KPMG

# Local Government Sector Climate Scenarios

September 2025

# Foreword

Up and down the country, local government is grappling with climate change. For some councils, extreme weather events are leading to increased costs, to rebuild damaged infrastructure and support communities to recover. For others, investments in supporting communities to lower their emissions are competing with other spending priorities, creating tension.

**As the impacts of extreme weather events increase, so will the social and political pressure to act,** to reduce emissions and increase resilience. These scenarios explore when global, domestic and local decisions to act could occur, and the severity and timing of the accompanying physical, economic and social disruption.

Councils could benefit from having a collective view of how the economy, central government funding, how rates affordability could be impacted in different climate scenarios, and what impact that could have on our ability to deliver services.

These scenarios, exploring three plausible climate futures, are designed to help.

In 2025, several councils joined together with the New Zealand Local Government Funding Agency (LGFA) and KPMG to create this resource, and we would like to thank all the participants, from 35 councils across the country,  as well as staff from the Department of Internal Affairs, Taituarā and Local Government New Zealand, for their contributions.

The three scenarios have been framed through an intergenerational lens, reflecting local government's responsibility to both current and future generations. The names of the scenarios emphasise whakapapa, the connections across past, present, and future, and kaitiakitanga, and remind us that the choices we make today will shape the legacy we leave to our mokopuna.

To help councils apply the scenarios, we have written specific guidance on how to make them organisation and location specific, and how to weave them into strategic risk processes and long-term planning. As a sector we will continue to collaborate to produce resources and tools to help evolve how we use the scenarios.

We hope that these scenarios and guidance start meaningful conversations for your council, and help you prepare your advice to elected officials for the decisions that lie ahead.

**Local Government Sector Climate Scenarios Working Group**

LGFA is proud to support this collaborative effort to form a shared understanding of how climate change could impact the local government sector under different plausible climate futures.

This work will help councils to better understand the strategic risk of climate change to their organisations, and to prepare for how it could materialise over time. As the key lender to the sector, these scenarios will inform our engagement with councils, helping them to prepare for these plausible futures and supporting their continued delivery of services to communities into the future.

We encourage council staff to make ongoing use of these scenarios, and to continue to collaborate with us and other councils on the way forward to a low carbon, climate-resilient future.

**Mark Butcher**
**CEO, Local Government Funding Agency**

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# Executive Summary

# Executive summary

**These scenarios show us the extent to which the transition to a low-carbon, climate-resilient economy might impact the work of local government across Aotearoa New Zealand. However the future evolves, there will be new opportunities as well as challenges that demand forward-thinking leadership.**

## Future thinking is strategic risk management

Climate change is no longer a distant threat - it is a strategic risk that councils must actively manage. This report introduces science-based, plausible but challenging climate scenarios as a practical tool to help local government leaders and council officers ask, “What if?”; to navigate uncertainty, stress-test decisions, and build long-term resilience.

Scenarios challenge assumptions, reveal blind spots, and support smarter planning. The 2035 timeframe aligns with the horizon of Long-Term Plans (LTPs), making these scenarios directly relevant to council strategy, investment, and community engagement. The 2050 horizon reflects national and global climate targets and aligns with forward-looking frameworks as well as council infrastructure strategies. Looking further ahead, the 2100 timeframe responds to the actual lifespan of many assets being planned and built today - such as roads, stormwater systems, and public facilities – investments that must be resilient to long-term climate pressures.

This report enables the identification of climate and transition risks affecting infrastructure, land use, service delivery, and financial sustainability. The scenarios within illustrate the disruption that could arise from both bold action and delayed response.

## Transition risks are real - and so are the opportunities

The transition to a low-emissions future will be at least as disruptive as the physical impacts of climate change in the short to medium term. Councils will face shifts in regulation, funding models, economic activity, and public expectations. These changes will affect every aspect of local government - from infrastructure and planning, to equity and service delivery.

The scenarios highlight that disruption is inevitable - but that proactive action can mitigate this. Councils have an opportunity to lead, collaborate, and innovate to ensure the transition is just, inclusive, and aligned with community aspirations. They can offer a framework for identifying proactive strategies, unlocking co-benefits, and building resilience across systems.

This is not *just* about risk - it’s about readiness and leadership. Councils that embrace the use of these scenarios will be better positioned to manage complexity, seize opportunity, and guide their communities toward a thriving, climate-resilient future.

***“Proactive adaptation can reduce climate-related losses by up to 90%” UNEP Adaptation Gap Report 2023.***

# Overview of scenarios

**Our scenarios cover three different, plausible, but challenging futures, and the range of possible transitions and physical impacts that local government might experience.**

Scenarios 1 and 2 explore the risks of transitioning to a low-carbon, climate-resilient economy, and how the speed and timing of this transition may impact financial stability and community outcomes. Scenario 3 explores what happens if we do not decarbonise - so higher temperature outcomes and physical risks.

The scenarios will support Council Officers in identifying climate-related risks and opportunities, can be used as an input into strategic planning to help future-proof decisions, and help foster shared understanding across departments. These scenarios can also help councils to meet their reporting requirements and provide a consistent base for entity-level analysis.

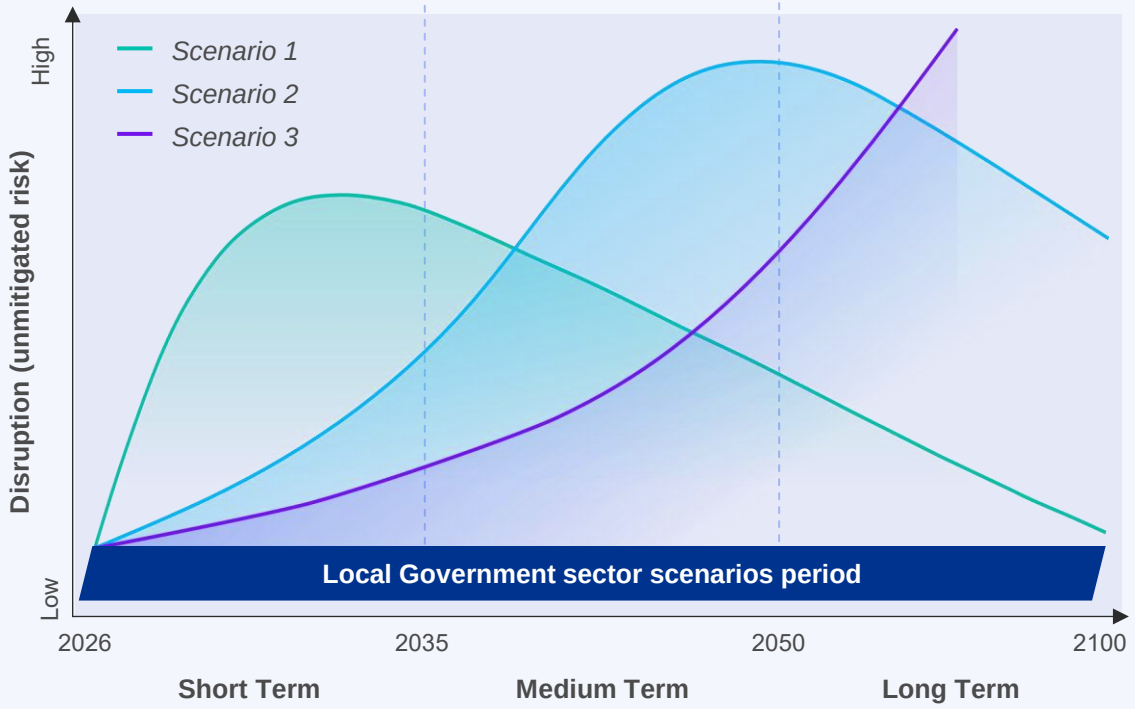
| | SCENARIO 1 | SCENARIO 2 | SCENARIO 3 |
|---|---|---|---|
| | **Acting now for our mokopuna** | **Leaving it to the next generation** | **Inheriting a broken world** |
| **Global warming** (vs pre-industrial levels) | +1.7°C at 2100 | +2.7°C at 2100 | +3.9°C at 2100 |
| **Shared Socioeconomic Pathway** | SSP1: Sustainability | SSP2: Middle of the Road | SSP3: Regional Rivalry |
| **Representative Concentration Pathway** | RCP 2.6 | RCP 4.5 | RCP 7.0 |
| **Network for Greening the Financial System** | Net Zero 2050 | Delayed Transition | Current Policies |
| | Coordinated global climate action from the late 2020s drives a transition to a low-carbon, climate resilient economy. Central government provides long-term leadership, policy, and funding support to local authorities to cut emissions and invest in climate adaptation. There is a greater focus on behavioural change and supporting vulnerable communities through the transition. Councils face challenges to rates affordability, service delivery, and social acceptance in the short to medium-term. Longer-term, the early investment in resilience and low-carbon technology pays off with the worst physical impacts avoided, and high social support for climate action. | Global climate action is delayed until the mid-2030s. A fast, disorderly transition creates very high economic and social costs for Aotearoa. Central government leads with blunt policy tools that lack coordination. Councils are expected to rapidly reduce emissions, with less focus on ensuring an equitable transition. Acting later means higher physical risks compound transition risks. Local authorities face financial stress from volatile rates affordability and service costs. Many services are paused. There is stronger social resistance to change. Inequality grows and there are winners and losers across and within councils and communities. Economic and social issues stabilise only after 2050. | Global climate action falters due to geopolitical tensions. Councils face lower expectations from the central government to decarbonise or support adaptation. Aotearoa New Zealand's economy performs comparatively well in the medium term. Long-term, emissions and physical risks continue to rise, creating regressive financial outcomes for local authorities as direct and indirect climate costs spiral. Social cohesion declines and inequality rises. High climate migration and refugees exacerbate service demand issues. By 2100, warming of +4°C triggers irreversible tipping points, ecosystem collapse, and severe climate impacts. |

# Overview of scenarios

**Our scenarios explore differences in the timing and type of our climate action. Reducing emissions or building resilience creates transition risk, whilst higher temperatures cause physical risk. The timing and combination of physical and transition risks creates differentiated disruption profiles across our three scenarios. Acting early leads to higher short-term transition risk, but reduces longer-term exposure to physical impacts. Conversely, not reducing emissions leads to physical risks rising exponentially to 2100 and beyond.**

### Figure 1: Scenario risk matrix


### Figure 2: The time horizon with peak impact varies between each scenario



# Physical hazards – extreme weather

**Physical hazards we experience today are a result of historic emissions. Under any of our scenarios, within the first two time horizons, historic emissions mean we are likely to experience a comparable level of physical hazards, even if we cut emissions to zero today. These hazards are summarised below for simplicity, rather than repeated in every scenario narrative. The potential longer term effects of continuing fossil fuel use as in Scenario 3 is summarised on the right.**

**Physical climate impacts in Scenarios 1-3 are relatively consistent from 2026 to 2050. Outcomes are differentiated by the level of concurrent transition risk, or climate resilience investment in each scenario.**

**Scenario 3, a higher-emissions scenario, has materially higher physical risks from 2050 onwards.**

## 2026

Scenario 1 | Scenario 2 | Scenario 3

### Acute physical impacts

Aotearoa New Zealand experiences a gradual intensification of extreme weather patterns. El Niño cycles exacerbate more frequent and variable rainfall, heatwaves, and alternating drought and storm conditions. While not yet at peak severity, these events test the resilience of local infrastructure and emergency services. Coastal and riverine flooding becomes more common, particularly during king tide events, and communities start to see more frequent landslides, wildfires, and strong wind events. These disruptions, though still uncommon, highlight the growing need for coordinated adaptation planning across local government services.

### Chronic physical impacts

Average temperatures continue to rise steadily, leading to more frequent hot days and increased pressure on public health, energy systems, and outdoor workforces. Sea level rise begins to manifest more visibly through coastal inundation, groundwater salination, and erosion, particularly in low-lying areas. Seasonal weather patterns become less predictable, affecting agricultural productivity and water availability. These chronic changes begin to accumulate, gradually eroding the reliability of infrastructure and natural systems that communities depend on.

## 2035

Scenario 1 | Scenario 2 | Scenario 3

### Acute physical impacts

Extreme weather events become more intense and less predictable. Heavier rainfall, stronger storms, and increased flooding occurs – now also impacting in urban areas where stormwater systems may be overwhelmed. Heatwaves will become more common and severe, posing health risks and straining energy systems. Wildfires increase in frequency and intensity, while harmful algal blooms become more prevalent in warmer freshwater and coastal environments, affecting water quality and ecosystems.

The early investment in hard and soft adaptation measures in the late 2020s in Scenario 1 reduces the medium term impact on communities.

### Chronic physical impacts

Temperatures continue to rise, with a notable increase in days exceeding 25°C across all regions. This exacerbates heat stress on infrastructure, reduces workforce productivity, and increases energy demand. Sea-level rise of up to 0.5 metres will cause persistent coastal erosion and inundation, affecting homes, roads, and public assets in low-lying areas. Drought becomes a regular feature, especially in the north and east, leading to soil shrinkage and ground instability. Ocean warming and acidification will stress marine life, with consequences for fisheries and biodiversity.

## 2050

Scenario 3

### Acute physical impacts

By the second half of the century, Aotearoa New Zealand experiences the full force of climate volatility. Extreme rainfall, extratropical cyclones, and storm surges become more destructive, pushing further south and overwhelming existing infrastructure. Heatwaves and droughts become more prolonged, triggering widespread wildfires and freshwater shortages. These acute events increasingly exceed the adaptive capacity of local systems, leading to cascading failures in transport, energy, and emergency services. Coastal communities face repeated storm surge events, and some ports may become inoperable due to sea level rise, disrupting trade and supply chains. Agricultural yields are volatile, with droughts or flooding badly affecting production in some regions each year.

### Chronic physical impacts

Chronic climate stressors dominate the landscape. Droughts are expected annually, frost becomes rare, and snow is confined to the highest elevations. Sea level rise of 1 metre by century's end is reclaiming low-lying land and contaminating freshwater aquifers. Biodiversity loss accelerates as ecosystems collapse under shifting thermal ranges and ocean acidification. Temperature range shifts mean some crops or livestock can no longer be produced in certain locations, although new species can be viable. By 2070, it is widely accepted that over 10 metres of sea level rise is locked in, necessitating long-term planning for managed retreat from many coastal settlements.

## 2100

02

# Introduction

# Introduction

## The challenge

Seventy-eight local authorities make up the local government sector in Aotearoa New Zealand. From Far North to Southland, councils exist to **enable democratic local decision making and action to meet the current and future needs of communities.**

Climate change threatens councils' ability to deliver on their purpose and can affect so many areas of our lives, from the quality of our water to the health of our ecosystems to our ability to travel and access services. Councils have been planning for and tackling these challenges for years, but as global temperatures rise the level of uncertainty ahead calls for more proactive and strategic approaches.

Many New Zealand sectors have developed sector-wide scenarios to develop a shared understanding of how climate change might impact them and how they might choose to respond. This has been catalysed by the mandatory Aotearoa New Zealand Climate Standards, which the LGFA is captured under. While most councils are not required to report under the Standards, we have seen the benefits of pooling resources, sharing insights and developing a sector-wide view of this challenge.

## The opportunity

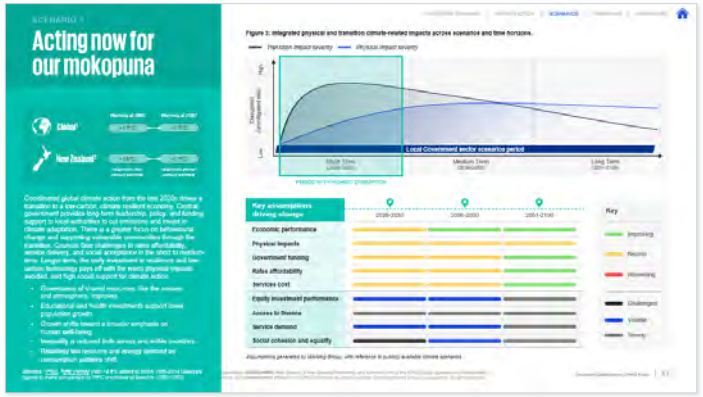
The local government sector has a significant role to play both in responding to the impacts of climate change and in driving the transition to limit them. From designing our towns and cities to managing our natural resources, councils have the opportunity to enable major shifts in how we live, work, and move around.

This project has enabled us to bring together councils from across the country to provide a foundation for exploring our climate-related risks and opportunities. It has helped us go beyond immediate local impacts of climate change to consider wider and longer-term economic, social and environmental trends. Following the lead of other sectors has also allowed us to benefit from and build on their work.

By exploring plausible futures, we have created a baseline for councils across Aotearoa New Zealand to leverage and support critical, strategic thinking in the face of climate change. Casting our minds even further than the long term planning councils undertake will help us improve resilience, enable change, and deliver on our purpose.

