

9.7 CLIMATE CHANGE UPDATE**Information Only - No Decision Required**

Report To:	Strategy and Policy Committee
Meeting Date:	1 June 2023
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1. Summary / Te Tuhinga Whakarāpoto

1.1 This report provides:

- a quarterly update on implementation of the current Tasman Climate Action Plan (2019); and
- climate change updates in brief at the regional, national and international levels.

2. Recommendation/s / Ngā Tūtohunga

That the Strategy and Policy Committee receives the Climate Change Update report RSPC23-06-10.

3. Updates on progress with implementing the Tasman Climate Action Plan

- 3.1 An internal working group comprising 16 staff from across the Council meets bi-monthly to ensure the current Tasman Climate Action Plan (TCAP) progresses. Highlights from the last quarter (March to May 2023) are presented in this section.
- 3.2 A new plan to reduce and electrify our fleet is about to become operational. In the next few months, the first few fleet vehicles will be replaced by electric equivalents. This is the first step towards electrifying two thirds of the Council's fleet.
- 3.3 Tasman District and Nelson City councils have commissioned an assessment of options for the collection and processing of food waste. This is expected to be complete in June, with work moving to a full business case for kerbside collections (supported by central government funding).
- 3.4 A revamped public transport service will be starting in August 2023, with new connections through to Motueka and Wakefield. The majority of the existing bus fleet will be replaced with 17 electric buses.
- 3.5 Staff are planning for a review of the Council's Emergency Event Funding Policy, which will examine how we fund damage to Council infrastructure in emergency events.

- 3.6 We have prepared a briefing note for staff that provides practical tips for capitalising on opportunities for climate-resilient infrastructure projects and investments (see Attachment 1).

Winter planting plans

- 3.7 This winter, 35,000 natives will be planted around the Waimea Inlet on reserves and berm lands, along with 3,000 salt marsh plants on the estuary edges.
- 3.8 Upcoming plantings planned for the wetland restoration project include planting at Porters constructed wetland, Puponga Wetland, Mangarakau Wetland and possibly Waiwhero Road Wetland.
- 3.9 A direct seeding trial is planned for the Teapot Valley native forest restoration project.
- 3.10 Weed control carried out for these ecological restoration projects now totals 142 ha. Another 976 ha of wilding pines have also been controlled to date. Wilding pine control work supports resilience to the impacts of climate change by reducing impacts on productive land and reducing the threats from wildfires.

4. Regional update

Nelson-Tasman Regional Climate Change Risk Assessment project

- 4.1 As outlined in previous 'Climate Change Update' reports, we are working together with Nelson City Council and iwi partners to undertake a [Regional Climate Change Risk Assessment](#) (RCCRA) for both the Tasman and Nelson regions.
- 4.2 This work is being led by consultant [Urban Intelligence](#). The project aims to assess and interactively communicate climate change risks in the region, as well as cascading risks and impacts³. The outcome is a 'living' platform called the 'Risk Explorer' that can be used by councils, iwi, businesses, organisations, and communities for climate adaptation planning, asset and spatial planning, and emergency planning.
- 4.3 The initiative is overseen by a project team comprising staff from both councils. The methodology, the stakeholders and iwi engagement plans have been finalised.
- 4.4 The consultant is continuing data collection (hazards and assets).
- 4.5 The Explorer currently has nine hazard types with multiple scenarios but has been sourced from public data - Council staff are being engaged to attain the detailed layers.
- 4.6 Approximately 46 different spatial asset layers are included in the assessment currently.

Nelson City Council update

- 4.7 Nelson City Council approved an extra role for their Climate Change team, bringing their total capacity up to 4.5 FTE. Their new carbon analyst (0.5 FTE) started in mid-May.
- 4.8 Nelson City Council received EECA funding (50% contribution) towards a fleet transition study to consider how they can transition their vehicle fleet to EVs. The outcome of this report is expected to be available in the next financial year.
- 4.9 Their Climate Change team is working to embed climate change in all Activity Management Plans across the Council and seeking funding through their Long Term Plan 2024-2034 process.

³ Cascading impacts from extreme weather/climate events occur when an extreme hazard generates a sequence of secondary events in natural and human systems that result in physical, natural, social or economic disruption, whereby the resulting impact is significantly larger than the initial impact (IPCC).

