WRC, RLC, infrastructure providers

GOAL A1.2 Transport Infrastructure Plan identifies climate risks and adaptation measures for a resilient transport system

	Timeframe		
	Underway	1-3yrs	4yrs+
Identify key road and bridge infrastructure at risk from severe weather events	■		
Identify and plan for infrastructure adapatationadaptation measures required e.g. strengthening, route changes, alternative route identification, change in materials		■	
Urban design requires co-location and connects public transport and key services to increase community resilience			■
Control the timing of road sealing activities to reduce risk of failure	■		

Parties involved: RLC, BOPRC, WRC, Waka Kotahi

GOAL A1.3 Potable water supply continues to meet the needs of the district

	Timeframe		
	Underway	1-3yrs	4yrs+
Ensure integrity of groundwater bores to protect water supply aquifers	■		
Investigate metering water to increase public awareness of water resource conservation			■
Ongoing leak detection programme	■		
Monitor population growth and model/plan to meet future potable water needs	■		
Plan for increased water reservoirs and connected water supply areas		■	
Promote storage of emergency water supplies in households and workplaces	■		

Parties involved: RLC, Te Arawa, BOPRC, Toi Te Ora, households and businesses

GOAL A1.4 Ensure resilience of the wastewater management system

	Timeframe		
	Underway	1-3yrs	4yrs+
Protect the wastewater system from stormwater incursion/ infiltration	■		
Create guidelines for the use of composting toilets, greywater collection systems, etc.		■	

Parties involved: RLC, developers, Te Arawa, Te Arawa Lakes Trust (TALT), Toi Te Ora, households

GOAL A1.5 Stormwater system is designed and maintained to accommodate climate-adjusted projected flooding

	Timeframe		
	Underway	1-3yrs	4yrs+
Continue to update stormwater design standards	■		
Understand and work with changing stormwater flow paths (catchment/flood mapping)	■		
Investigate soft design solutions e.g. swales		■	
Promote urban design which increases the permeability of hard surfaces to reduce demand on stormwater infrastructure e.g. roofs, driveways, paths, public spaces		■	
Investigate alternative materials for Council-managed community asset surfaces	■		
Identify and reinstate wetlands		■	
Develop policies which encourage an increase in on-site water storage and reuse e.g. rainwater collection, on-site stormwater control	■		
Manage lake levels to prevent and handle flooding	■		

Parties involved: RLC, BOPRC, Te Arawa, TALT, developers

GOAL A1.6 Increase resilience of power supply and telecommunications to interruption

	Timeframe		
	Underway	1-3yrs	4yrs+
Undertake public education to convey the importance of protecting overhead lines through tree maintenance and location planning	■		
Street trees planned and maintained as part of a tree management programme	■		
Contingency planning to ensure power supply for essential services across the district in the event of disruption	■		
Move powerlines underground in new developments/ retrofits	■		
Investigate opportunities for local generation to increase resilience especially in rural areas - wind, solar, micro-hydro, geothermal, biomass		■	

Parties involved: RLC, BOP Lifelines Group, energy and telecommunications providers and networks, households and businesses

A2. PEOPLE AND COMMUNITIES

GOAL A2.1 Increase resilience of public space to extreme high temperatures and rainfall

	Timeframe		
	Underway	1-3yrs	4yrs+
Assess and prioritise public locations to implement cooling measures			■
Planning and design of public spaces caters for more extreme weather e.g. shade and rain protection structures, green roofs, planting and drinking water provision		■	
Identify opportunities to design and renovate public buildings to maximise resource-efficient temperature control			■
Develop a heat alert system to protect vulnerable people including elderly, children and outdoor workers from extreme high temperatures			■

Parties involved: RLC, Toi Te Ora, Te Arawa, Lakes District Health Board (Lakes DHB)

GOAL A2.2 Build local resilience to increased price of food and other items related to increased price of carbon

	Timeframe		
	Underway	1-3yrs	4yrs+
Increase locally-grown food supply and distribution including home and community gardens, maara kai, markets, food preservation and storage of surplus	■		
Investigate opportunities for shared community resources such as tool banks, community power set-ups, shared spaces, shared vehicles, group purchasing power			■

Parties involved: RLC, Te Arawa, communities, households, agriculture sector

GOAL A2.3 Increase sustainability of housing to support health and wellbeing of residents despite changes in climate