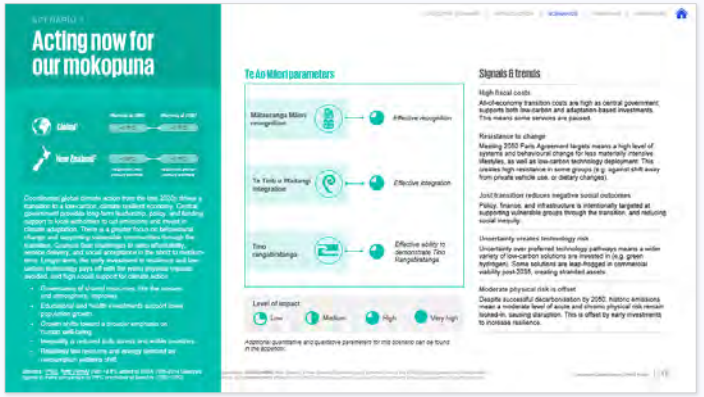
# How to read these scenarios

**There are three different scenarios presented in this report: "Acting now for our mokopuna," "Leaving it to the next generation," and "Inheriting a broken world." Each scenario is explored over three different time horizons: 2026-2035 (short term), 2036-2050 (medium term), and 2051-2100 (long term). Personas of different council typologies at 2050 have also been developed to bring the scenarios to life.**




**To set the scene** for each scenario, a landing page with key elements, including:

- Warming projections for both global and New Zealand contexts;
- A short summary of the scenario and key assumptions;
- A graph visualising the impact profile of the scenario (i.e. in which period does the most disruption happen?);
- Key assumptions driving change for local government within the period of highest disruption under this scenario. The first 5 assumptions, and their associated RAG rating, are included on the top right of the scenario narrative pages.

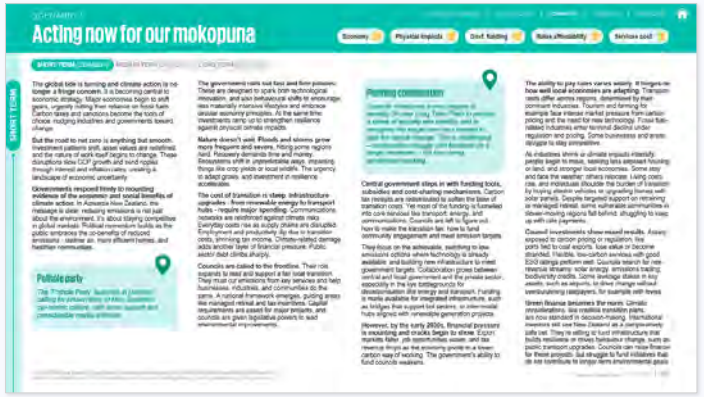



**An overview of parameters and key signals and trends** used to guide the scenario narratives.

This page includes:

- Te Ao Māori assumptions within each scenario and their level of impact, and;
- A summary of the most notable signals and trends under each scenario - these are the key features for local government to consider and monitor.

An extended list of parameters can be found in the appendix.




**Narratives developed by the Working Group**, based on the parameters/assumptions. These storylines explore how the future might play out under our different scenarios. Each scenario has 3x narratives, one for each time horizon:

**SHORT TERM** (2026-2035) **MEDIUM TERM** (2035-2050) **LONG TERM** (2051-2100)

The narratives are structured consistently across key areas:

- International context
- National Level – Policy, Economy & Funding
- Regional Level – Income: Rates & Investments
- Regional Level – Demand: Service Cost & Deliverability
- Regional Level – Social Outcomes

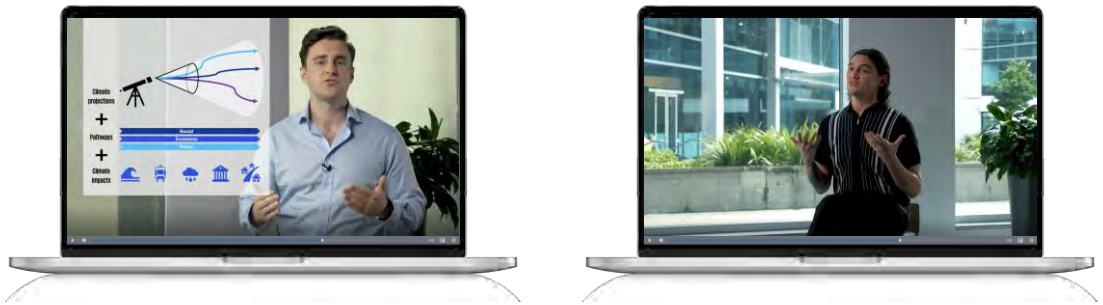
Vignettes (in coloured boxes) are short, rich stories to bring the scenarios to life, and imagine what might be happening in each future.

# Using these scenarios

**These scenarios are a foundation for us to explore how climate change could impact local governments' ability to deliver services. They offer us a sector-wide view of what trends could unfold and how that might impact services, funding, communities, and more.**

However, they are a starting point to build out further. Scenarios are designed to be used, not read. To make these as useful and relevant as possible for individual councils, we recommend that you tailor these to your specific council and context. You can do this by leveraging the relevant parts of these scenarios and bringing in locally relevant data or trends. You can also leave out or edit sections that don't apply to your council's situation.

We have created guidance to support councils with doing just this, and you can find it here: Local Government Sector Scenarios. The following page provides a summary of the topics addressed in the guidance document.






## Key design choices to support council use of the sector scenarios:

### Parameters

The impacts of climate change, and councils' responses to it, are inherently localised. Even one physical factor (for example, sea level rise) will not present uniformly around the country, let alone the compounding nature of climate impacts. The Working Group opted for qualitative discussion of parameters in order to keep the scenarios accessible, easy to localise, and reflective of the expertise and data councils already bring.

### Transition risk

As above, we know councils are already effective at thinking long term, planning for decades to come, and considering the impacts of climate change and other factors on physical assets. We have typically spent less time exploring what the transition to a low-carbon economy would mean for our services and communities. These scenarios aim to focus more heavily on transition risk to support councils with this in the future.

### Council personas

We have included personas or short summaries to paint a picture of what circumstances might be like for council types in different scenarios. While these are completely fictional, councils may find it helpful to leverage personas with similar characteristics to them to consider how the scenario would impact their ability to deliver services.

# Guidance Document

**The guidance provides a foundational framework for those beginning to explore futures thinking or aiming to integrate it more thoroughly into their work.**

**Understanding what climate scenarios are and how you can use them to support your council's planning and decision making.**

The guidance document is designed to help council officers understand and apply the Local Government Sector Climate Scenarios in their planning and decision making. It provides practical, but high-level support for council officers in a wide variety of roles.


**The FAQs in the document cover localizing:**

## 1 Futures thinking

- What are scenarios and pathways?
- What are scenarios for?
- What scenarios are not

## 2 Foundational understanding of climate scenarios

- What are climate scenarios?
- Why are climate scenarios important for local government planning?
- Why aren't climate scenarios used as forecasts?

## 3 The Local Government Sector Climate Scenarios process

- How were these climate scenarios developed?
- How do I interpret the scenarios?

## 4 Using these climate scenarios in practice

- How can councils use climate scenarios in planning?
- How do I make a scenario relevant to my council's context?
- How do climate scenarios link to long-term planning documents (e.g. LTPs)?

## 5 Using climate scenarios for engagement and collaboration

- How can councils use scenarios to engage elected members or non-climate teams?
- How do the Local Government Sector Climate Scenarios link to other climate scenarios?

## 6 Guidance on integrating Māori perspectives into scenarios

- Why should councils engage Hapū and Iwi when localising climate scenarios?
- Who should councils engage with?
- When should engagement begin?
- What approaches are recommended for engagement?
- How can councils ensure climate scenarios are culturally grounded?
- What are some common mistakes to avoid?
- How can councils support Māori capacity to engage in climate scenario work?

# Council personas

**Four personas have been developed which imagine what different, fictitious councils might be experiencing in the period from 2036-2050 (medium term).**

These examples are intended to bring the scenarios for life. They are only a snapshot of what one council might be experiencing, and are not intended to be typical for all councils in that typology or region.

Throughout the scenarios, we have used these personas to bring the narrative to life with vignettes.

In section 4, each persona also has a short narrative which explores key questions including:

- What **key events** has the local authority experienced in the past few years?
- What's happening to **rates**?
- What's happened to **service delivery**?
- What are **key issues** for **community**?

## Matana

Upper North Island

Unitary authority

Matana is a coastal region with low population density (population ~55k). It's a popular retirement location, and the local iwi and hapu are very active. Key industries include agriculture and some tourism.

## Marygold

Central North Island

Territorial – District Council

Marygold is a small town (population ~20k) servicing an expanse of productive agricultural land. It has a strong heritage for dairy and beef, which are mostly exported to foreign markets. Its historic wealth has not been evenly distributed.

## Rochester

Central North Island

Territorial – City Council

Nestled on the banks of a major river, Rochester is the beating heart of the North Island. It has a young, diverse population (population ~170k) and a high number of immigrants. A mature service sector attracts international business and finance.

## Dashton

East coast of South Island

Regional Council

Dashton (population ~600k) covers a large area of agricultural and coastal land, with a small city home to a world-renowned university and a rich cultural heritage.

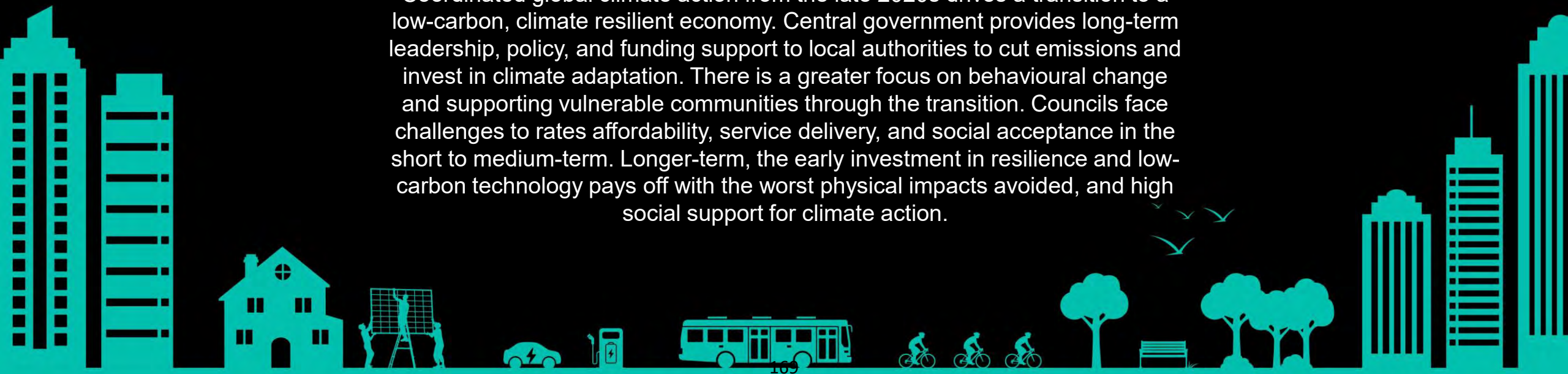
03

# Scenarios

## Scenario 1

# Acting now for our mokopuna

Coordinated global climate action from the late 2020s drives a transition to a low-carbon, climate resilient economy. Central government provides long-term leadership, policy, and funding support to local authorities to cut emissions and invest in climate adaptation. There is a greater focus on behavioural change and supporting vulnerable communities through the transition. Councils face challenges to rates affordability, service delivery, and social acceptance in the short to medium-term. Longer-term, the early investment in resilience and low-carbon technology pays off with the worst physical impacts avoided, and high social support for climate action.



SCENARIO 1

# Acting now for our mokopuna

| | Warming at 2050 | Warming at 2100[1] |
|---|---|---|
| Global[1] | +1.7°C | +1.7°C |
| New Zealand[2] | +1.6°C *MfE/NIWA mid-century estimate* | +1.7°C *MfE/NIWA end-of-century estimate* |

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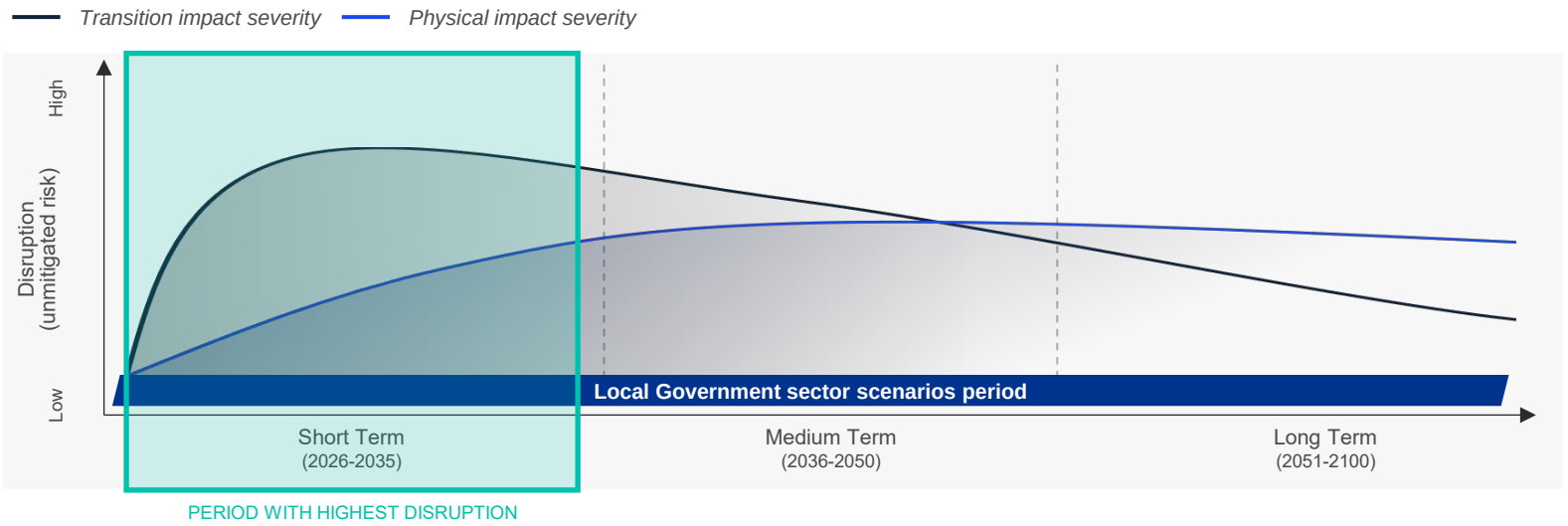
- Governance of shared resources, like the oceans and atmosphere, improves.
- Educational and health investments support lower population growth.
- Growth shifts toward a broader emphasis on human well-being.
- Inequality is reduced both across and within countries.
- Relatively low resource and energy demand as consumption patterns shift.

*Sources: [1]IPCC, [2]MfE (NIWA) (NB: +0.8°C added to NIWA 1995-2014 baselines figures to make comparable to IPPC pre-industrial baseline (1850-1990)*

**Figure 3: Integrated physical and transition climate-related impacts across scenarios and time horizons.**




| Key assumptions driving change | 2026-2035 | 2036-2050 | 2051-2100 |
|---|---|---|---|
| Economic performance | Neutral | Improving | Improving |
| Physical impacts | Neutral | Neutral | Neutral |
| Government funding | Neutral | Neutral | Improving |
| Rates affordability | Neutral | Neutral | Improving |
| Services cost | Neutral | Neutral | Improving |
| Equity investment performance | Volatile | Volatile | Steady |
| Access to finance | Steady | Steady | Steady |
| Service demand | Volatile | Volatile | Steady |
| Social cohesion and equality | Challenged | Volatile | Steady |

Key: Improving; Neutral; Worsening; Challenged; Volatile; Steady

*Assumptions generated by Working Group, with reference to publicly available climate scenarios*

SCENARIO 1

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## Te Ao Māori parameters

| | |
|---|---|
| Mātauranga Māori recognition | *Effective recognition* |
| Te Tiriti o Waitangi integration | *Effective integration* |
| Tino rangatiratanga | *Effective ability to demonstrate Tino Rangatiratanga* |

**Level of impact**

Low | Medium | High | Very high

*Additional quantitative and qualitative parameters for this scenario can be found in the appendix.*

## Signals & trends

### High fiscal costs

All-of-economy transition costs are high as central government supports both low-carbon and adaptation-based investments. This means some services are paused.

### Resistance to change

Meeting 2050 Paris Agreement targets means a high level of systems and behavioural change for less materially intensive lifestyles, as well as low-carbon technology deployment. This creates high resistance in some groups (e.g. against shift away from private vehicle use, or dietary changes).

### Just transition reduces negative social outcomes

Policy, finance, and infrastructure is intentionally targeted at supporting vulnerable groups through the transition, and reducing social inequity.

### Uncertainty creates technology risk

Uncertainty over preferred technology pathways means a wider variety of low-carbon solutions are invested in (e.g. green hydrogen). Some solutions are leap-frogged in commercial viability post-2035, creating stranded assets.

### Moderate physical risk is offset

Despite successful decarbonisation by 2050, historic emissions mean a moderate level of acute and chronic physical risk remain locked-in, causing disruption. This is offset by early investments to increase resilience.