4.10 Nelson City Council is supporting the Nelson Tasman Climate Forum during the Climate Action Week by organising an EV Tradeshow at Saxton Field on 3 June with local car dealers.

Nelson Tasman Climate Forum update

4.11 There is now a new website for the [Nelson Tasman Climate Forum](#).

4.12 Staff and Councillor representatives have continued to attend monthly Leadership Group hui of the Forum.

4.13 Upcoming events being hosted by the Forum include the [Nelson-Tasman Climate Action Week](#) (26 May to 3 June). Mayor King will speak at the Ben & Earth Community Composting launch event on 27 May. Council staff are contributing to a webinar on active transport and a composting workshop in Appleby.

Te Taihū Intergenerational Strategy and Climatorium

4.14 On 21 March, Wakatū Incorporation and others launched 'Tūpuna Pono Ao Ora – the Climatorium', a proposal for a world leading centre for climate resilience partnership.

4.15 A workshop with Councillors will be held on 28 June to provide an overview of the Climatorium initiative and to discuss replacing the Council's current community outcomes with those included in the Te Taihū Intergenerational Strategy.

5. National update

Budget 2023 allocations for Climate Change

5.1 Budget 2023 continues to position New Zealand to seize the advantages of a low-emissions and climate-resilient economy and helps to support families and households experiencing cost of living pressures.

5.2 Budget 2023 states that climate change also presents opportunities for New Zealand to improve living standards for our people and make our economy more resilient. Climate action can help us to reduce our reliance on volatile global energy markets, develop new, low-carbon industries, improve the health of our natural environment, and enable a fair and just low-carbon transition.

5.3 Central government funding allocation includes:

Climate change adaptation

- \$120 million operating to protect communities from future climate events, including a \$100 million fund to help councils invest in future flood resilience;
- \$39.2 million to improve the mapping of New Zealand's coastline and identify coastal areas at significant risk of climate-related hazards and natural disasters; and
- \$24.7 million to improve data on impacts of climate change and adaptation and mitigation.

Climate change mitigation

- \$120 million for electric vehicle charging infrastructure;
- \$30 million for clean heavy vehicle grants including trucks;
- \$300 million to accelerate private investment in low-emissions activities;

- Another \$30 million (on top of the \$16 million in Budget 2022) to ensure communities and households benefit from renewable energy;
- \$32 million for green hydrogen for use in regions and sectors that face greater barriers to decarbonization; and
- \$403 million to expand the scope of the Warmer Kiwi Homes programme.

Public transportation

- Investment of \$327 million to reduce the cost of public transportation. This investment will extend the Community Connect programme to offer free public transportation to children under 13, and half-price transportation to Total Mobility passengers and passengers aged 13 to 24.

Treasury climate economics assessment

5.4 [Ngā Kōrero Āhuarangi Me Te Ōhanga: Climate Economic and Fiscal Assessment 2023](#), published this month, was prepared by Treasury and MfE. The assessment highlights key future economic and fiscal implications of climate change for New Zealand and utilises the Living Standards Framework and He Ara Waiora. The assessment was designed to support public and private sector decision-makers identify and manage the risks and opportunities of physical climate change and transitioning to a low emissions and climate-resilient future. Key takeaways from this assessment are:

- New Zealand could face a bill of \$24 billion in the years leading up to 2030 in order to meet its international climate change targets;
- New Zealand has committed internationally under the Paris Agreement to reduce net greenhouse gas emissions in 2030 by 50% below gross emission levels in 2005, part of global efforts to limit warming to below 1.5C;
- essentially, to meet that target, New Zealand's emissions between 2021 and 2030, shall not exceed 571 megatonnes of carbon dioxide equivalent gases (Mt CO₂e). For context, New Zealand emitted 84 Mt CO₂e in the year to June 2021, almost one-sixth of the budget. If New Zealand does produce emissions greater than the budget, it must pay others to make up the difference, which involves purchasing carbon credits; and
- it includes the costs of adapting to climate change, reducing emissions, and not meeting international obligations. It highlights how climate change and rising carbon costs will adversely affect agriculture and fisheries. It also notes how a low-emissions economy and the physical risks of climate change will disproportionately affect lower-income households, particularly Māori.