	Timeframe		
	Underway	1-3yrs	4yrs+
Investigate policies to support increased uptake of insulation, resource-efficient heating, cooling and ventilation	■		
Encourage building of affordable homes designed to optimise resource-efficient heating and cooling		■	
Identify opportunities to enable households to increase energy resilience in severe weather events			■
District Plan, Spatial Plan and other Council planning functions inform the public on climate risks and projected impacts in relation to building and renovation		■	
Encourage design/retrofit of buildings to include increased energy efficiency for heating and cooling		■	

Parties involved: RLC, BOPRC, Te Arawa, EECA, Toi Te Ora, building sector

GOAL A2.4 Increase the future working population's ability to respond to a changing employment environment

	Timeframe		
	Underway	1-3yrs	4yrs+
Identify pathways and key skills for future local employment and collaborate to support pathways for youth to succeed		■	
Collaborate to ensure local education and training is planning for future needs		■	
Advocate for adult retraining programmes and resources	■		

Parties involved: RLC, Ministry of Social Development (MSD), Ministry of Education (MoE), Ministry of Business, Innovation and Employment (MBIE), education providers, communities

A3. NATURAL ENVIRONMENT

GOAL A3.1 Optimise rural land use in a changing climate environment to ensure environmental resilience

	Timeframe		
	Underway	1-3yrs	4yrs+
Gather and share information to enable decision-making and planning for rural land use e.g. water availability		■	
Support innovation in land management systems e.g. water, planting	■		
Identify opportunities for new crops which are flood and drought resistant, and low-nitrogen impact	■		
Catchment flood protection built into rural land use plans e.g. wetlands, riparian, native forestry in head-waters	■		
Understand vulnerability of land to slips and landslides and plant to manage	■		

Parties involved: BOPRC, WRC, Te Arawa, MPI, agriculture and forestry sectors

GOAL A3.2 Support the maintenance and protection of native species, including a healthy conservation estate

	Timeframe		
	Underway	1-3yrs	4yrs+
Model pest incursions and support pest control initiatives	■		
Rationalise and maintain a safe public track network	■		
Monitor and protect native biodiversity; support Te Mana o te Taiao Aotearoa NZ Biodiversity Strategy 2020	■		
Support community planting of indigenous trees Rotorua Lakes Programme works to achieve lake water quality targets	■		

Parties involved: TALT, Department of Conservation (DOC), BOPRC, WRC, RLC, rural sector, communities

GOAL A3.3 Urban natural environments support community wellbeing and resilience

	Timeframe		
	Underway	1-3yrs	4yrs+
Planning for planting in reserves and streetscapes considers plant species resilience and impact on shade, soil erosion, stormwater and community wellbeing	■		
Increase local community food production, e.g. community gardens and orchards, maara kai, allotments, home gardens, reserves	■		
Facilitate novel approaches to increase resilience of urban spaces e.g. raingardens, green roofs, urban beekeeping		■	

Parties involved: RLC, Te Arawa, developers, communities and households

A4. GOVERNANCE, LEADERSHIP AND ADVOCACY

GOAL A4.1 Budgeting and investment supports priorities for community adaptation to climate change

	Timeframe		
	Underway	1-3yrs	4yrs+
Budgets are set to support climate adaptation initiatives		■	
Advocate to central government for ongoing resourcing for adaptation needs		■	

Parties involved: RLC, BOPRC, WRC, Te Arawa, central government

GOAL A4.2 District planning and processes support implementation of adaptation initiatives

	Timeframe		
	Underway	1-3yrs	4yrs+
Climate change adaptation is considered in all Council planning – District Plan, Spatial Plan, Long-term Plan, Infrastructure Plan, Reserve Management Plans, building and planning regulations	■		

Parties involved: RLC, BOPRC, WRC, Te Arawa

GOAL A4.3 Increased community safety, preparedness and resilience to severe weather events

	Timeframe		
	Underway	1-3yrs	4yrs+
Council Civil Defence and emergency management team preparedness through training and practice exercises, and evaluation of event response outcomes	■		
Public is advised on keeping safe during severe weather events	■		
Partners across the Civil Defence community work to identify areas at increased risk, and develop prevention, alert and response plans for community safety	■		