# Acting now for our mokopuna

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

SHORT TERM (2026-2035) | MEDIUM TERM (2036-2050) | LONG TERM (2051-2100)

SHORT TERM

**The global tide is turning and climate action is no longer a fringe concern.** It is becoming central to economic strategy. Major economies begin to shift gears, urgently cutting their reliance on fossil fuels. Carbon taxes and sanctions become the tools of choice, nudging industries and governments toward change.

**But the road to net zero is anything but smooth.** Investment patterns shift, asset values are redefined, and the nature of work itself begins to change. These disruptions slow GDP growth and send ripples through interest and inflation rates, creating a landscape of economic uncertainty.

**Governments respond firmly to mounting evidence of the economic and social benefits of climate action**. In Aotearoa New Zealand, the message is clear: reducing emissions is not just about the environment, it's about staying competitive in global markets. Political momentum builds as the public embraces the co-benefits of reduced emissions - cleaner air, more efficient homes, and healthier communities.

## Pothole party

*The 'Pothole Party' launches in Dashton, calling for preservation of New Zealand's car-centric culture, with some support and considerable media attention.*

**The government rolls out fast and firm policies.** These are designed to spark both technological innovation, and also behavioural shifts to encourage less materially intensive lifestyles and embrace circular economy principles. At the same time, investments ramp up to strengthen resilience against physical climate impacts.

**Nature doesn't wait. Floods and storms grow more frequent and severe**, hitting some regions hard. Recovery demands time and money. Ecosystems shift in unpredictable ways, impacting things like crop yields or local wildlife. The urgency to adapt grows, and investment in resilience accelerates.

**The cost of transition is steep. Infrastructure upgrades - from renewable energy to transport hubs - require major spending**. Communications networks are reinforced against climate risks. Everyday costs rise as supply chains are disrupted. Employment and productivity dip due to transition costs, shrinking tax income. Climate-related damage adds another layer of financial pressure. Public sector debt climbs sharply.

**Councils are called to the frontline.** Their role expands to lead and support a fair local transition. They must cut emissions from key services and help businesses, industries, and communities do the same. A national framework emerges, guiding areas like managed retreat and tax incentives. Capital requirements are eased for major projects, and councils are given legislative powers to lead environmental improvements.

## Planning collaboration

*Councils collaborate across regions to develop 30-year Long Term Plans to provide a sense of security and stability, and to recognise the longer-term lens needed to plan for climate change. This is challenging – communities struggle with feedback on a longer timeframe – but has strong government backing.*

**Central government steps in with funding tools, subsidies and cost-sharing mechanisms.** Carbon tax receipts are redistributed to soften the blow of transition costs. Yet most of the funding is funnelled into core services like transport, energy, and communications. Councils are left to figure out how to make the transition fair, how to fund community engagement and meet emission targets.

They focus on the achievable, switching to low-emissions options where technology is already available, and building new infrastructure to meet government targets. Collaboration grows between central and local government and the private sector, especially in the kye battlegrounds for decarbonisation like energy and transport. Funding is made available for integrated infrastructure, such as bridges that support bot sectors, or inter-modal hubs aligned with renewable generation projects.

**However, by the early 2030s, financial pressure is mounting and cracks begin to show**. Export markets falter, job opportunities waver, and tax revenue drops as the economy pivots to a lower-carbon way of working. The government's ability to fund councils weakens.

**The ability to pay rates varies widely. It hinges on how well local economies are adapting.** Transition costs differ across regions, determined by their dominant industries. Tourism and farming for example face intense market pressure from carbon pricing and the need for new technology. Fossil fuel-related industries enter terminal decline under regulation and pricing. Some businesses and areas struggle to stay competitive.

As industries shrink or climate impacts intensify, people begin to move, seeking less exposed housing or land, and stronger local economies. Some stay and face the weather; others relocate. Living costs rise, and individuals shoulder the burden of transition by buying electric vehicles or upgrading homes with solar panels. Despite targeted support on retraining or managed retreat, some vulnerable communities in slower-moving regions fall behind, struggling to keep up with rate payments.

**Council investments show mixed results**. Assets exposed to carbon pricing or regulation, like ports tied to coal exports, lose value or become stranded. Flexible, low-carbon services with good ESG ratings perform well. Councils search for new revenue streams: solar energy, emissions trading, biodiversity credits. Some leverage stakes in key assets, such as airports, to drive change without overburdening ratepayers, for example with levies.

**Green finance becomes the norm.** Climate considerations, like credible transition plans, are now standard in decision-making. International investors still see New Zealand as a comparatively safe bet. They're willing to fund infrastructure that builds resilience or drives behaviour change, such as public transport upgrades. Councils can raise finance for these projects, but struggle to fund initiatives that do not contribute to longer-term environmental goals.

# Acting now for our mokopuna

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

**SHORT TERM** (2026-2035) | MEDIUM TERM (2036-2050) | LONG TERM (2051-2100)

SHORT TERM

**Service delivery becomes harder.** Falling income, rising demand, and inflation squeeze budgets. There is strong demand for climate and sustainability expertise across councils, and increasing workforce challenges around burnout, retention, and service delivery. Ageing populations and climate damage add pressure. Councils try to restore nature while cutting emissions, but the decline in ecosystem services adds costs for water management and pest control.

Legacy infrastructure such as landfills or wastewater plants lock some councils into high-emission service delivery. They face steep carbon pricing, community criticism of emissions performance, and high costs to transition. Others, having delayed action, now face rising fossil fuel costs and transition out of necessity.

**Capital costs soar. Decarbonisation technology is expensive to import.** With high carbon prices, if a council cannot source low-carbon options, it makes services like road building and maintenance costly. Some services become uneconomical. Inflation in supply chains pushes up prices for key materials. Emergency response and repair bills spike as cyclones and other extreme weather events hit.

**Communities expect bold adaptation. Resilience projects are costly, and decisions around managed retreat are fraught**. Councils turn to nature-based solutions, aiming for dual benefits, resilience and mitigation. Many must reprioritise, cutting services not directly linked to decarbonisation or adaptation. Revenue sources that don't align with government priorities become harder to sustain. Local attractions like museums raise prices to cover new costs, but attendance drops as people face their own transition expenses like adopting solar panels or EVs.

Some councils face serious financial stress due to reduced central government funding, lower rate income, and rising costs.

**Despite momentum building around climate action, with many groups welcoming progress, some communities remain resistant**. People are frustrated by job losses or the financial strain of government decisions. Even with a focus on fairness, poorer communities, especially in remote or economically vulnerable areas, feel disconnected and left behind.

Some regions experience sharp declines in key industries, slipping into multi-year local recessions. Populations shrink. In these places, councils struggle to maintain public trust. Inequalities emerge. Whilst urban policies to reduce car use gradually succeed, many rural communities face rising travel costs and feel forced to change their way of life.

**Legal challenges arise** as councils take on the complex task of managed retreat. New powers allow them to halt development in risky areas and relocate communities, but these powers stir controversy.

**Iwi expectations for services are high.** With central government support, councils work to build stronger partnerships with mana whenua, recognising the need for mutual support to maintain services and protect the environment. Early examples show the benefits of this approach. Councils without Māori Strategy teams begin to establish them, deepening their understanding of mana whenua expectations. The role of local government as a partner under Te Tiriti o Waitangi is renewed.

## Levied and loaded

*The government launches a National Adaptation and Resilience Fund, tasking councils with collecting a new climate levy from residents. Smaller councils struggle to explain its long-term benefits, as stretched teams face growing pressure to redirect funds toward immediate emergencies. Rollout proves more fraught than officials had anticipated.*

# Acting now for our mokopuna

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

SHORT TERM (2026-2035) | **MEDIUM TERM (2036-2050)** | LONG TERM (2051-2100)

MEDIUM TERM

**Most developed countries now run on clean energy and have transitioned to low-carbon industries**, even in sectors that were previously considered hard to decarbonise. Despite efforts to support global transition, many developing countries remain behind, relying on expensive fossil fuels. Those facing high physical climate risks continue to struggle.

**Public and political support in Aotearoa New Zealand remains firmly behind continued investment** in low-carbon technology and social infrastructure. The focus is on enabling low-carbon lifestyles and building a circular, low-waste economy.

**Early investment in resilience pays off.** Extreme weather events that were once rare now occur regularly, with new records set each year. However changes to infrastructure, or early warning systems mean many of the worst economic and humanitarian impacts are avoided, and the country is better prepared than most.

**A growing population and low-carbon technology support improved macroeconomic conditions.** New Zealand's export profile shifts toward lower-carbon, niche, and high-end products. Inflation and interest rates stabilise. By 2050, GDP is growing again, though less tied to material consumption. The economy becomes more circular and service-based, with savings realised via the efficiency of low-carbon technologies.

**The pace of government-led change slows. Most of the energy transition is complete.** As a result, both dedicated funding and pressure on councils to meet specific climate goals ease. In the early 2040s, targeted investments focus on sectors that are still hard to decarbonise, helping meet New Zealand's legal commitments under the Paris Agreement.

## Kahikatea credits

*Marygold council uses biodiversity credits to convert a brownfield site into a kahikatea grove. With government support, the site becomes a community-led conservation zone, complete with walking tracks, bird counts, and a composting hub fed by the region's circular economy.*

New policy settings and local powers around land use and spatial planning face early challenges but begin to settle. Councils use these tools to protect ecosystems and build resilience.

**Central government begins to step back from funding recovery for every climate event, as these events become more common**. Taxes remain high to cover the remaining costs of transition, including debts incurred in the 2030s to fund green infrastructure. Investments in resilience help reduce the financial toll, but regions hit repeatedly by extreme weather struggle to fully recover. Tough decisions are made about where to rebuild. As the economy improves, central government's ability to support local government begins to strengthen.

**New Zealand's economy continues to evolve.** Primary industries like forestry and agriculture remain important, but now focus on lower-carbon products for high-value niche markets. Early investment, both domestic and international, helps high-tech sectors flourish.

Data centres, Agri 4.0, and aerospace services take root in regions where councils supported new business and resilience. Some provincial centres experience rapid growth.

**Still, not all regions thrive. Some councils continue to struggle after losing industries that couldn't adapt.** Yet green shoots emerge, often led by iwi investment in local communities. Farming areas without the capital to invest in new technologies or industries are hit hard. Many residents relocate to cities as local services are cut. Climate-related migrants and some refugees arrive, mostly in urban centres, helping to balance an ageing population.

**By the late 2040s, households and businesses ability to pay rates improves**. Council investment portfolios begin to recover, especially those aligned with low-carbon goals. Foreign investment fuels growth in some regions. Councils benefit from international interest in carbon and biodiversity credits, creating carbon forests and nature-based solutions on their land. Green finance requirements are now standard. Insurance access improves steadily as resilience investments pay off.

## The Matana merger

*Faced with shifting populations and economic hubs, councils begin merging or reshaping their structures. Three councils, including Matana, trial a joint climate unit, sharing data, staff, and strategy to stay ahead of change.*

**The transition creates both winners and losers across local authorities**. Some regions face high service demand from more unemployed and ageing populations, but lack the revenue to meet those needs. Supply chain disruptions and carbon pricing on shipping and air freight keep material and labour costs unstable and varying by region.

**Uncertainty around viable technology pathways in the late 2020s led to a few poor choices**. Some councils now face high costs to switch to preferred decarbonisation options or technology. While service delivery improves in many areas, most councils have had to cut some services, often facing backlash from communities.

**Extreme weather continues to disrupt council operations and affect staff livelihoods**, making service delivery more difficult. Council staff and elected members face scrutiny from parts of society for their climate-related work. However, underlying support remains strong. Turnover is low, and engagement with communities continues.

**Councils' social licence improves as the benefits of transition and resilience investment become visible**. Legal challenges to council decisions and rate increases decline, as communities better understand the climate risks they aim to avoid.

**Central government continues to support councils in building strong partnerships with mana whenua.** In many regions, mana whenua begin delivering their own climate mitigation and adaptation services. More papakāinga are established, asserting tino rangatiratanga and offering safe, resilient, low-carbon, regenerative living for their uri.

# Acting now for our mokopuna

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

SHORT TERM (2026-2035) | MEDIUM TERM (2036-2050) | LONG TERM (2051-2100)

LONG TERM

**The world breathes a little easier. Early and coordinated global action has helped keep warming below 2˚C by the end of the century**. Fossil fuels are no longer the backbone of the global economy. Climate impacts still occur, sea levels continue to rise, and extreme events persist, but they are increasingly manageable. The worst-case scenarios have been avoided.

**Global economic wellbeing begins to recover**, though the metrics have shifted. GDP is no longer the sole measure of progress. Population growth and migration stabilise, and a new era of climate-aware global cooperation begins to take shape.

**Aotearoa stands as a testament to what early action can achieve**. The economy now works with nature rather than against it. Land use rules and planning systems prioritise ecosystem health, guided by iwi–council partnerships that embed holistic, place-based decision-making. Climate regulation is routine, and government priorities have shifted toward building a fully circular economy and advancing social equity.

**Decades of investment in resilience have paid off.** Physical risks remain higher than they were in the 2020s, and climate events occur more regularly, but their impacts are far less severe than they might have been.

**National investments in the transition during the 2020s ad 2030s begin to deliver real returns**. Clean energy is resilient and affordable. Food supply chains are more stable. Interest and inflation rates are lower than if action had been delayed.

**Economic wellbeing improves as Aotearoa benefits from high-tech, decarbonised industries** like Agri 5.0, space tourism, and world-class eco-tourism. International demand for carbon and biodiversity credits continues, helping countries meet their 2100 targets.

**Central government's capacity to fund local authorities is more predictable** as employment rates and tax income rise. As climate risks settle, funding contributions become fairer and more consistent across regions.

**Regional trends in population, climate hazards, and economic activity begin to stabilise**. Since the 2020s, both people and industries have shifted location. Many regions grow more prosperous, fuelled by advanced technology and affordable, unlimited renewable energy. Residential and commercial ratepayers are in a strong position to contribute, as the costs of transition now deliver tangible benefits.

**Council investment portfolios evolve. Assets are green, circular, and regenerative**. The term 'green finance' fades, now, all finance operates within planetary boundaries. Councils with strong governance and clear planning attract international investment. Many diversify their revenue sources beyond rates. This financial stability supports long-term planning and investment for future generations.

**Service delivery becomes more stable across most councils**. Spending on disaster recovery declines. Resilience investments mean infrastructure and communities are better prepared. Recovery is quick and affordable.

## Mahi tahi

*Leadership reflects the diversity in Aotearoa diversity. Councils and central government strike a balance between national coordination and local autonomy, easing tensions and boosting responsiveness.*

Councils develop robust systems for responding to natural hazard events and emergencies. Nature-based adaptation helps restore ecosystems and reduces ongoing maintenance and renewal costs.

**Demand for services eases as community stewardship grows**. Councils in previously high-risk areas reinvest in services that had been delayed. Those with strong adaptation plans continue to benefit from comparatively lower costs and reliable delivery. Funding begins to shift towards improving lives, through community wellbeing, arts, and cultural programmes.

## Resilience realised

*In 2092, a massive quake strikes the Hikurangi Subduction Zone. Bridges buckle, power grids fail - but no lives are lost. Years of investment into climate resilient response systems, processes and infrastructure design standards carry over - turning catastrophe into a quiet triumph.*

**Social tensions ease as communities adjust to the 'new normal'.** A strong focus on a just transition means most economic and social challenges have been addressed. The initial costs of change fade into memory. Councils redirect resources to support those who were left behind, working to reduce inequality. The built environment reflects this shift. Green infrastructure, adaptive housing, and nature-based solutions are now standard across regions.

**Councils spend less time on emergency response** and more on nurturing thriving, connected communities. Greater transparency, a sense of ownership, and deep relationships with community and whenua mean people see their rates as investments, not just payments for services.

**Many services are handed over to mana whenua and community stewardship** thanks to confidence and trust in local government being high. Papakāinga settlements become centres of prosperity and models for community self-governance, a new form of local government. Strong partnerships with iwi and a commitment to intergenerational thinking and mātauranga Māori preserve the memory of tough decisions, and the catastrophic outcomes that were avoided. A holistic, community-focused mindset becomes the norm across Aotearoa.

## Scenario 2

# Leaving it to the next generation

Global climate action is delayed until the mid-2030s. A fast, disorderly transition creates very high economic and social costs for Aotearoa. Central government leads with blunt policy tools that lack coordination. Councils are expected to rapidly reduce emissions, with less focus on ensuring an equitable transition. Acting later means higher physical risks compound transition risks. Local authorities face financial stress from volatile rates affordability and service costs. Many services are paused. There is stronger social resistance to change. Inequality grows and there are winners and losers across and within councils and communities. Economic and social issues stabilise only after 2050.