Climate Change Adaptation Bill

- 5.5 Under the resource management reforms, the draft Climate Change Adaptation Bill is expected to be introduced into Parliament in the next two to three months (the Spatial Planning Bill and Natural and Built Environments Bill are currently in the Select Committee process).
- 5.6 The latest update from MfE, received in April, states that MfE is developing tools and processes that could support the identification of areas where further planning for adaptation is needed, including managed retreat.
- 5.7 As part of their engagement work, they identified a key gap around ensuring that local government has the mandate, clarity on responsibilities, direction and tools to consistently

plan for and take into account natural hazards and climate projections. This is the focus of the Climate Change Adaptation Bill.

- 5.8 MfE is currently considering different options for how a managed retreat system could work and working closely with a Managed Retreat Expert Working Group⁴, with their advice expected in the next few months.

Climate Action Hub

- 5.9 MfE is exploring options to develop an All-of-Government Climate Action Hub to bring together the abundance of useful climate tools and resources which exist across government, and help to fill critical gaps.
- 5.10 This is likely to be a combination of locally driven ‘on the ground’ engagement, supported by a digital support hub to enable New Zealanders to assess and understand their risks and make informed choices about taking climate action. It would provide a single source of tailored and user-friendly, plain English guidance, information and tools.
- 5.11 Targeted engagement with NIWA, the local government Aotearoa Climate Adaptation Network (ACAN), and government agencies is underway. This is helping MfE understand the scope and products that might be needed. Data alignment across scales will be important and this needs to be an enabler of action as opposed to just filling information gaps.

Climate Adaptation Platform

- 5.12 Ross Waugh (a consultant we have often engaged to review our Activity Management Plans) has recently published a blog series on ‘Climate Adaptation Infrastructure Management’ on the [Climate Adaptation Platform](#):
- [Part 1](#) discusses how New Zealand could build back better after Cyclone Gabrielle, implementing its National Adaptation Plan with equity at the centre, including managed retreat and building resilience into infrastructure.
 - [Part 2](#) focuses on how New Zealand can build infrastructure resilience, on the increasing frequency and severity of climate events, how locals can be better prepared to cope, and when it is time to move out.
 - [Part 3](#) talks about New Zealand’s experiences with relocating people and the challenges involved, creating mutual insurance coverage for climate change risks, options for adaptation for people in vulnerable areas, and dealing with displaced people from climate change.
 - [Part 4](#) addresses the populated flood-prone areas in the country and feasibility of managed retreat, incentives for adapting to climate change, and how to avoid climate gentrification.

Three property categories revealed as Government progresses cyclone recovery work

- 5.13 In response to Cyclone Gabrielle, the Government has settled on [three categories under which the future of flood and landslide affected properties will be assessed](#):

⁴ The Managed Retreat Expert Working Group was established by MfE last year to develop a report with design options for an enduring managed retreat system, to inform the Ministry’s policy development process.

- Low Risk – repair to previous state is all that is required to manage future severe weather event risk. This means that once any flood protection near the property is repaired, the home can be rebuilt at the same site.
- Managed Risk – community or property-level interventions will manage future severe weather event risk. This could include the raising of nearby stop banks, improving drainage or raising the property (category two is split into three sub-categories).
- High Risk – areas in the high risk category are not safe to live in because of the unacceptable risk of future flooding and loss of life. Homes in these areas should not be rebuilt on their current sites.

5.14 Communities will be consulted before any final decisions are made about which category properties are placed into. Those discussions will begin as soon as assessments are completed and quality assurance is done.

New Zealand’s Greenhouse Gas Inventory

5.15 [Stats NZ reported](#) a reduction in greenhouse gas (GHG) emissions across industry and households by 3.5% (696 kilotonnes) in September 2022 quarter. This reduction is a change to the trend of increases observed over the past three quarters.

5.16 Notably, this was mostly driven by significant reductions (26% or 533 kilotonnes) in the electricity, gas, water, and waste services industry, and in the manufacturing industry when compared with the June 2022 quarter.

NZ Emission Trading Scheme (NZETS)

5.17 Minister of Climate Change, James Shaw, recently released the Climate Change Commission’s second annual advice on [NZ Emissions Trading Scheme \(ETS\) unit limits and price control settings for 2024-2028](#).

5.18 The Government is currently reviewing the New Zealand Emissions Trading Scheme to assess if changes are needed to provide a stronger incentive for businesses to transition away from fossil fuels, while also supporting greenhouse gas removals.