Parties involved: Te Arawa, RLC, BOPRC, civil defence and emergency services

GOAL A4.4 Communities are educated and informed and contribute to climate change adaptation actions

	Timeframe		
	Underway	1-3yrs	4yrs+
Agencies partner to support community climate education, establishing informed community conversations and decision-making regarding adaptation		■	
Targetted climate change education and engagement on adaptation with tangata whenua, community, youth and interest groups	■		
Climate Change Commission to provide fora for feedback and discussion from public and agencies	■		
Provide information to public and businesses to ensure climate resilience measures are planned for in all built-environment projects		■	

Parties involved: Te Arawa, RLC, BOPRC, WRC, civil defence services, Climate Change Commission, central government

A5. ECONOMY

GOAL A5.1 Opportunities for new low-carbon local businesses are identified

	Timeframe		
	Underway	1-3yrs	4yrs+
Undertake feasibility study for 'green future' opportunities		■	
Investigate food technology innovation	■		
Investigate large-scale composting and recycling plants and waste to energy projects		■	
Partner to investigate circular economy opportunities and sustainable solutions to business and environmental challenges	■		
Develop low-carbon tourism opportunities to meet changing customer requirements Promote local procurement to reduce carbon impact		■	
Investigate development of reusable products and packaging			■

Parties involved: Te Arawa, RLC, BOPRC, WRC, MBIE, Scion, RED businesses

GOAL A5.2 Businesses adapt operating models to take advantage of opportunities from changing climate

	Timeframe		
	Underway	1-3yrs	4yrs+
Support business to remain informed about the impact of climate change and emerging opportunities		■	

Parties involved: Te Arawa, RED, RLC, MBIE, business sector groups, central government

Appendix III
Rotorua District's gross emissions split by Sector and associated sub-categories (2018/19)

Sector	tCO2e	% Gross	% Sector
Stationary Energy			
Electricity Consumption	46,680	3.4%	35.5%
Electricity Transmission and Distribution Losses	3,833	0.3%	2.9%
Natural Gas	41,507	3.0%	31.6%
Natural Gas Transmission and Distribution Losses	6,624	0.5%	5.0%
LPG	5,491	0.4%	4.2%
Stationary Petrol & Diesel Use	18,981	1.4%	14.4%
Coal	5,800	0.4%	4.4%
Biofuel / Wood	2,489	0.2%	1.9%
Bioethanol	0.0	<0.1%	<0.1%
Total:	**131,405**	**9.4%**	**100%**
Transport			
Petrol	118,755	8.5%	39.9%
Diesel	170,483	12.3%	57.2%
Jet Kerosene (Commercial Flights)	7,340	0.5%	2.5%
Aviation Gas	1,159	0.1%	0.4%
LPG	95	<0.1%	<0.1%
Total:	**297,832**	**21.3%**	**100%**
Waste			
Open landfill (Tirohia)	62	0.0%	0.1%
Closed landfill (Rotorua/ Atiamuri)	76,218	5.5%	93.6%
Wastewater Treatment Plants	2,756	0.2%	3.4%
Individual Septic Tanks	2,411	0.2%	3.0%
Total:	**83,477**	**6.0%**	**100%**
IPPU			
Industrial Product and Process Use	26,598	1.9%	100%
Total:	**26,598**	**1.9%**	**100%**
Agriculture			
Enteric fermentation	657,655	47.3%	77.2%
Manure from Grazing Animals	94,189	6.8%	11.1%
Manure Management	48,992	3.5%	5.8%
Agricultural Soils	21,604	1.6%	2.5%
Atmospheric Deposition	15,819	1.1%	1.9%
Other Agriculture Emissions	13,754	1.0%	1.6%
Total:	**852,016**	**61.1%**	**100%**
Forestry			
Exotic Forest Sequestration	-1,796,330	N/A	N/A
Native Forest Sequestration	-84,521	N/A	N/A
Harvest Emissions	2,225,548	N/A	N/A
Total	**344,697**	**N/A**	**N/A**
Total Net Emissions (incl. Forestry)	**1,733,995**		
Total Gross Emissions (excl. Forestry)	**1,389,298**		

ROTORUA
LAKES COUNCIL
Te Kaunihera o ngā Roto o Rotorua