SCENARIO 2

# Leaving it to the next generation

| | Warming at 2050 | Warming at 2100[1] |
|---|---|---|
| Global[1] | +2.0°C | +2.7°C |
| New Zealand[2] | +1.8°C | +2.4°C |
| | *MfE/NIWA mid-century estimate* | *MfE/NIWA end-of-century estimate* |

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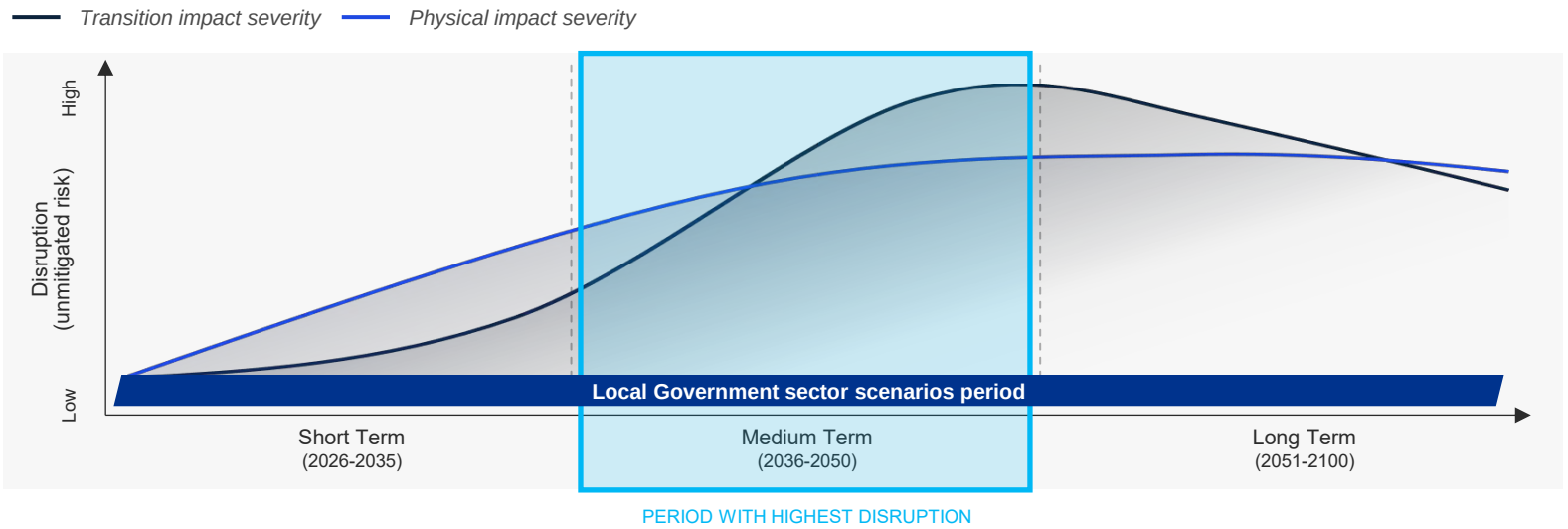
- Global and national institutions work toward but make slow progress in achieving SDGs.
- Environmental systems experience degradation, although overall the intensity of resource and energy use declines.
- Global population growth is moderate.
- Income inequality persists.
- Technological development proceeds, but without significant breakthroughs.

*Sources: [1]IPCC, [2]MfE (NIWA) (NB: +0.8°C added to NIWA 1995-2014 baselines figures to make comparable to IPPC pre-industrial baseline (1850-1990)*

**Figure 4: Integrated physical and transition climate-related impacts across scenarios and time horizons**





*Assumptions generated by Working Group, with reference to publicly available climate scenarios*

SCENARIO 2

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## Te Ao Māori parameters

| | |
|---|---|
| **Mātauranga Māori recognition** | *Moderate recognition* |
| **Te Tiriti o Waitangi integration** | *Moderate integration* |
| **Tino rangatiratanga** | *Moderate ability to demonstrate Tino Rangatiratanga* |

**Level of impact**

Low | Medium | High | Very high

*Additional quantitative and qualitative parameters for this scenario can be found in the appendix.*

## Signals & trends

### Compounding risks impact the medium term

Transitioning later means making investments and change at the same time as physical risks are higher. This creates compounding risks, such as weather-linked delays on delivery of low-carbon technology which becomes essential to operate.

### Disorderly transition hinders progress

Fragmented climate actions across local, regional, and national governments, inconsistent private sector engagement, and lack of international coordination result in abrupt policy shifts, stranded assets, and elevated transition risks.

### Inequality increases

A late focus on reducing carbon emissions reduces investment in nature or a just transition. This means some vulnerable groups are left behind, and experience negative outcomes, whilst ecosystem services decline.

### Technology clarity reduces misplaced bets

Transitioning later means there is more clarity on viable technology pathways, and adaptation solutions, reducing misplaced bets.

### Moderate physical risk hits hard

Despite eventually decarbonising, historic emissions mean a moderate level of acute and chronic physical risk remain locked-in, causing disruption.

SCENARIO 2

# Leaving it to the next generation

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

**SHORT TERM** (2026-2035) | MEDIUM TERM (2036-2050) | LONG TERM (2051-2100)

SHORT TERM

**Globally, climate action remains a political battleground**. Major economies face mounting internal pressures, security concerns, economic instability, and shifting public opinion. This leads to inconsistent climate commitments. Some governments pull back on targets or delay action, prioritising short-term economic fixes. International agreements weaken, and climate policy becomes a flashpoint in elections and public debate.

## Mapped but misaligned

*With no clear funding or direction, councils interpret hazard maps differently. Some mandate retreat; others stall. In affluent areas of Dashton, iwi-led planning and community buy-in turn risk into resilience, highlighting the gap between capacity and need.*

**Global uncertainty on climate action spills into New Zealand**, where decisions are often influenced by international pressure rather than local consensus. Government policies fluctuate between ambition and delay, creating a fragmented and reactive environment for councils, and despite steady macroeconomic trends, local governments must lead climate efforts without clear funding or consistent support.

**Councils struggle to implement plans before they are overturned by the next government**. Some attempt innovation, but many, especially those with fewer resources, focus on maintaining existing services and delay investment in resilience or emissions reduction. A gap opens between regions that can act and those that cannot.

Policy instability makes long-term planning difficult. Carbon pricing and emissions reporting rules are introduced, then repealed. Councils find it hard to attract private investment or build momentum. Central government funding is limited and competitive, often tied to short-term political goals. Planning processes stall, and costs rise as expectations shift again and again.

**Economic impacts from the transition remain limited**. Decarbonisation occurs only when financially viable. Delays add pressure to households and businesses, as energy and construction costs rise between project approval and delivery. Climate impacts - local and global - disrupt production and exports, reducing ratepayer capacity in some areas.

## Code red, code wrong

*In Rochester, a trial for a new climate disaster response AI chatbot provided inaccurate information, leading to communities not evacuating in time. Protests ensued with a petition titled "Keep Humans in the Loop."*

**Demographic trends continue: populations grow older, more diverse, and more urban**. Younger, mobile people head to cities with better infrastructure and job prospects. Rural and provincial areas are left with ageing communities. Physical impacts like flooding and extreme heat become more frequent and severe. Councils in these areas struggle to maintain services and begin exploring shared service models or mergers to survive.

## Carbon for the Kāinga

*A few councils test new revenue streams - levies on high-emissions activities, iwi joint ventures, and local enterprise partnerships. In Marygold, a carbon surcharge on tourism operators funds wetland restoration. Promising, but still rare.*

**Wealthier residents fund their own transitions**, buying EVs, installing decentralised energy systems, and relocating to safer areas to reduce personal costs. Inequality deepens across and within regions. Ratepayer ability and willingness to pay begins to drop in some areas.

**Council investments are only intermittently affected by extreme weather**, **but exposure grows**. Transition costs like carbon pricing evolve slowly. Green finance is available, but only larger, better-resourced councils tend to use it. New revenue options like biodiversity credits lack national consistency or credibility.

**By the early 2030s, the insurance sector raises alarm bells**. New national climate hazard modelling is released, and insurers begin pulling out of many areas, leaving assets and communities exposed.

**Service demand trends remain steady**. Investment in climate-related infrastructure is delayed, and adaptation planning stays reactive. Physical impacts drive up service delivery costs. Councils that can plan ahead do so. Those that cannot fall further behind.

**Public trust begins to fray**. Community expectations of local government grow more mixed and tense. Ratepayer fatigue sets in, especially in areas repeatedly hit by extreme weather. Communities polarise, some demand stronger climate leadership but are frustrated by the lack of real action, while others resist government involvement and prioritise affordability over climate concerns.

**Councils are criticised for doing too little, or too much**. Protests grow, community interactions become more fraught, staff morale drops, extreme weather affects council teams and their communities, reducing capacity when it's needed most. In addition, legal challenges over unplanned retreat and service failures drain reserves and raise borrowing costs.

**Some Māori communities disengage from council processes** and lead their own resilience efforts through papakāinga. The level of partnership with iwi varies widely, depending on council capability and political will. In many regions, expectations under Te Tiriti o Waitangi are not met, leading to more tension and fragmentation.

# Leaving it to the next generation

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

SHORT TERM (2026-2035) | **MEDIUM TERM (2036-2050)** | LONG TERM (2051-2100)

MEDIUM TERM

**In 2038, a wave of extreme weather shocks the world.** Insurance companies begin pulling back from all but the safest areas. Major economies reach consensus that climate action is now essential for trade and diplomacy. International markets start penalising countries that fail to meet emissions targets.

**New Zealand responds urgently**. As fuel costs rise and market access declines, the government adopts a command-and-control approach, similar to its COVID-19 response. Sweeping policies are rolled out to rapidly decarbonise the economy. The urgency to meet Paris Agreement targets intensifies. Social and environmental considerations are sidelined as the government focuses narrowly on carbon reduction. Fewer co-benefits are achieved, and the transition relies more on technology than on shifting behaviours toward less resource-intensive lifestyles.

**The lack of earlier investment in resilience, both physical and social, means financial impacts of increasingly severe weather events are worse and recovery is slower.** Transitioning later results in overlapping physical and transition risks. Councils face compounding challenges, such as trying to install stormwater infrastructure during extreme weather or navigating supply chain disruptions while implementing low-carbon fleet, fuels, or infrastructure and juggling service continuity.

Although Aotearoa fares better than many vulnerable countries, the overall toll is heavy. The economy absorbs very high costs. Inflation spikes. Interest rates become volatile. Economic growth slows significantly.

**The cost of transitioning across the economy is extreme,** driven by major spending on infrastructure and technology. Disrupted supply chains and global competition push prices higher. New Zealand exporters struggle to remain competitive against overseas producers. Physical climate damage leads to direct costs like repairs and healthcare demand, and also indirect costs like lower productivity, employment, and tax income.

**Emergency legislation mandates councils to decarbonise operations**, support local businesses and community emissions reductions, and deliver low-carbon infrastructure. Emissions quotas are imposed. Councils are told what must be done, but not how. Implementation is left to local authorities, with limited support. Ecosystem restoration and broader initiatives receive little attention.

## Social unrest impacts officers

*As burnout spreads, councils lose key staff. Safety concerns grow amid public anger. In Rochester, frontline workers receive de-escalation training while budgets for parks and libraries shrink to cover rising security costs.*

**Adaptation policy remains slow and reactive.** Retreat from high-risk areas is less managed or standardised nationally. Councils must prioritise decarbonisation, but their implementation approach varies depending on local cost and leadership.

## The sentiment gap

*To meet government quotas, a Dashton council unveils new bus and cycleways, but without community input. On opening night, protestors vandalise the infrastructure. Insurers refuse coverage, citing social unrest. The rush to deploy untested technology or infrastructure often outpaces public sentiment.*

**Councils are expected to lead, but many lack the tools, funding, and legal clarity to do so effectively**. New funding options do eventually emerge like subsidies or grants, but come with strict conditions. Councils with small teams or limited expertise struggle to meet these requirements. Even with higher taxes, central government's ability to fund local government drops sharply.

**Businesses and households in many regions struggle to keep up with rate payments**. Emissions-heavy sectors decline quickly. Regions that rely heavily on fossil fuel industries see their economies collapse within five years as costs rise and carbon pricing and directive regulation changes demand. Disrupted supply chains and competition for low-carbon materials, labour, and technology push up costs indirectly for most organisations. Businesses face energy price spikes and even blackouts during heatwaves or droughts.

**Unemployment rises in many areas, especially provincial, rural and remote ones**. Other regions do better, either because more people move there or because earlier investments in low-carbon industries are now paying off.

Living costs rise sharply for a time. With little government support, many residents and businesses try to fund their own transitions, and to self-recover from ongoing severe weather events, which lowers their willingness and ability to pay rates.

**Changing job markets continue to speed up urbanisation, especially among younger people.** Some regions see only older and vulnerable populations remaining as they lose younger ratepayers. These Councils struggle with staffing, as the local community are mostly retirees, and what staff they do have mostly live elsewhere. Elsewhere in New Zealand, climate-related migration and refugee arrivals (both from within New Zealand and elsewhere around the globe) increase as physical risks grow. Urban councils face rising demand for services, but don't get enough funding for housing, infrastructure, and social support. This puts pressure on both ends of the local government system.

**These transition-related problems are compounded by physical impacts**. Areas that have lost their economic base or workforce are also being hit by major floods and storms. Councils must make tough decisions, not just about how to respond, but whether they can afford to deal with the social and infrastructure damage. Legal challenges over rapid, unplanned retreat and service failures increase, draining resources and reducing public trust. Despite some investment from central Government, resources are stretched and some communities in lower-priority areas find their services declining, and limited support on relocation.

# Leaving it to the next generation

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

SHORT TERM (2026-2035) | **MEDIUM TERM (2036-2050)** | LONG TERM (2051-2100)

MEDIUM TERM

**Service demand and ratepayer ability to pay become highly unstable**, and rapid changes mean they're often out of sync across areas, creating winners and losers both between and within regions.

**Most councils' investment portfolios are struggling**, with unstable returns and more stranded assets. Some councils are forced to sell their investment portfolios and some land holdings in order to afford to rebuild following storms and floods, resulting in a loss of investment revenue streams.

**Access to debt now depends on emissions performance**, and green finance becomes mandatory. Markets seek investment in safer areas. Areas with low resilience are stung with higher interest costs. New revenue options like biodiversity credits remain undervalued and some councils benefit from strong ETS revenues as carbon prices rise internationally. However, ongoing storm damage impacts on the ability of some councils to rely on this revenue.

**Insurance markets start factoring in social unrest and climate risk**, making coverage unaffordable or unavailable for many councils. Some are forced to self-insure critical infrastructure, adding more financial risk. Low-risk wealthier councils with strong governance and credit ratings are better able to innovate, while others struggle to attract investment or meet complex requirements.

**Financial pressures cause some councils to default on debt**, requiring emergency bailouts from central government. These bailouts, however, also mean that Commissioners are appointed to enforce austerity and recoup central government costs.

The LGFA joint and several liability provisions are narrowly avoided, but there is angst in some member councils about this, resulting in some councils leaving.

**Delayed action does mean clearer technology options when investing in low-carbon solutions**, which reduces risk. But high global competition makes accessing resources difficult. Processing stranded or retired high-carbon assets puts strain on local waste management.

**Without central funding, some services are shut down because low-carbon delivery options aren't available**. Councils face tough choices about which services to keep, recreational facilities, cultural events, and community programmes are often the first to go.

**More frequent and intense weather events disrupt council staff** and their communities. This causes high issues with resource availability for some councils at periods when demand is high. Council staff and Elected Members are constantly under a barrage of criticism, resulting in high stress levels, regular turnover and a low willingness to engage with communities.

## Councils at a Crossroads

*Rural councils face tough choices. Matana and a nearby council explore a merger to stay afloat. Others invest in local resilience and off-grid services. Iwi partnerships vary - some regions co-design climate plans, while others struggle to connect.*

## Compounding risks

*Heavy rains trigger landslides near new wind farm sites in Dashton. Construction halts, and locals question the siting process. Council faces scrutiny for prioritising emissions targets over geotechnical risks, revealing gaps in integrated climate planning.*

**Service cuts hit vulnerable communities hardest.** Social cohesion in Aotearoa is under serious strain. The fast and reactive climate transition, after years of delay, creates deep divisions. Councils don't have the chance to build trust through early engagement and inclusive planning. Many communities feel resentment, fatigue, and polarisation.

**Communities that have suffered repeated climate impacts with little support feel abandoned**. Floods, droughts, and asset losses erode trust in both central and local government as response budgets dwindle. In some regions, people see climate mitigation policy not as protection, but as punishment - disrupting livelihoods, adding costs, and failing to offer real support.

**Climate activists become more vocal, demanding accountability and faster action**. Meanwhile, others, especially in rural and economically stressed areas, feel their way of life is being erased by sudden, top-down mandates. The transition is seen not as a shared national effort, but as a forced restructuring that benefits cities and global investors.

**Legal challenges to rate increases and managed retreat policies reach record levels**. Some councils lose, setting expensive precedents and further damaging public trust. The cost of defending these cases, legal fees, settlements, and reputational damage, drains reserves and raises borrowing costs. Councils start setting aside contingency budgets for litigation. This takes money away from services and infrastructure.

**Efforts to engage with iwi and uphold Te Tiriti o Waitangi are inconsistent**. In some regions, partnerships grow and deliver real results. In others, expectations aren't met, and Māori communities disengage from council processes, choosing to lead their own mitigation and adaptation work independently.