5.19 The Commission recommended a series of changes to the NZETS in order to stay on track for meeting national emissions reductions targets.

Climate Change Commission emission targets

5.20 Commission Chair Dr Rod Carr stated that updated advice, “reflects new data and updates to our approach. Our advice has been informed by current information from the market that emerged after the Government’s decisions on the NZ ETS in 2022.” Dr Carr further cautioned that, “if the Government declines the recommendations, then it will need a much stronger policy approach to achieve emissions budgets than the one outlined in the emissions reduction plan.”

Consultation Opportunities

Call for evidence: Emissions reduction targets and emissions budgets

5.21 Calls for evidence to support the Commission’s work on [NZ’s emissions reduction targets and emissions budgets](#), closes Monday 31 July 2023. The Council will not be making a submission on this.

Advice on New Zealand’s second Emissions Reduction Plan

- 5.22 The Climate Change Commission is also consulting on its 2023 draft advice to inform the strategic direction of the Government's second emissions reduction plan, covering Aotearoa New Zealand's 2026–2030 emissions budget. Submissions are due by 20 June 2023 and the Commission will deliver their final advice to the Minister of Climate Change by 31 December 2023.
- 5.23 The second emissions budget (for 2026-2030) has been set, but the Government needs a plan to deliver on it. The Commission's role is to provide independent, evidence-based advice on the direction of policy, taking a systems-wide view. They last provided advice like this in their 2021 report *Ināia tonu nei*.
- 5.24 The Commission's proposed recommendations include:
- accelerating EV charging infrastructure roll out to keep up with demand;
 - bringing new renewable electricity generation online faster and making sure local lines companies are able to support growth;
 - scaling up efforts to move industry away from coal and other fossil fuels;
 - preparing for the rapid roll-out of low emissions technologies and practices on farms;
 - retrofitting buildings so they are healthier, more resilient, lower emissions and cheaper to run;
 - avoiding new installations of fossil gas where there are affordable low emissions alternatives;
 - making it much easier for people to use public transport and active transport;
 - improving the capture of methane at landfills;
 - accelerating Iwi/Māori emissions reduction by allocating resources directly; and
 - sorting out the New Zealand Emissions Trading Scheme and the role of forestry.
- 5.25 The proposed recommendations are what the Commission considers the highest priority, most urgent actions required to achieve Aotearoa/New Zealand's 2026–2030 emissions budget and enable the country to meet its emissions reduction goals.
- 5.26 The Commission visited the Council on 4 May. Staff shared their views on the draft advice at this meeting and will follow up by preparing a brief written submission from the Council.

Draft strategy for EV charging

- 5.27 In April, the Ministry of Transport released the draft strategy [Charging our Future: a draft electric vehicle strategy for Aotearoa NZ](#). The strategy details the Government's long-term vision for our national electric vehicle (EV) charging infrastructure system for its expansion out to 2035. It includes five long-term outcomes and further focuses on the accessibility and equitability of EV charging for all New Zealanders.
- 5.28 The strategy is part of the implementation of the Emissions Reduction Plan, to help reduce transport emissions as one of the largest contributors to total domestic emissions (17%). Consultation closed on Thursday 11 May 2023. The Council did not make a submission.

Strengthened national direction on renewable energy

- 5.29 MBIE and MfE is consulting on [strengthened national direction on renewable energy](#), with submissions closing on 1 June. Council's Environmental Policy team is engaging with this consultation opportunity.

New Zealand Energy Strategy

- 5.30 MBIE will develop an [Energy Strategy](#) by 2024 to outline how the energy sector will decarbonise and increase resilience to climate change and extreme weather events (for example, potentially by Enabling Investment in Offshore Renewable Energy). Targeted engagement is set to occur through to September 2023 to support the development of the Energy Strategy, for example by identifying key challenges and opportunities, success measures, and research priorities. Staff have not yet assessed this consultation opportunity in detail.

MfE-led Environment and Climate Research Strategy

- 5.31 MfE is leading the cross-agency development of [Te Kete Mātauranga a Āhuarangi me te Taiao o Aotearoa | Environment and Climate Research Strategy](#) (ECRS) in partnership with the Ministry of Business, Innovation and Employment, the Department of Conservation, and the Ministry for Primary Industries.
- 5.32 The aim is for the strategy to be a single point of reference for priority government environment and climate research needs that are connected to national-level objectives.
- 5.33 The draft strategy was open for targeted consultation (directed at those who have already been involved in the strategy's development) for 18 days during April. Once feedback has been incorporated they will work through the approval process, with Cabinet scheduled to consider the strategy for approval in late July 2023.
- 5.34 Staff reviewed the submission prepared by Te Uru Kahika – Regional and Unitary Councils Aotearoa and provided some additional points for inclusion.

Resource management reform

- 5.35 Reporting back dates on the Spatial Planning and National and Built Environment Bills have been delayed until 6 June 2023. The Environmental Policy team submitted feedback to the Ministry for the Environment (MfE) on the National Planning Framework on 27 April.

6. International update

- 6.1 The Intergovernmental Panel on Climate Change (IPCC) recently released its highly anticipated Synthesis Report making it the culmination of its sixth assessment cycle.
- 6.2 The IPCC's AR6 Synthesis Report provides a comprehensive summary of our current understanding of climate change, its widespread impacts and risks, as well as the strategies for mitigation and adaptation. Read the [Summary for Policy Makers](#).
- 6.3 The report concludes that human-induced emissions have de-stabilised our planet, and the decisions we make today will determine our collective future. Urgent action is required to limit emissions, build resilience and prevent further warming.
- 6.4 Note that the LTP climate change assumptions will be updated once the latest Intergovernmental Panel on Climate Change regional data is available.

7. Attachments / Tuhinga tāpiri

1. [AMP guidance note on incorporating climate change considerations](#)

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ACTIVITY MANAGEMENT PLANNING GUIDANCE NOTE: INCORPORATING CLIMATE CHANGE CONSIDERATIONS

This briefing note provides **quick practical tips for capitalising on opportunities** for climate-resilient infrastructure projects and investments.

addresses **all project life phases**, including development (preparation, appraisal, and procurement), implementation (construction, operation, maintenance), and decommissioning.

Infrastructure underpins the quality of life valued by the community. It helps **support a safe, healthy, liveable and vibrant district**. These services include drinking water, flood protection, safe disposal of wastewater, roads, cycleways, footpaths, reserves, community facilities and council property.

Infrastructure networks will be affected by the physical impacts of climate variability and change but will also play an essential role in building resilience to those impacts. Cyclone Gabrielle reminded us that the impacts of climate change are here and now.

Extreme weather events vividly illustrate that critical infrastructure is vulnerable to the effects of climate change.

Having effective and reliable infrastructure is vital for providing critical services to communities. Natural hazard events, including those exacerbated by climate change, can adversely affect council infrastructure, compromising councils' ability to deliver these services and a community's ability to recover after such events.

Ensuring that infrastructure is climate resilient will help reduce direct losses and indirect costs of disruption. Given the long lifespan of infrastructure assets, we must ensure that future investments avoid negative impacts (do no harm) and are low-emission, resilient, sustainable, and circular (do good).

This document seeks to go beyond conventional practice and **provide guidance on how to ensure climate-resilient considerations are included in Council's Long Term Plan and Activity Management Plans**.



Climate change concerns related to council assets

- ▶ **Direct impacts:** infrastructure construction and operation often contribute to environmental change: land conversion, fragmentation of natural habitats (e.g. barrier effect of roads), disturbance (e.g. noise, hydrology, erosion), waste, pollution and greenhouse gas emissions (from vehicles, industry).
- ▶ **Indirect consequences:** the provision of infrastructure to mitigate inundation and erosion risks can enable the development of more vulnerable areas, such as floodplains, putting the people in those areas at risk; construction and use of transport infrastructure can lead to the spread of invasive plants or animals.
- ▶ **Natural hazards and climate vulnerability:** hard infrastructure may be susceptible to damage or failure due to natural hazards exacerbated by climate change (extreme weather events, sea level rise, changing temperatures) leading to loss of life, serious injury, and health and well-being impacts resulting from a lack of clean drinking water, wastewater contamination, and isolation, including the inability to access food and other critical goods.
- ▶ **Lock-in and stranded assets:** Given the long lifespan of infrastructure and the difficulty of modifying it, failure to invest in clean, sustainable, and resilient infrastructure can lock regions into a greenhouse gas and resource-intensive development pathway, including measures that emit greenhouse gas or risk the stranding of assets before the end of their lifespan.