# Leaving it to the next generation

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

SHORT TERM (2026-2035) | MEDIUM TERM (2036-2050) | LONG TERM (2051-2100)

LONG TERM

**Global warming rates begin to slow**, although historic temperature rise has meant there are still negative impacts to global markets. International confidence returns slowly through the period, with GDP eventually stabilising, albeit at a lower level. However, there's now a clear divide between countries that successfully transitioned and developing nations still reliant on fossil fuels.

**Aotearoa has moved past the most turbulent phase of its climate transition**. Investments in climate action are now delivering clear economic benefits with renewable energy accounting for the majority of final energy use. The government shifts its focus to improving social equality, using resources more efficiently, and restoring ecosystems.

**The economy has stabilised, but at a lower level of prosperity than it might have reached with earlier action**. Extreme weather events are now more frequent and severe than the 2020s, and chronic impacts like sea level rise and heat stress have fundamentally changed some regions forever.

**New Zealand no longer follows a single model of governance**. Instead, regional differences shape how things operate. Some councils have become well-resourced and adaptable, earning strong community trust and building diverse revenue streams. Others remain fragile, still recovering from years of financial pressure, legal disputes, and population decline.

**Funding capacity is improving compared to the 2040s and 2050s, but challenges remain** as the country works to rebuild its 'new economy'. The government expects councils to focus on emergency response and provide clear direction for certain services.

**Large changes in population and the economy have reshaped who can pay rates across Aotearoa**. Some regions have completely shifted away from their traditional industries, attracting new businesses and growth. Others remain stuck in long-term economic decline. Population growth and immigration have slowed. As new industries take root and climate resilience improves, more people begin moving back to rural areas.

**Revenue generation is increasingly driven at the local level**. Urban councils introduce tools like dynamic pricing for services, congestion charges, and climate levies. Rural councils focus on land stewardship, and support economic development agencies and regional tourism operators around industries like eco-tourism and regenerative farming.

**Over two degrees of warming have locked in higher physical impacts** which vary widely between regions. Lack of early investment in resilience means many areas struggle with ongoing extreme weather events, or chronic impacts to water availability, crop yield, or rising sea levels.

## Kanohi ki te Kanohi

*People increasingly want in-person communication on climate issues, despite digital being ubiquitous. In Marygold, a council's failure to front a post-disaster hui leads to calls for "eye contact, kōrero, and reciprocity" and that "Trust is earned in person, not programmed!".*

## From refuge to resilience

*Urban centres grow younger, more diverse, and globally connected. Councils respond to climate migration with multilingual services and inclusive planning. In Rochester, a pop-up market for Kiribati climate refugees is co-designed with council staff. Some rural areas remain more culturally homogenous.*

**Inequality has grown**. Whilst cost-of-living improvements see more residents and ratepayers able to contribute, many communities have been left disadvantaged by the fast and messy transition.

**Council investment performance also varies**. Many councils have sold assets to repay storm damage. Of those remaining, some assets are well suited, or have been successfully adapted, to the low-emissions economy. Others are underperforming or stranded and have proven difficult to divest due to a limited market. Some councils have managed to diversify their income beyond rates, using circular economy initiatives, local business partnerships, and climate-linked investment portfolios. Others operate with very limited reserves and borrowing power, making long-term planning difficult.

**Councils rely on a mix of seasonal income and emergency grants**. Some rely on community-supported initiatives as a form of funding. Access to green finance is uneven, and some councils have stopped using traditional insurance altogether, choosing pooled self-insurance or informal guarantees instead. Disputes over funding allocations continue, and many councils are still repaying debts from earlier climate-related disasters.

**The cost and delivery of services varies across regions**. Vulnerable, ageing, or lower-income groups often overlap, making service planning more complex. Input costs are stabilising as supply chains adjust to a higher level of physical risks, and ecosystem services are gradually restored. However, major weather events still cause spikes in demand, pushing some councils to their financial limits.

**Councils tailor services to fit local needs, resources, and risks**. In urban areas, services are integrated, digital, and responsive, supported by AI and real-time data. In rural areas, services are decentralised and led by communities, focusing on self-reliance and low-tech resilience. Green buildings, adaptive transport systems, and nature-based solutions are now standard across regions. Councils invest in flexible, mobile services that can be deployed quickly in response to climate events or population changes.

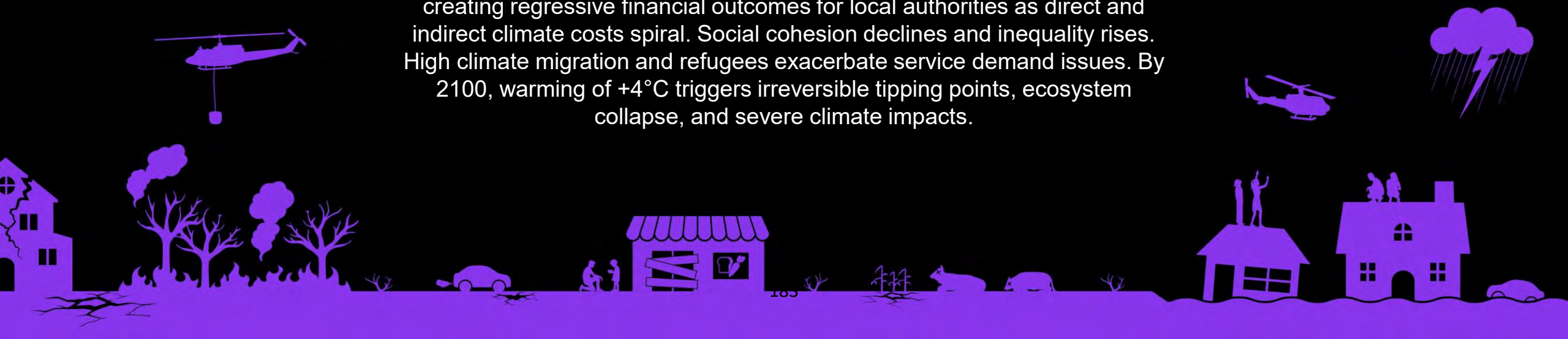
**Some communities are starting to rebuild trust** in local government after decades of division and trauma caused by extreme events. Recreational and cultural services return, with a focus on supporting wellbeing and community connection. Councils that focus on transparency, inclusion, and partnerships with iwi see better engagement and more stable governance. In these regions, Te Tiriti o Waitangi is not just recognised, it's embedded in decision-making, planning, and service delivery. Mana whenua now run many services in some areas.

**However, not all regions have reached this level of cohesion**. In places where councils failed to engage properly or managed retreat poorly, distrust remains. Some communities have never recovered and continue to feel abandoned. Legal challenges continue to pose risks.

## Scenario 3

# Inheriting a broken world

Global climate action falters due to geopolitical tensions. Councils face lower expectations from the central government to decarbonise or support adaptation. Aotearoa New Zealand's economy performs comparatively well in the medium term. Long-term, emissions and physical risks continue to rise, creating regressive financial outcomes for local authorities as direct and indirect climate costs spiral. Social cohesion declines and inequality rises. High climate migration and refugees exacerbate service demand issues. By 2100, warming of +4°C triggers irreversible tipping points, ecosystem collapse, and severe climate impacts.



SCENARIO 3

# Inheriting a broken world

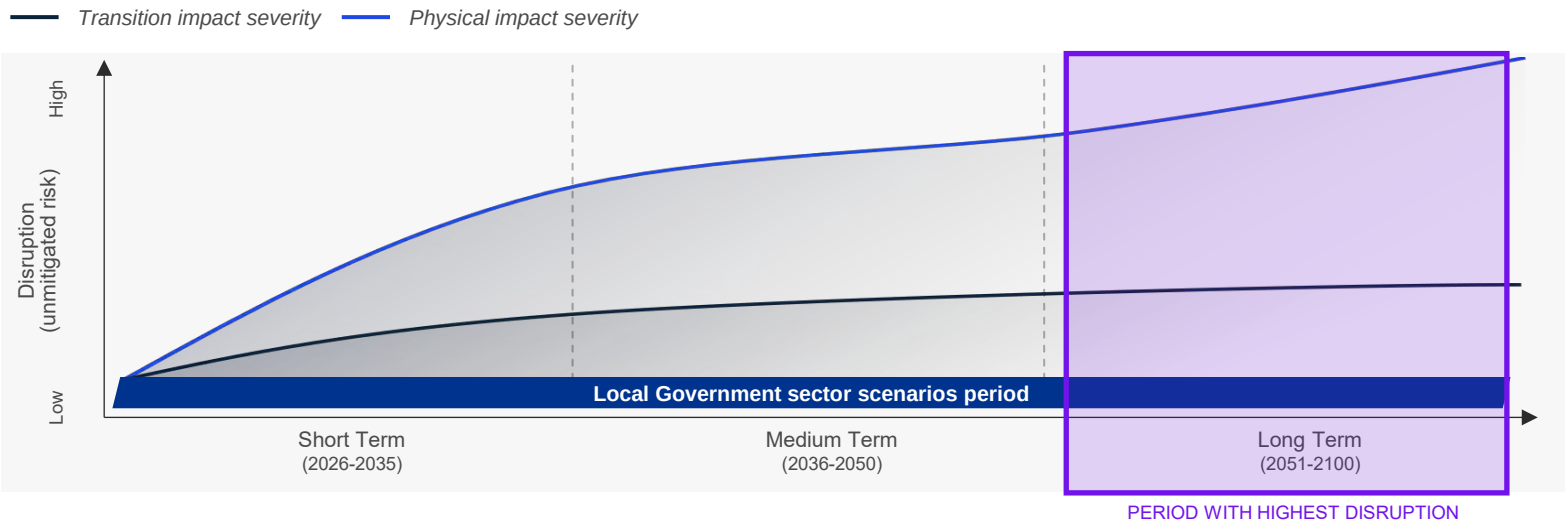
| | Warming at 2050 | Warming at 2100[1] |
|---|---|---|
| Global[1] | +2.1°C | +3.9°C |
| New Zealand[2] | +2.1°C | +3.9°C |
| | *MfE/NIWA mid-century estimate* | *MfE/NIWA end-of-century estimate* |

Global climate action falters due to geopolitical tensions. Councils face lower expectations from the central government to decarbonise or support adaptation. Aotearoa New Zealand's economy performs comparatively well in the medium term. Long-term, emissions and physical risks continue to rise, creating regressive financial outcomes for local authorities as direct and indirect climate costs spiral. Social cohesion declines and inequality rises. High climate migration and refugees exacerbate service demand issues. By 2100, warming of +4°C triggers irreversible tipping points, ecosystem collapse, and severe climate impacts.

- Investments in education and technology growth decline.
- Economic development is slow, consumption is material-intensive, and inequalities persist or worsen.
- Population growth is low in industrialised countries and high in developing ones.
- Strong environmental degradation in some regions.
- Several regions move towards more authoritarian government.

*Sources: [1]IPCC, [2]MfE (NIWA) (NB: +0.8°C added to NIWA 1995-2014 baselines figures to make comparable to IPPC pre-industrial baseline (1850-1990)*

**Figure 5: Integrated physical and transition climate-related impacts across scenarios and time horizons.**




| Key assumptions driving change | 2026-2035 | 2036-2050 | 2051-2100 |
|---|---|---|---|
| Economic performance | Improving | Neutral | Worsening |
| Physical impacts | Neutral | Worsening | Worsening |
| Government funding | Neutral | Worsening | Worsening |
| Rates affordability | Improving | Neutral | Worsening |
| Services cost | Neutral | Worsening | Worsening |
| Equity investment performance | Volatile | Challenged | Challenged |
| Access to finance | Steady | Volatile | Challenged |
| Service demand | Steady | Volatile | Volatile |
| Social cohesion and equality | Volatile | Challenged | Challenged |

**Key**

- Improving
- Neutral
- Worsening
- Challenged
- Volatile
- Steady

*Assumptions generated by Working Group, with reference to publicly available climate scenarios*

SCENARIO 3

# Inheriting a broken world

| | Warming at 2050 | Warming at 2100[1] |
|---|---|---|
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Global climate action falters due to geopolitical tensions. Councils face lower expectations from the central government to decarbonise or support adaptation. Aotearoa New Zealand's economy performs comparatively well in the medium term. Long-term, emissions and physical risks continue to rise, creating regressive financial outcomes for local authorities as direct and indirect climate costs spiral. Social cohesion declines and inequality rises. High climate migration and refugees exacerbate service demand issues. By 2100, warming of +4°C triggers irreversible tipping points, ecosystem collapse, and severe climate impacts.

- Investments in education and technology growth decline.
- Economic development is slow, consumption is material-intensive, and inequalities persist or worsen.
- Population growth is low in industrialised countries and high in developing ones.
- Strong environmental degradation in some regions.
- Several regions move towards more authoritarian government.

*Sources: [1]IPCC, [2]MfE (NIWA) (NB: +0.8°C added to NIWA 1995-2014 baselines figures to make comparable to IPPC pre-industrial baseline (1850-1990)*

## Te Ao Māori parameters

| | |
|---|---|
| Mātauranga Māori recognition | *Restricted recognition* |
| Te Tiriti o Waitangi integration | *Restricted integration* |
| Tino rangatiratanga | *Restricted ability to demonstrate Tino Rangatiratanga* |

**Level of impact**

Low | Medium | High | Very high

*Additional quantitative and qualitative parameters for this scenario can be found in the appendix.*

## Signals & trends

**Very high physical risks**

Up to 2050, and especially after, frequent and intense extreme weather events are the norm. Sea level rise compounds costal flooding. Heat stress has materially shifted where industry and people can operate and live. Damages create regressive fiscal outcomes.

**Geopolitical conflict**

Huge pressure on natural resources globally has led to geopolitical conflict, with countries retreating into trading blocs and on-shoring production. Conflict is common and there is high inter-country inequality.

**Technology change is certain**

Huge advances in technology have transformed many aspects of life. 4D printing has localised manufacturing, metaverse and hologram technology enable lifelike virtual communication, and remote robotics enables employment of overseas skilled workers.

**Reduced social cohesion and increased inequality**

Natural and financial resources are centred in the hands of the few, who often retreat into gated communities. There are high numbers of climate migrants and refugees, and physical climate impacts put pressure on resources. Social tension is high and cohesion low, with conflict more regular.

**Tipping points reached**

Tipping points have been reached in the Earth system. These self-sustaining, irreversible shifts catapult the Earth into a new climate system, locking-in sea level rise of up to 10m, even if emissions were to stop abruptly. This means full-scale retreat for many areas in Auckland and Wellington before 2200, which becomes the back-drop for all planning decisions.

# Inheriting a broken world

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

**SHORT TERM** (2026-2035) | MEDIUM TERM (2036-2050) | LONG TERM (2051-2100)

SHORT TERM

**The global climate agenda begins to unravel. Political and economic priorities shift away from emissions reduction**, with energy security and competitive economic advantage taking centre stage. Physical climate impacts steadily worsen, and Aotearoa New Zealand is not spared, several extreme weather events hit hard. Governments around the world renege on their Paris Agreement commitments, and some withdraw entirely. International cooperation fractures, replaced by bilateral deals and fragmented diplomacy.

**Central government doubles down on boosting exports, sidelining emissions reduction and Paris targets**. New Zealand's high-emissions export economy, particularly in the primary sector, performs well, lifting tax revenue, GDP growth, and stabilising inflation.

**Funding to local authorities remains steady**, but expectations around services do not shift. ETS revenue plateaus, and biodiversity credits fail to gain traction. Policy direction is unclear and frequently changes, making it difficult for councils to justify climate-related decisions. Climate knowledge among leaders varies across regions. Councils lack the powers and funding to plan proactively, especially in spatial and strategic planning. Short-term issues dominate.

**Poor planning decisions made in the late 2020s begin to lock in future problems**. As climate-related damage increases nationally, central government's ability to cover costs declines.

Some councils face funding shortfalls after major events and cannot support their communities to rebuild. Criteria for central support tighten, pressuring communities to voluntarily leave high-risk areas.

**Demographic and economic trends remain steady.** Population grows, becomes older, more urban, and more diverse. People move to areas perceived as safer, placing pressure on growth infrastructure.

**Most residents and businesses continue to have capacity to pay rates,** except in areas where insurance becomes unavailable. Export industries perform well, but physical climate impacts hit regions unevenly. Activities like dairy and viticulture gradually shift South. Tourism grows slowly. Digital infrastructure and Agri 4.0 are strong growth sectors.

**Some regions benefit from comparatively higher climate disruptions overseas**. For example as ski fields and fisheries in Australia falter due to physical climate impacts, New Zealand businesses seize a temporary window of opportunity, until local impacts catch up.

**Some councils are hit hard by severe weather such as droughts or flooding**. These events bring immediate emergency costs and long-term recovery bills, rebuilding infrastructure, restoring productivity, and supporting employment. Tax revenue drops, public spending rises. Infrastructure repair costs spike.

## Burnout in the halls

*Council offices fall silent as burnout increases. In Marygold, a climate planner steps down during a project, citing fatigue and public antagonism. Strategic planning is replaced by crisis management as optimism fades.*

**Council investment portfolios generally perform well**, except where assets are directly affected by extreme weather. Most councils maintain good credit ratings and access to debt. Insurance retreat accelerates in the early 2030s as the global emissions pathway becomes clearer. Many councils opt to self-insure.

**Service costs and deliverability remain mostly steady**, though physical impacts cause intermittent disruptions. Investment in climate mitigation-related technology or infrastructure is low and uneven. Some councils invest where there's a clear financial return, but most focus on energy-intensive tech, like AI, to improve operations.

**Community expectations grow strained**. Public trust in local government is challenged. Engagement with climate issues swings with elections. Many people disengage. By 2035, councils begin raising rates to cover lost income and climate damage.

**Without planned retreat, physical impacts increase inequality,** cost of living, and public frustration. Wealthier ratepayers leave high-risk areas. Vulnerable communities move in, priced out of safer zones. Legal challenges to rate increases emerge. Service delivery lawsuits continue steadily, with rising costs. Most councils manage, but pressure builds.

**Expectations around Te Tiriti o Waitangi remain unchanged**. Central government becomes less willing to fund related initiatives. Historic co-investment with iwi holds steady, but tensions grow. Iwi have greater service needs, and councils struggle to meet them.

## The battery divide

*Affluent households install solar arrays and relocate to higher ground. In contrast, renters in flood-prone suburbs face rising energy bills and insurance premiums. In Dashton, a family watches their power costs triple while down the road a family's new battery hums quietly through the storm with cheap, reliable energy.*

# Inheriting a broken world

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

SHORT TERM (2026-2035) **MEDIUM TERM (2036-2050)** LONG TERM (2051-2100)

MEDIUM TERM

**Climate-related damage begins to drag down global GDP and reshape international relations**. Countries shorten supply chains and form trading blocs. Resource shortages spark conflict. Securing fuel, food, and water becomes paramount. Emissions reduction is sidelined. The Paris Agreement collapses under geopolitical strain.

**In Aotearoa, emission reductions are driven by overseas market expectations**, energy efficiency, and tech improvements, not behaviour change or reduced consumption. Many households and businesses still rely on expensive fossil fuel imports. Wealthier groups build decentralised renewable energy systems.

**Physical climate damage steadily escalates.** Infrastructure repairs and healthcare costs rise. Productivity and tax income fall. Ecosystem services decline, making other services more expensive. Extreme weather and global supply chain disruptions push up inflation for key imports. Exports drop as overseas markets localise production.

**Councils scramble to respond to frequent policy changes**. Securing resources becomes a priority. Rising climate costs increase public sector debt, tightening central funding. Some councils amalgamate to cut costs.

**Regions face economic challenges** from flooding, heat stress, and seasonal shifts that affect crops and labour. Economic activity that can't adapt becomes stranded. Unemployment rises as inflation and living costs climb.

**Climate migration accelerates both to and within the country**. Aotearoa receives its first climate refugees in the late 2030s. Urbanisation speeds up as people seek jobs, or flee areas, coastlines, or floodplains exposed to physical risks and lack of insurance cover. Vulnerable populations struggle to relocate. Lower-income communities are priced out of safe zones and end up in high-risk areas. In cities, some "safe" areas grow rapidly, but without supporting services or jobs, they become impoverished.

**Extreme weather events intensify**. Poor planning decisions from the 2020s come back to haunt councils. "1-in-200-year" floods and heatwaves push infrastructure beyond its limits. Councils abandon core assets, landfills, sea walls, and water treatment plants, sparking backlash.

## Shortcuts and storms

*Floodwaters breach a newly built subdivision and wastewater plant - both built in the 2020s without proper climate risk modelling. In Rochester, residents wade through sewage, demanding answers. Councils scramble for funding, but trust erodes as past planning shortcuts surface in the media.*

## Infrastructure abandoned

*In the late 2030s, new climate data confirms a +3°C world. Central government retreats from repairing rural infrastructure that isn't economic to maintain after extreme weather damage. The focus shifts to critical assets like state highways. In Matana, a washed-out bridge is left unrepaired, causing loss of trust in the council.*

**There are variable financial outcomes for local authorities**. Councils facing population loss, climate impacts, ageing communities, and industry collapse fall into deficit. Some become insolvent. Council staff are increasingly impacted personally by extreme weather, with impacts on staff availability and morale. Attracting staff becomes steadily more challenging.

**Local authority investment portfolios suffer**. Physical climate impacts lower returns – both from direct damage and indirect social disruption in affected communities. Assets become stranded. Some councils divest to fund disaster recovery. Others attract overseas investors, usually regions with low exposure and growing populations. Insurance retreat accelerates. Premiums rise. Costs are passed to communities. Credit ratings drop. Debt access tightens.

**Wealthier communities remain resilient**. Lower-income groups feel the strain - financially, socially, and emotionally. Inequality and polarisation deepen. Gated communities grow. Those with resources invest in their own adaptation. Vulnerable communities are left behind in resilience terms.

**Support for local government funding declines.** Affluent ratepayers see fewer benefits and push back. Councils' social licence erodes. Legal challenges block rate increases. Class action lawsuits target councils for poor decisions and lack of resilience. Other cases challenge councils that miss 2050 net zero targets.

**Iwi expectations rise as te taiao degrades**. Councils often can't meet them. Relationships vary. In some regions, mana whenua take over core services. In others, they go it alone, protecting their uri first.

# Inheriting a broken world

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

SHORT TERM (2026-2035) | MEDIUM TERM (2036-2050) | LONG TERM (2051-2100)

LONG TERM

**Aotearoa now faces regular extreme rainfall, severe cyclones, and widespread flooding.** Rising seas and storm surges damage low-lying farmland and contaminate coastal freshwater sources. Wildfires, droughts, and extreme heat are common, causing some ecosystems to collapse and sparking unrest due to water shortages across the motu.

Critical tipping points in the Earth's climate system have been crossed. Irreversible changes mean up to 10 metres of sea level rise is now locked in for the next century. Most coastal cities, including Auckland and Wellington, face large-scale retreat and relocation. This becomes the foundation for all future planning. Some cities absorb a high influx of climate refugees, often concentrated in areas already under pressure.

Major advances in technology, renewable energy, and AI, developed during more stable decades, help food and essential systems adapt. Automation reduces the need for transport, travel, and outdoor labour exposed to extreme weather. But society is more unequal than ever. Vulnerable communities remain highly exposed to climate risks.

**The scale of infrastructure damage, rising costs, and frequent extreme events creates regressive outcomes for New Zealand's financial system**. The government struggles to fund repairs, leading to declining infrastructure standards and hardship in remote areas. Critical assets, major ports, highways, water infrastructure, are prioritised. But there is widespread retreat from less economically viable roads, bridges, and coastal structures serving small populations.

**New Zealand's GDP and economy are heavily impacted**. Unemployment surpasses levels seen during the Global Financial Crisis and persists for longer. Public sector debt rises sharply due to direct climate damage (e.g. infrastructure rebuilds) and indirect effects (e.g. reduced productivity, lower tax income, rising healthcare costs). Credit downgrades follow. An ageing population faces heat stress, new climate-linked diseases, and extreme weather, driving up healthcare costs. Inflation and interest rates remain high. Overseas investment dries up. Exports fall as major markets localise production. Long-haul tourism declines due to lost destinations, rising costs, and perceived risk. Virtual tourism or premium climate-resilient resorts emerge, but only for the wealthy. Scarcity of resources and trade barriers drive up prices and make it harder to access key goods, finance, and technology, adding to cost-of-living pressures and making long-term funding more difficult.

## Power to the people

*Hyper-localisation takes hold. In Dashton, residents gather in a converted warehouse to vote on budget priorities via a citizen assembly mural. Council staff facilitate, but decisions rest with the community. Elsewhere, traditional governance struggles to keep pace with shifting expectations.*

**Central government focuses on food, energy, water, and resource security**. Some exports are sent overseas as premium products, or to disaster zones, but only after domestic needs are met. Migration is relied on for economic growth. High peaks in arrivals of climate refugees following major events can overwhelm infrastructure and services, causing inefficiencies and unrest. Politics becomes dominated by climate, with a "wartime" tone in how resources are managed. Emergency powers and centralised planning extend into daily life to maintain order during ongoing crises and supply disruptions.

**Local authorities are expected to focus on disaster prevention and response**, and maintaining social stability and law and order. Despite high taxes, funding for councils becomes very limited and is mostly directed to civil defence. Only some emergency events receive support, with government highly selective about when to step in.

**Most regions face serious financial pressure and high volatility in ratepayer capacity** and investment performance. Regional economies are weakened by frequent extreme weather and inflation from disrupted supply chains. Some areas and assets are abandoned due to rising seas, flooding, or drought. Entire industries disappear, for example some coastal aquaculture, alpine tourism, or some types of agriculture, leaving regions with high unemployment.

**Some industries perform well** such as vertical farming, climate analytics, or water recycling technologies. Councils that attract the right skills, investment, and infrastructure to the area help keep commercial rates afloat. Businesses invested in food security, waste recycling, and premium exports remain viable. Fossil fuel prices are extremely high due to supply chain disruption as social unrest in many regions boils over. Migration, both domestic and international, accelerates, driven by economic need and the desire to escape exposed areas.

## Drone drops and Māra Kai

*In Matana, tech-savvy families live in near-total isolation, sustained by drone deliveries, 4D-printed essentials, and immersive virtual workspaces. Down the valley, a marae-led solar and kai initiative powers resilience for those without high-end tech. Decentralised energy and food systems become lifelines, as Aotearoa shifts toward self-sustaining local production and consumption.*

# Inheriting a broken world

Economy | Physical impacts | Govt. funding | Rates affordability | Services cost

SHORT TERM (2026-2035) | MEDIUM TERM (2036-2050) | LONG TERM (2051-2100)

LONG TERM

**Councils typically retain fewer investment portfolios.** Most have sold assets to fund rebuilds. Remaining investments, mostly in equity and debt, are badly affected. Some asset classes do well, especially those linked to resilience, resource security, or virtual services.

**Councils face financial distress.** Many urgently seek funding for adaptation projects**,** but rising debt pushes financial ratios beyond safe limits. Credit downgrades follow. LGFA access is lost. Borrowing costs rise. Critical resilience projects are delayed. Vulnerability grows. Insurance retreat accelerates. Budgets collapse. Many councils fall under statutory management. Commissioners are appointed.

**Extreme climate impacts drive up service costs and reduce delivery capacity.** Many communities struggle, especially low-income groups and workers in declining sectors. Income and demand are out of sync.

## Borders closed, trust opened

*A heat-driven virus emerged in Southeast Asia, spreading rapidly through dense urban centres. New Zealand shut its borders for nearly two years. Despite strict controls, a handful of cases appear in Marygold and Rochester. Councils activate emergency health plans, but public trust wavers - many question why climate risks haven't been addressed earlier.*

## Self-reliance rising

*Canal closures stall fuel imports. Droughts in Marygold cut crop yields. Overseas factories shut in heatwaves. With global supply chains fraying, Aotearoa faces rising prices and a shift toward self-reliance.*

**Council staff face personal climate impacts**, displacement, trauma, stress. Availability drops. Expectations for adaptation grow. Councils regularly make tough decisions to retreat from certain locations. Emergency response and recovery become core services.

**Councils that do deliver effective emergency services earn trust**. Frequent contact during crises improves perceptions. But traditional services are shut down. The focus shifts to essentials.

**Political division increases across Aotearoa**. This is driven by rising living costs and worsening health and economic inequality. Tensions rise. Conflict breaks out in some areas. Inequality deepens. Financial hardship hits coastal and vulnerable communities hardest. Young people face limited opportunities as New Zealand's export market shrinks.

**Some regions try to attract wealthy individuals and tech firms**. Gated communities with private security emerge. As council services decline, willingness to pay rates drops. Protests and legal challenges grow. Mana whenua step in to provide services, often without support.

**Numerous communities become self-sufficient, cut off from trade**. They establish their own local governments, shunning official councils. These "republics" are tolerated, low demand, high resilience. Many are founded by mana whenua. Others remain wary of iwi and hapū.

## Nations lost, whānau found

*As sea levels rise, families from Tokelau and Tuvalu are arriving in Aotearoa. Their homes are no longer safe – saltwater contaminates wells, crops fail, and schools relocate inland. Councils set up emergency housing and cultural support. But some locals are angry, blaming missed emissions targets for the destruction of entire nations.*

04

# Personas

# Council personas

**Four personas have been developed which imagine what different, fictitious councils might be experiencing in the period from 2036-2050 (medium term).**

These examples are intended to bring the scenarios for life. They are only a snapshot of what one council might be experiencing, and are not intended to be typical for all councils in that typology or region.

Throughout the scenarios, we have used these personas to bring the narrative to life with vignettes.

In section 4, each persona also has a short narrative which explores key questions including:

- What **key events** has the local authority experienced in the past few years?
- What's happening to **rates**?
- What's happened to **service delivery**?
- What are **key issues** for **community**?

## Matana

Upper North Island

Unitary authority

Matana is a coastal region with low population density (population ~55k). It's a popular retirement location, and the local iwi and hapu are very active. Key industries include agriculture and some tourism.

## Marygold

Central North Island

Territorial – District Council

Marygold is a small town (population ~20k) servicing an expanse of productive agricultural land. It has a strong heritage for dairy and beef, which are mostly exported to foreign markets. Its historic wealth has not been evenly distributed.

## Rochester

Central North Island

Territorial – City Council

Nestled on the banks of a major river, Rochester is the beating heart of the North Island. It has a young, diverse population (population ~170k) and a high number of immigrants. A mature service sector attracts international business and finance.

## Dashton

East coast of South Island

Regional Council

Dashton (population ~600k) covers a large area of agricultural and coastal land, with a small city home to a world-renowned university and a rich cultural heritage.

# Matana

**MEDIUM TERM** (2036-2050) | Upper North Island | Unitary authority

| | | Acting now for our mokopuna | | Leaving it to the next generation | | Inheriting a broken world | |
|---|---|---|---|---|---|---|---|
| | | **Description** | **Trend** | **Description** | **Trend** | **Description** | **Trend** |
| 2050 | **Geography/hazards** | High – cyclones, occasional coastal flooding | | Higher – cyclones, coastal flooding, heat stress | | Highest – cyclones, coastal flooding, heat stress | |
| | **Population** | 55,000 | ↔ | 52,000 | ↓ | 48,000 | ↓ |
| | **Average age** | 46 | ↑ | 47 | ↑ | 50 | ↑ |
| | **Employment rate** | 66% | ↔ | 60% | ↓ | 57% | ↓ |
| | **Vulnerable population** | 35% | ↔ | 44% | ↑ | 40% | ↑ |
| | **Economic strength** | Moderate but mixed between main town and neutral areas | ↑ | Low and mixed between main town and neutral areas | ↔ | Moderate but mixed between main town and neutral areas | ↓ |
| 2036-2050 | **Narrative** | Matana has seen a shift in its industries, and several extreme weather events in the past decades. Category 5 cyclones impact every couple of years. Luckily, the Regional Adaptation & Resilience Fund has meant early intervention limited loss of life or assets.<br>With a limited budget, council have focussed investments and social attention to restoring ecosystems. Nature-based solutions, such as restored wetlands and green buffers, help absorb secondary cyclone impacts, whilst also attracting income from biodiversity credits.<br>Whilst some younger people moved away during the transition, the region has managed to pivot towards more premium horticulture products, and eco-tourism integrated into local ao Māori culture.<br>Rates have declined, but more steadily and in-line with reduced service demand.<br>Council is now mostly focussed on disaster preparation, and keeping key transport links open across the region. In most remote areas, mana whenua now run decentralised, local services that make the most of new technology – for example 3D printing medical equipment, using solar energy, or drones for infrastructure repair.<br>Ageing groups are mostly concerned by connectivity, and access to local hubs which provide key services. Young people want local jobs, without having to move to the nearby city. | | Rapid transition hit Matana hard. Fuel cost spikes, fast decline in dairy exports, and rising cost-of-living affected the rural region's vulnerable populations at the same time as they experienced back-to-back Category 5 Cyclones in a period of 2 months. Lack of resilience planning saw costs spiral, and some core services not reinstated for 18 months.<br>Some areas retained connection and profitable land-use. However, this was often through valuable ETS conversions and farms, which required little labour or local community involvement. Many groups found themselves cut off by damaged roads and in economic decline. There were numerous protests against low-carbon policies as locals saw them as unfeasible.<br>With limited funding, communities improvise flood defences - some pooling resources, others patching up on their own. To avoid maladaptation, councils launch innovation hubs for expert coordination.<br>Council faced high volatility of government funding and local rates, and struggled to match outgoings with income. The sprawling road network becomes impossible to maintain, leading to regressive financial outcomes and hard decisions on maintenance retreat.<br>Many core services declined over the period of 2038-2043. Young people left the region, searching for employment.<br>Community mistrust grew as council staff fronted tough adaptation talks without real decision-making power. Protests flared, legal threats rose, and morale sank. Some communities broke away - forming iwi-led resilience hubs or anti-government enclaves. | | Matana's regional economy performed well during the 2020s and 2030s. However, the region has become increasingly exposed to extreme weather events. A series of Category 5 cyclones caused high damage to infrastructure, housing, and the economy. Lack of investment in hard or soft preparation measures made the impacts worse.<br>Many people are experiencing cost-of-living rises as global climate-related supply chain disruption affects prices for basic products. Fuel is expensive. A delayed fuel import due to the Suez Canal being closed for 3 weeks after local social unrest and heatwave-induced infrastructure damage saw a spike in local fuel stockpiling and a burgeoning black market. Affluent individuals with EVs saw their cars vandalised at the peak of the crisis.<br>Rates are declining as people are forced to move out of areas, and the traditional agricultural sectors decline due to summer heat stress.<br>Service delivery is impacted by these physical events, but also growing social polarisation.<br>Local key issues are the inability to get insurance and access to reliable, cost-effective fuel. | |