Mainstream sustainability and resilience as early as possible

- ▶ Pro-actively identify opportunities to integrate climate, disaster risk reduction, and environmental objectives into the Long Term Plan and Activity Management Plans, including identification, design, construction, operation and decommissioning of infrastructure projects; integrate environmental criteria into project selection and prioritisation (e.g., using carbon prices, multi-criteria analyses).
- ▶ Ensure that infrastructure projects are linked to the Future Development Strategy and Tasman Resource Management Plan, which are aligned to climate, environmental, and disaster risk reduction objectives.
- ▶ Engage early with public, private and the community; plan for the disclosure of environment-related information (transparency) and ensure accountability.
- ▶ Apply the range of natural hazards and sea-level rise maps that council has developed [Local Maps](#) and the Nelson Tasman Risk Explorer tool (due end of 2023), before or coinciding with economic analysis in the identification phase, so it can contribute to the comparative analysis of options/alternatives.



Promote the 'greening' of infrastructure

- ▶ **Green infrastructure:** create networks of (semi-)natural or constructed nature that provide a variety of ecosystem services ranging from flood storage and coastal defence to nature protection, combatting urban heat islands and/or providing recreational space.
- ▶ **Nature-based solutions:** use natural ecosystem processes to address issues traditionally solved by hard (or grey) infrastructure (e.g. coastal defence, wind breaks, water purification, sediment traps) in order to be more flexible and resilient ("green where possible, grey where necessary").
- ▶ **Retrofit** green elements into existing project design, including disaster resilient features and mitigation measures such as animal under- and overpasses in roads, fish ladders in dams and weirs, green roofs to combat heat stress, integrating solar panels in infrastructure, adding flood resilience to urban structures.
- ▶ Apply a **circular economy approach** to designing infrastructure to favour the efficient use and reuse of assets and resources.



Create climate resilient infrastructure (adapt to climate change)

- ▶ Avoid a narrow focus on resilience of assets only, but also include the resilience of services provided by infrastructure networks, and of infrastructure users. This may involve innovative, alternative, and community-based ways of meeting the needs of communities.
- ▶ Integrate climate-proofing and disaster resilience in the design of the infrastructure (e.g. including disaster resilient building codes/design standards in infrastructure development). The Nelson Tasman Climate Risk Assessment could be useful in this regard.
- ▶ Develop emergency preparedness plans and disaster risk reduction strategies in relation to key infrastructure assets in line with local and/or national strategies.



Design for low-emission (climate mitigation) and resource efficient (circular) infrastructure:

- ▶ Opt for energy-efficient, low-carbon infrastructure and building materials, and ensure that these considerations are included at the start of the planning and design process.
- ▶ Apply circular principles to designs and material choices, including durability and adaptability, to optimise material use and reduce waste and emissions throughout the project's life cycle.
- ▶ Minimise the transport of materials over long distances, minimise the energy requirements of construction techniques.
- ▶ Wherever possible, switch to low-carbon, renewable sources of energy to power infrastructure.



Integrate climate change in investments

- ▶ Screen infrastructure projects for climate risks. Financing institutions are increasingly using risk screening as part of their lending processes for new infrastructure projects.



Promote green procurement

- ▶ Incorporate environmental, including climate change risks/impacts into qualification and selection criteria, technical specifications, standards, KPIs, and contractual provisions.
- ▶ Require Council enterprises and contractors to follow responsible to adopt green supply chain management by ensuring green procurement in contracts.



Further information and support:

- ▶ Section 101B(3)(e) of the Local Government Act requires councils in their infrastructure strategies to:
 - ...outline how the local authority intends to manage its infrastructure assets, taking into account the need to...provide for the resilience of infrastructure assets by identifying and managing risks relating to natural hazards and by making appropriate financial provision for those risks.
- ▶ This briefing note aligns with the Council's Infrastructure Strategy 2018-2048 and the Reserves and Facilities Activity Management Plan 2021–2051 provide long term strategies for all of the core infrastructure assets combined. It identifies four key long term priorities for managing our infrastructure, including **planning, developing and maintaining resilient communities**.
- ▶ [Aotearoa New Zealand's first national adaptation plan | Ministry for the Environment](#)
- ▶ Local Government New Zealand (2018), "LGNZ work reveals billions at risk from sea level rise" at www.lgnz.co.nz.
- ▶ [Quality Infrastructure Principles; OECD Reference Note on Environmental and Social Considerations in Quality Infrastructure](#):
- ▶ OECD, 2018, [Climate-resilient Infrastructure](#). OECD Environment Policy Paper No. 14.
- ▶ [OECD Compendium of Good Practices for Quality Infrastructure Investment](#)
- ▶ [LIFELINES. The Resilient Infrastructure Opportunity](#), World bank Group