# Marygold

**MEDIUM TERM** (2036-2050) | Central North Island | Territorial – District Council

| | | Acting now for our mokopuna | | Leaving it to the next generation | | Inheriting a broken world | |
|---|---|---|---|---|---|---|---|
| | | **Description** | **Trend** | **Description** | **Trend** | **Description** | **Trend** |
| 2050 | **Geography/hazards** | Low - Heat stress, Flooding of river | | Low - Heat stress, Flooding of river | | Low - Heat stress, Flooding of river | |
| | **Population** | 21,000 | ↔ | 17,500 | ↓ | 23,000 | ↓ |
| | **Average age** | 41 | ↑ | 46 | ↑ | 44 | ↓ |
| | **Employment rate** | 73% | ↔ | 63% | ↓ | 67% | ↑ |
| | **Vulnerable population** | 28% | ↓ | 38% | ↑ | 31% | ↔ |
| | **Economic strength** | Agriculture, Biodiversity Credits & Technology | ↔ | Agriculture (Dairy) and carbon offset plantations | ↓ | Agriculture – Dairy & Beef | ↓ |
| 2036- 2050 | **Narrative** | Marygold has seen a steady decline in its local dairy and beef sector output. Some local businesses serve high-end niche markets, and a collaboration between the council, an overseas investor, and a local entrepreneur means there is a successful business exporting patented digital codes to 3D print famous New Zealand beef overseas. Many farmers now produce low-carbon food for domestic supply, and benefit from the booming biodiversity credit market.<br>The river now floods almost annually, but proactive retreat has reduced impacts. The 2030s saw a lot of community resistance to change. But now, the council is investing heavily in transport links and virtual connectivity with rural areas to boost the economy, and people have adapted.<br>Ratepayer capacity has been steadily declining as people moved away looking for work, and the population has aged. However, it has been a slow, managed decrease, alongside reduction in service provision.<br>In many areas, mana whenua have taken over services such as waste recovery and recycling, and the maintenance of cultural assets like parks. Investments in resource and waste circularity, along with local resilience, have enabled both residents and mana whenua to operate these services independently of council.<br>Local communities are mostly concerned with continuing connectivity, and having autonomy to make local decisions on things like resource use. | | Council faced a difficult transition as it attempted to meet net zero targets on a limited budget. Compounding climate risks caused issues – for example, flooding at an overseas production facility caused a 6 month delay in the import of a replacement electric waste collection lorry when the current one was due for retirement. Rubbish ended up piling up on the streets and gained national press.<br>Council faced a lot of backlash from community groups about imposing reductions on private vehicle use. Many people felt left behind. This led to a number of high-profile protests outside council offices.<br>There was a sharp drop-off in dairy and beef demand in the early 2040s. Many young people left the area to move to cities. Rates declined fast, leading to closure of several non-core services.<br>Service delivery is now becoming more affordable as low-carbon options become available, but officers feel they are long way from ‘normal’.<br>For some community groups, their main concern is regaining their old lifestyle. For others, its affordable access to transport and energy as their old vehicles and gas boilers are now prohibitively expensive. Many face growing health and social issues locally. | | Marygold’s dairy and beef industries have performed well for the last 15 years, boosting populations and ratepayer capacity. However, wider cost-of-living issues since 2040 have caused social problems across the region. Food and consumer goods are becoming more expensive each year.<br>There are growing tensions between the council and mana whenua about the degradation of the local awa and biodiversity, leading to public conflict and an active lawsuit. This comes on top of the one being filed by activists for council missing its 2050 Net Zero target.<br>Rates are steadily declining as the economy shrinks and people move towards cities.<br>Service delivery is becoming more expensive due to cost inflation for imports like fuel and machinery. A major flood in 2046 caused a lot of damage to a major bridge, which pretty much blew the annual budget on recovery.<br>Local groups want economic growth, but are increasingly divided. The local iwi are increasingly distancing themselves from council and its services. | |

# Dashton

**MEDIUM TERM** (2036-2050) | East coast of South Island | Regional Council

| | | Acting now for our mokopuna | | Leaving it to the next generation | | Inheriting a broken world | |
|---|---|---|---|---|---|---|---|
| | | **Description** | **Trend** | **Description** | **Trend** | **Description** | **Trend** |
| 2050 | **Geography/hazards** | Coastal flooding and sea level rise | | Coastal flooding and sea level rise | | Coastal flooding and sea level rise | |
| | **Population** | 621,000 | ↑ | 643,000 | ↑ | 678,000 | ↑ |
| | **Average age** | 38 | ↑ | 35 | ↓ | 35 | ↑ |
| | **Employment rate** | 84% | ↑ | 74% | ↑ | 76% | ↔ |
| | **Vulnerable population** | 22% | ↓ | 27% | ↔ | 27% | ↑ |
| | **Economic strength** | Moderate – Agriculture (horticulture), high-tech sectors (e.g. remote robotics), and a University | ↔ | Moderate – Agriculture (dairy, horticulture), manufacturing, and a University | ↑ | Moderate – Agriculture (dairy, beef), manufacturing, a University, and growing high-tech manufacturing | ↑ |
| 2036-2050 | **Narrative** | Dashton proactively leaned into the transition. Council engaged communities early about the risk and counterfactual. The region focused on the opportunity of being relatively climate resilient, and its renewable energy advantage. It has attracted foreign direct investment, and set up high-tech sectors, including remote-operated robotics and pharma.<br>Major storms did cause coastal flooding in the 2030s. However, managed retreat in the late 2020s helped reduce costs. Dashton funded a major resilience programme in 2035 through biodiversity credits and a Public-Private Partnership. With a reduction in agricultural land, its ecosystems are regenerating fast.<br>Ratepayer capacity declined during the 2030s as agricultural and manufacturing businesses changed, but is now rising again as more businesses migrate South to Daston.<br>Service delivery is now cheaper and easier thanks to low-carbon and automated technology.<br>The community is focussed on re-skilling in the high-tech agricultural and robotics sectors to ensure there are good jobs. Supporting virtual connectivity and local food security to enable decentralised lifestyles is a big topic. | | Dashton is just emerging from a period of change. It's agricultural and manufacturing bases were heavily hit by carbon prices in the late 2030s. A major employer shut down almost overnight in 2038. The council has worked hard with the University to attract new businesses to the region, but it is still work in progress as New Zealand is an expensive place to do business. Warmer climates have seen new horticulture farms emerge.<br>Coastal flooding has cost the council a lot of money as they had to reactively buy out a large community in 2039. However, planning has improved, and people are now moving to the area, which is seen as having an increasingly desirable climate.<br>Ratepayer capacity is slowly recovering after a volatile period in the late 2030s. Growing populations are improving the situation.<br>Rising populations are putting pressure on infrastructure. With limited Central Funding, the council have had to sell off some assets, and have afforested large areas to gain ETS income.<br>The community are split between wanting to see more jobs in rural areas, and investing in urban infrastructure, which wasn't designed for such high populations. | | Dashton has seen high population rise in its urban areas. This has coincided with major coastal flooding, which with limited resilience investment has cost the council and community a lot.<br>Local ecosystems are under severe pressure, which is impacting agricultural yields and creating high tension with the local iwi.<br>A small group of investors met with the council to facilitate the opening of a high-tech manufacturing location near one of the main awas. The region is attracting inward R&D into businesses focussing on pharma, food genetics, defence, and resource recovery.<br>Rates have been generally good over the last 20 years as exports stayed strong, and some overseas competitors crashed out of the market.<br>However, the cost of services has steadily risen as heat stress, infrastructure damage, and flooding become more prevalent.<br>Many in the community are angry about the lack of consultation about new business arrivals, or the use of resources. There is growing economic inequality within and between rural and urban areas. | |

# Rochester

**MEDIUM TERM** (2036-2050) | Central North Island | Territorial – City Council

| | | Acting now for our mokopuna | | Leaving it to the next generation | | Inheriting a broken world | |
|---|---|---|---|---|---|---|---|
| | | **Description** | **Trend** | **Description** | **Trend** | **Description** | **Trend** |
| 2050 | **Geography/hazards** | Moderate - seismic risk; flooding from large river | ↑ | Moderate - seismic risk; flooding from large river | ↑ | Moderate - seismic risk; flooding from large river | ↑ |
| | **Population** | 173,000 | ↑ | 175,000 | ↑ | 210,000 | ↑ |
| | **Average age** | 37 | ↓ | 39 | ↓ | 35 | ↔ |
| | **Employment rate** | 77% | ↑ | 72% | ↔ | 70% | ↓ |
| | **Vulnerable population** | 30% | ↓ | 30% | ↓ | 30% | ↑ |
| | **Economic strength** | High – globally connected service sector with corporate HQs, and servicing local regenerative agri | ↑ | Medium – service sector economy, with higher proportion of domestic companies | ↑ | Medium – service sector based on supporting the local primary sector | ↓ |
| 2036-2050 | **Narrative** | Rochester has seen its population rise over the past decades. Luckily, early integrated planning means its trending on the right direction in terms of higher urban density, more public transport options, and is even seeing nature bloom in its parks and urban spaces.<br>A celebration was held in 2045 for meeting Net Zero targets 5 years early. The city invested early in adaptation, and a combination of spatial planning, buy outs, and cross-organisation planning on resilience mean it now weathers even the most severe events well.<br>Aside from a couple of misplaced bets in hydrogen busses, the city has navigated the transition well financially, and is now seen as an attractive location for high-tech overseas companies to headquarter. Young, skilled people see Aotearoa and Rochester as a viable option.<br>Rates have been boosted by in-migration and increasingly younger populations. Commercial rates benefit from a number of listed companies who are based in Rochester now for its quality of life.<br>Services are more efficient and use AI-enabled orchestration and planning.<br>The younger population means growing demand for more cultural and community services, especially those embedded in ao Māori. | | Rochester is emerging from a difficult transition which took place mostly in the last decade. There was a lot of social backlash against the council for what people saw as over-reach into their lives. Congestion charging and removal of CBD parking, mandated work-from-home days for companies, and seemingly endless road works to build out public transport capacity tested most residents patience.<br>A strong anti-emission sentiment created social polarisation. There was a 6-week protest outside council in 2041 against the cost of transition.<br>The regional economy is struggling, and many people move to Rochester from surrounding rural areas looking for work.<br>Rushed planning decisions combined with high fuel prices mean many vulnerable communities lack connectivity and opportunity in some suburbs.<br>Ratepayer capacity is relatively flatline, as productivity is down despite higher populations.<br>Demand for services has increased noticeably. Urban sprawl in the 2020s and 30s means most delivery teams and budgets are stretched.<br>Whilst many people are now adapting to a low-emissions lifestyle, there are pockets of poverty and protest against the cost of living. | | Urban sprawl has continued, and most people still retain the use of private vehicles. Like much of New Zealand, Rochester is now a city of haves and have-nots, with the city welcoming its 4th billionaire, who has invested in a new premium gated community on the outskirts of the town.<br>This compares to when council officers watched in horror as a major river flooding event in 2038 hit a relatively new social housing development. There had been major protests against the construction on land that was deemed as climate-exposed. Residents and the local area never fully recovered.<br>Rates capacity increases, but doesn't keep up with per-capita demand.<br>Rising fuel costs, export market decline, and lack of social cohesion are making it increasingly difficult to deliver services across a large area. Rising numbers of climate migrants and refugees are entering the area. This has placed further pressure on services, many of which are at breaking point.<br>Community groups complain about rising crime, and young people bemoan the lack of opportunity. | |


05

# Appendices

# Scenario design

**Scenario design includes the technical decisions made by the Working Group to ensure the scenarios were high quality and robust.**

It includes decisions around project governance and process, and also around framework architecture (underlying pathway assumptions), parameters (quantitative and qualitative variables for assumptions), scope (relevant local government services and council typologies), boundaries and granularity (level of detail of parameters).

While most of the local government sector is not currently captured under the Aotearoa New Zealand Climate Standards, we have aimed to align these sector scenarios with key requirements of the Standards to support comparability. For example, we have selected three scenarios following a 1.5˚C, 3+˚C and another pathway.

## Project governance

Wellington City Council provided project management & support for this scenarios work and organised participant coordination, with funding from multiple organisations. The project was led by representatives from 9 organisations representing various elements of the local government sector who formed the 'Working Group'.

All material decisions about scenario design and content were made by agreement among the Working Group, with technical advice provided by KPMG New Zealand.

## Our scenario process

### Project co-design and kick-off

We established the Working Group and agreed the scope and boundaries for our work.

With KPMG's support, we agreed our scenario framework, including architecture and parameters.

Qualitative parameters were used to help make scenarios more practical and valuable for local authorities to down-scale to their entity and use local data which is more relevant.

To support sector-wide engagement, we hosted a webinar to bring the sector along the journey with us.

### Driving forces and storyline development

We ran two workshops with an attendance from 30 councils across Aotearoa. In these we:

- Identified and agreed on the external drivers of change that influence local government's ability to deliver services (aka 'drivers').
- Developed scenario narrative storylines based on key service areas.

The outputs were reviewed and prioritised by the Working Group where required.

### Scenario narratives

The workshops and Working Group insights informed the scenario narratives. The Working Group also undertook an exercise to directly map drivers against local government funding sources and service delivery cost/demand and develop the **key assumptions driving change** that underpin each of the narrative time horizons

Where relevant, we drew on existing sector scenarios to support consistency and acknowledge local government's integration with so many other sectors.

### Guidance and refinement

To support the usefulness of the sector scenarios to councils, the Working Group and KPMG developed guidance for utilising them at a local level.

This was developed based on feedback through the workshops, Working Group insights and KPMG's previous experience developing sector and entity-level scenarios.

**April** | **May** | **June** | **July** | **August**

## Our contributors

**Working Group** | **Wider participants**

**KPMG**
*Technical Advisor & Facilitator*

# Scenario design - Defining the Local Government system

## Services

The local government sector's services and areas of responsibility are broad. They also vary depending on the council typology and can be informed by the needs of their communities and environments. To focus our thinking and clarify the scope of our work, Working Group discussions helped to determine four overarching council service areas (see right) and a list of key services to explore:

- Roading
- Transport
- Water supply
- Waste water
- Solid waste/Refuse
- Environmental protection
- Emergency management
- Culture
- Planning & regulation
- Community development
- Economic development
- Property
- Governance
- Support services
- Recreation & sport

As we delved further into the future, we identified that, while service decisions will be made at local levels often by elected members, the nature and availability of funding will impact every council and service.

We have therefore concentrated our work on considering how local government funding may be impacted by a broad range of climate-related factors, from physical events to changing demographics, in order to determine climate change's impact on services.

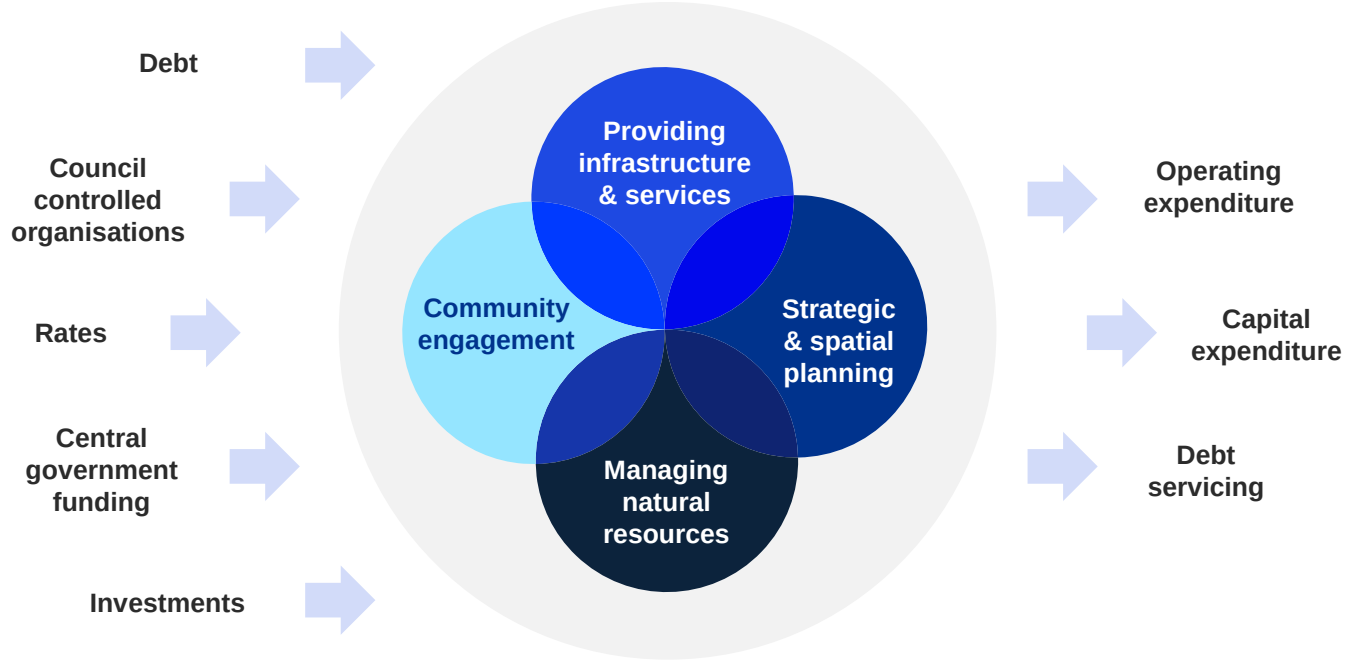
## Funding sources (income)

Funding sources spans rates, both commercial and residential; central government funding such as contribution towards approved projects; Council controlled organisations which are commercial ventures which sometimes generate income; and debt, primarily from the LGFA.

## Council spend (expenditure)

Council spend on services falls under capital expenditure (capex) which can be investment in new or existing infrastructure; operating expenditure (opex) which includes service delivery costs such as staff costs and overheads; and debt servicing, such as paying interest on borrowed funds.

## System model



# Scenario design – Architecture and parameters

**The Working Group made key decisions around the scenario architecture, such as the scope and assumptions we used, which informed discussion of how the drivers could evolve over different time horizons and across three scenarios. These then formed the basis for our scenario narratives by providing parameters.**

## Referencing other scenarios

Other publicly available scenarios were referenced when developing these narratives for comparability and consistency. The publicly referenced scenarios include:

- Transport Sector Scenarios
- Energy Sector Scenarios
- Agriculture Sector Scenarios
- Insurance Sector Scenarios
- Climate Scenarios for the Construction & Property Sector
- Tertiary Education Scenarios
- Auckland Council Scenarios
- Reserve Bank Climate Stress Test

## To note – use of parameters

Users may find some differences between the assumptions in frameworks and those used in these scenarios. The Working Group made a conscious decision to provide indicators that were most relevant and useful to the local government context. For example, focusing on qualitative parameters where possible to enable councils to bring in specific local data and knowledge around physical climate impacts, despite where quantitative parameters might exist within global frameworks and other sector scenarios.

| | IPCC | | Network for Greening the Financial System | Climate Change Commission | International Energy Agency |
|---|---|---|---|---|---|
| | Shared Socioeconomic Pathway | Representative Concentration Pathway | | | |
| Acting now for our mokopuna | SSP1: Sustainability | RCP 2.6 | Net Zero 2050 | HTHS | NZE |
| Leaving it to the next generation | SSP2: Middle of the Road | RCP 4.5 | Delayed Transition | HTLS | SDS |
| Inheriting a broken world | SSP3: Regional Rivalry | RCP 7.0 | Current Policies | Reference | STEPS |
| **Sources for parameters** | SSPs - SSP Database | *IPCC* | *NGFS* | *CCC* | IEA |

Table 1. Framework selected for Local Government Sector Climate Scenarios

# Acting now for our mokopuna

## Qualitative parameters

**NGFS Net Zero 2050**

*Implied temperature outcome of policy[8]*: +1.4°C

| | |
|---|---|
| Severity of physical risk[7] | ***Medium:*** *extreme events occur annually but don't accelerate* |
| Severity of transition risk[7] | ***Medium:*** *fossil fuel technologies quickly phased out* |
| Policy reaction to climate change[7] | ***Immediate and smooth:*** *climate becomes a priority immediately* |
| Technology change[7] | ***Fast change:*** *new electric technologies suddenly replace old* |
| Socio-political instability[7] | ***Low – Moderate:*** *urban areas thrive, some rural areas adjust* |
| Land use change (NZ)[6] | ***Strong regulation; higher native afforestation*** |

## Te Ao Māori parameters

| | |
|---|---|
| Mātauranga Māori recognition | *Effective recognition* |
| Te Tiriti o Waitangi integration | *Effective integration* |
| Tino rangatiratanga | *Effective ability to demonstrate Tino Rangatiratanga* |

**Level of impact**

- Low
- Medium
- High
- Very high

*Sources: [1]IPCC, [2]MfE (NIWA), [3]SSP Database, [4]Aotearoa Circle [5]StatsNZ [6]CCC [7]NGFS [8]NGFS*

# Leaving it to the next generation

## Qualitative parameters

**NGFS Delayed Transition**

*Implied temperature outcome of policy[8]*: +2.7°C

| | |
|---|---|
| Severity of physical risk[7] | ***Moderate:*** *extreme events rise to every year from 2035* |
| Severity of transition risk[7] | ***Moderate:*** *social push for climate action accelerates suddenly* |
| Policy reaction to climate change[7] | ***Delayed:*** *no significant policy change until 2040* |
| Technology change[7] | ***Slow then fast:*** *rapid electrification only after 2040* |
| Socio-political instability[7] | ***Moderate:*** *unemployment doubles in some regions* |
| Land use change (NZ)[6] | ***Incomplete regulation; higher exotic afforestation for ETS*** |

## Te Ao Māori parameters

| | |
|---|---|
| Mātauranga Māori recognition | *Moderate recognition* |
| Te Tiriti o Waitangi integration | *Moderate integration* |
| Tino rangatiratanga | *Moderate ability to demonstrate Tino Rangatiratanga* |

**Level of impact**

- Low
- Medium
- High
- Very high

*Sources: [1]IPCC, [2]MfE (NIWA), [3]SSP Database, [4]Aotearoa Circle [5]StatsNZ [6]CCC [7]NGFS*

# Inheriting a broken world

## Qualitative parameters

**NGFS Current Policies**

*Implied temperature outcome of policy[8]*: +3.6°C

| | |
|---|---|
| Severity of physical risk[7] | ***Extreme:*** *by 2050, several extreme events happen each year* |
| Severity of transition risk[7] | ***Low:*** *no change in energy sources and demand increases* |
| Policy reaction to climate change[7] | ***None:*** *no new policies are implemented* |
| Technology change[7] | ***Slow change:*** *investment in 'clean tech' drops* |
| Socio-political instability[7] | ***High:*** *international conflict and security is a significant concern* |
| Land use change (NZ)[6] | ***Limited regulation; poorer protection of forests*** |

## Te Ao Māori parameters

| | |
|---|---|
| Mātauranga Māori recognition | *Restricted recognition* |
| Te Tiriti o Waitangi integration | *Restricted integration* |
| Tino rangatiratanga | *Restricted ability to demonstrate Tino Rangatiratanga* |

**Level of impact**

- Low
- Medium
- High
- Very high

*Sources: [1]IPCC, [2]MfE (NIWA), [3]SSP Database, [4]Aotearoa Circle [5]StatsNZ [6] 2023 CST Scenario [7]CCC [8]NGFS*

# Scenario design – Drivers of change

1 With our wider participants, we identified and prioritised the external **drivers** of change that could impact local government's ability to deliver core services.

**Drivers** are external factors that influence the events, trends, and patterns determining the direction of change, and thus the 'outcomes' in the sector's environment.

2 We built on the PESTLE framework to bring structure to this work and included an additional 'T' category to capture Te Ao Māori-related drivers.

3 The Working Group then considered the potential paths of the drivers of change and how they would impact:

- The cost to deliver services, demand for services and deliverability; and
- Different funding sources including capacity and willingness to pay.

| PEST(T)LE categories | Key drivers of change 1 |
|---|---|
| Political | Central government expectations of local government<br>Central government climate action |
| Environmental | Acute physical impacts<br>Ecosystem wellbeing |
| Social | Social licence of local government<br>Climate literacy of local leaders<br>Changing demographics |
| Technological | Availability of transition technology |
| 2 Te Ao Māori | Expectations for council to give effect to Te Tiriti o Waitangi<br>Expectations from mana whenua / local iwi for meaningful partnership |
| Legal | Legal system response |
| Economic | Performance of the national economy |

Income 3 | Expenditure

Central government funding
Local ratepayer capacity
Portfolio investment performance
Demand for services
Cost and deliverability of services

# Limitations and mitigation measures

## Limitations and reflections

The scenarios process has some limitations, particularly in relation to scope and capability. While the process aimed to incorporate a range of perspectives, Māori knowledge systems were not substantively involved. As a result, the scenarios may not fully reflect te ao Māori, mātauranga Māori, or iwi and hapū aspirations. A dedicated Te Ao Māori section has been included in the scenarios guidance to support councils in localising scenarios to a gold standard, should they choose. Rural community involvement was also limited, which may affect the representation of regional and place-based perspectives. Broader limitations inherent to scenario analysis are discussed below:

## Inherent limitations

Climate change scenarios have inherent limitations, including:

- **Uncertainty:** Scenarios are based on assumptions about the future, and the future is intrinsically uncertain. Moreover, the speed at which climate-related impacts are evolving is unprecedented and little reliance can be placed on historical experience to assess their magnitude, timing, or how different climate-related forces might interact. This gives rise to a higher level of uncertainty.
- **Simplification:** Even the most complex scenarios are highly simplified representations of profoundly complex systems. They cannot capture all the nuances and interdependencies of the real world, and they may overlook important forces that can have a significant impact on the future.
- **Bias:** Scenarios are influenced by the assumptions and biases of the people that develop them. Different participants may develop different scenarios based on their own perspectives and assumptions.
- **Over-reliance:** Scenarios are useful tools for exploring different futures, but they should not be over-relied upon. They are just one of many tools that can help inform decision-making, and they should be used in conjunction with other methods and sources of information

## Combining higher-level, publicly available scenarios

The sector-specific scenarios in this report take from Network for Greening the Financial System (NGFS), IPCC, and Climate Change Commission (CCC) ‘backbone’ (i.e. high level, sector-agnostic) scenarios, allowing for greater granularity and breadth of decision-relevant insights. However, this approach comes at a cost, especially:

- **Friction:** NGFS, IPCC, and CCC scenarios were not designed to be integrated. They have been developed using different methodologies, assumptions, and models, which makes it difficult to blend them in ‘frictionless’ narratives. Apparent inconsistencies and/or contradictions can undermine credibility in the eyes of end-users.
- **Complexity:** Drawing on multiple scenarios increases the complexity of analysis, which can make interpretation and communication more difficult.

Overall, blending well-recognised backbone scenarios can be useful for exploring the potential impacts of climate change and making well-informed decisions.

## Process constraints

We aimed to mitigate known risks and limitations across the project by:

- Developing challenging scenarios that capture a wide range of possible outcomes; and
- Employing a collaborative process leveraging a range of perspectives across the local government sector.

However, any sector scenario project has constraints and limitations from capacity, funding and timing. We note the number of contributors to the scenarios was limited by these factors, particularly in the area of Māori engagement. We have developed guidance to support councils in addressing this in their own downscaling or use of the scenarios as this would help enhance and localise scenarios.

## A final word of caution

Climate science may be moving more slowly than climate change, and the projections in this report may significantly underestimate the extent and/or timing of physical impacts. As such, users should apply the precautionary principle when making material decisions in the face of deep and dynamic uncertainty.

# Glossary, acronyms & abbreviations

| TERM | DEFINITION |
|---|---|
| Climate Change | A persistent and long term change in average range or variability of climate which is attributed directly or indirectly to human activity. |
| Climate Migrant | Someone who moves to a new country or area (permanently or temporarily) because climate change has made it very difficult for them to continue to live or work where they are. |
| Climate Refugee | Someone who is forced to leave their home country or area because climate change has made it impossible for them to continue to live or work there. |
| Climate-related Scenario | A plausible, challenging description of how the future may develop based on a coherent and internally consistent set of assumptions about key drivers of change and relationships covering both physical and transition risks in an integrated manner. Note that climate-related scenarios are not intended to be probabilistic or predictive, or to identify the 'most likely' outcomes of climate change. |

| TERM | DEFINITION |
|---|---|
| Drivers of change | Broad scale, external factors that that change across the different scenarios, and affect the outcomes of the focal question(s), also known as 'drivers'. |
| Impacts | The effects of climate-related risks and opportunities materialising on an entity, which will in turn depend on the impacts of climate change on the broader socio-economic and ecological systems the entity operates within. These impacts are driven by the specific climate-related risks and opportunities to which an entity is exposed, and its strategic and risk management decisions on seizing those opportunities and managing those risks. |
| Just Transition | Refers to a framework for managing the shift towards a low carbon economy in a way that is fair and equitable for workers and communities impacted by the transition. The International Labour Organization defines it as "greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind". |
| Maladaptation | Actions that may lead to increased risk of adverse climate-related outcomes, including via increased greenhouse gas emissions, increased or shifted vulnerability to climate change, more inequitable outcomes, or diminished welfare, now or in the future. Most often, maladaptation is an unintended consequence. |
| Mitigation | A human intervention to reduce the sources or enhance the sinks of greenhouse gases. |
| Narratives | Qualitative descriptions of plausible future world evolution, describing the characteristics, general logic, and developments underlying a particular quantitative set of scenarios. |

# Glossary, acronyms & abbreviations

| TERM | DEFINITION |
|---|---|
| Natural Hazard | A hazard is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Climate change is considered an underlying driver of risk for meteorological, hydrological and environmental hazards and can exacerbate the impacts of these hazards as well as those which are geological / geophysical. Climate change is altering the frequency and intensity of hazard events, affecting vulnerability, and changing exposure patterns. |
| Pathways | The temporal evolution of natural and/or human systems toward a future state. Pathway concepts range from sets of quantitative and qualitative scenarios or narratives of potential futures, to solution-oriented decision-making processes to achieve desirable societal goals. Pathway approaches typically focus on biophysical, techno-economic, and/or socio-behavioural trajectories and involve various dynamics, goals, and actors across different scales. |
| Physical Risk | Risks related to the physical impacts of climate change. Physical risks emanating from climate change can be event-driven (acute) such as increased severity of extreme weather events. They can also relate to longer term shifts (chronic) in precipitation and temperature and increased variability in weather patterns, such as sea level rise. |
| Reporting | The methods for measuring, monitoring, evaluating and reporting the outcomes and impact of the adaptation and resilience financing, including the indicators used. |

| TERM | DEFINITION |
|---|---|
| Resilience | The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management. |
| Scenario Analysis | A process for systematically exploring the potential impacts, affecting the entity, of the range of plausible futures described under the climate-related scenarios. While acknowledging the uncertainty of these futures, this process allows entities to better understand how climate-related risks and opportunities may impact their strategy and business model over time. |
| Scenario 'Framework Architecture' | The combinations of SSPs (Shared Socio-economic Pathways), RCPs (Representative Concentration Pathways), NGFS (Network for Greening the Financial System) representative scenarios, modified SPANZ (Shared Policy Assumptions for New Zealand) selections and CCC (Climate Change Commission) reference scenarios that comprise each scenario. |
| Scenario Narrative | A plausible propagation of natural, macroeconomic, socio-economic and political factors occurring during each time frame of each scenario. |
| Scenario Pathway | The political, technological, and economic developments and associated risk drivers (e.g. which sectors and regions bear the most emissions reductions, or which energy technologies win out in different economies) that lead to a particular scenario outcome; there can be distinctively different pathways leading to the same outcome. Also see Pathways. |
| Tipping Points | 'Positive tipping points' refer to the moment at which low carbon technologies become more affordable, attractive and/or accessible than high carbon alternatives. 'Negative tipping points' refer to a situation where a small change in the Earth climate system triggers a larger and more permanent change. |

# Glossary, acronyms & abbreviations

| TERM | DEFINITION |
|---|---|
| **Transition Risk** | Risks related to the transition to a low emissions, climate resilient global and domestic economy, such as policy, legal, technology, market and reputation changes associated with the mitigation and adaptation requirements relating to climate change. |
| **Uncertainty** | A state of incomplete knowledge that can result from a lack of information or from disagreement about what is known or even knowable. It may have many types of sources, from imprecision in the data to ambiguously defined concepts or terminology, incomplete understanding of critical processes, or uncertain projections of human behaviour. Uncertainty can therefore be represented by quantitative measures (e.g. a probability density function) or by qualitative statements (e.g. reflecting the judgment of a team of experts) |
| **Vulnerability** | Refers to the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. |

| ACRONYMS & ABBREVIATIONS | |
|---|---|
| **CCC** | Climate Change Commission |
| **GDP** | Gross Domestic Product |
| **HTHS** | High Transition, High Stability |
| **HTLS** | High Transition, Low Stability |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **LGFA** | Local Government Funding Agency |
| **LTPs** | Long-Term Plans |
| **MfE** | Ministry for the Environment |
| **NGFS** | Network for Greening the Financial System |
| **NIWA** | National Institute of Water and Atmospheric Research |
| **PEST(T)LE** | Political, Economic, Social, Technological, Te Ao Māori Legal, and Environmental |
| **RCP** | Representative Concentration Pathway |
| **SDS** | Sustainable Development Scenario |
| **SSP** | Shared Socioeconomic Pathway |

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