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A checklist for climate-resilient infrastructure

The steps outlined below are intended to assist activity managers in understanding the actions they may take to make investment projects more resilient to climate variability and change. Climate resilience can be incorporated at any stage into any project lifecycle. The following steps are meant to help you through the pre-feasibility, design, and operational phases.

Pre-feasibility

- ✓ **Conceptual design** – Have you considered the risks associated with design options (for example, project location and site, financial, economic, operations and management, legal, environmental, and social)?

Project Initiation phase / feasibility

- ✓ **Assess project risks / hazards** - What climate risks / hazards exist at the location?
- ✓ **Site selection** - Are there alternative locations available to manage or reduce climate risk to acceptable levels?
- ✓ **Assess mitigation options** - Are there any other options to mitigating climate risk?
- ✓ **Climate risk tools** - What climate modelling tools are available (for example, climate risk assessment explorer, deep uncertainty /probabilistic scenarios modelling tools, regional scenarios, and impact models)
- ✓ **Contractors / suppliers** – Have you ensured that suppliers / supplies are climate resilient? Is it adequately covered in contracts
- ✓ **Project team** - Have you included climate adaptation experts in the project?

Planning phase

- ✓ **Assess vulnerability** – Is an exposure assessment based on detailed hydrological models included? Hazard maps that incorporate climate change projections, hazard and catastrophe models, network and system level assessment, including interdependencies and cascading impacts?
- ✓ **Undertake cost-benefit analyses of adaptation measures**
- ✓ **Incorporate risk and uncertainty analysis** – No regret, low regret, flexible or adaptive management, robust adaptation, soft measures (e.g., behavioural change, changes to facility operation), and win-win options (minimise risks or capitalise on potential opportunities while also providing other social, economic or environmental benefits?)
- ✓ **Ensure flexible adaptation** – Have alternative pathways being considered? Are you designing structures that allow modifications? Is land set aside for new defences?
- ✓ **Technology selection** – Have technologies and associated design thresholds that are most sensitive to climatic conditions been identified, so that adaptation measures (for example, extra headroom, change in technology) can be identified early on?

Execution phase

- ✓ **Identify adaptation options** – Is a combination of soft (reallocation of resources, behavioural change, training and capacity building) and hard (e.g., retrofit existing infrastructure) approaches being considered?
- ✓ **Evaluate / cost adaptation options** - Are the costs and advantages of adaptation options undertaken considering solely financial budgetary costs and benefits only? Or, more broadly, taking into account the wider costs and benefits to the local community?
- ✓ **Develop risk management plans** – Have risk prevention, preparedness, and response strategies been included, as well as related emergency plans?
- ✓ **Ensure collaboration** – Is work being done in partnership with Iwi and community stakeholders to ensure adaptation options do not have unintended consequences for them?

Monitoring and control

- ✓ **Ensure regular monitoring and control** – Is the project being monitored on a regular basis to ensure that it is providing the required level of risk reduction and climate science updates?
- ✓ **Proactive monitoring and remote sensing techniques** – Have you allowed for a better approach to asset condition monitoring by determining the frequency of inspections based on the risk of failure? Does the risk take into account the projected effects of climate change as well as the implications of asset failure, allowing for inspection that prioritises locations with the highest potential for climate change impacts to disrupt the system? Is the project capable of both rapid data gathering as well as comprehensive detailed monitoring of assets most vulnerable to climate impacts?

Operation and maintenance

- ✓ **Business continuity and emergency management plans** – Is there a maintenance plan in place that takes climate change and early warning considerations into account? Is the infrastructure capable of providing safe and reliable service in the face of increasing frequency and severity of climate events, as well as changes in operational conditions? Is there a plan to anticipate and adapt?
- ✓ **Risk-based inspections** – Is asset maintenance prioritised and scheduled based on a risk-based assessment that considers climate risk? Is the activity considering the range of potential exposure to new risks (including the high-impact low-probability hazards) and managing the degree of uncertainty created by climate change impacts?