Title: **Testing our thinking - Developing an enduring National Infrastructure Plan**

Organisation: **Adapt Research Limited**

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Summary of information submitted

Page 1 - Introduction

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We're seeking feedback

Our Discussion Document, Testing our thinking: Developing an enduring National Infrastructure Plan, sets out our thinking as we begin work to develop a National Infrastructure Plan. The Discussion Document sets out what we expect the Plan will cover and the problem it's trying to solve, as well as the approach we're proposing to take to develop it.

We're sharing this now to test our thinking and give you the chance to share your thoughts. Let us know if we've got it right or if there are issues you think we've missed.

We'll use your feedback as we develop the Plan. We'll be sharing our thinking by presenting at events around the country, hosting workshops and webinars, and sharing updates through our website, newsletter, and social media. We'll also seek feedback on a draft Plan before publishing the final Plan in December 2025.

Submission overview

You'll find 17 main questions that cover the topics found in the Discussion Document. You can answer as many questions as you like and can provide links to material within your responses. On the final page (6. Next steps) you can provide any other comments or suggestions that you would like us to consider as we develop the National Infrastructure Plan. Submissions are welcomed from both individuals and organisations.

A few things to note:

- You can save progress using the button at the top right of this form.
- A red asterisk (*) denotes a mandatory field that must be completed before the form can be submitted.
- We expect organisations to provide a single submission reflecting the views of their organisation. Collaboration within your organisation and internal review of your submission (before final submission), is supported through our Information Supply Platform. You'll need to be registered with an Infrastructure Hub account, and be affiliated with your organisation to utilise these advanced features. Many organisations will already have a '*Principal respondent*' who can manage submissions and assign users at your organisation with access to the draft responses.
- Submissions will be published on our website after the closing date. The names and details of organisations that submit will be published, but all personal and any commercial sensitive information will be removed.

Further assistance

Each submission that is started is provided a unique reference identifier. These identifiers are shown in the top right of each application page. Use this identifier when seeking further assistance or communicating with us about this submission by using one of the following methods.

- Use info@tewaihanga.govt.nz to contact us with any questions relating to our Discussion Document and consultation.
- Use inform@tewaihanga.govt.nz for help managing roles and permissions of user accounts affiliated with your organisation in the Information Supply Platform (ISP).

Submission method

Our preferred method is to receive responses through this form. However, we anticipate some submitters will wish to upload a pdf document, especially where their submission is complex or long. If this submission method is necessary, please use this word template and save as a pdf. We ask that you retain the structure and headings provided in the template as this will support our processing of responses.

Select a submission method

To continue, select the method you will be using.

Online form

Page 2 - Context for the Plan

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Testing our thinking

The Discussion Document includes five sections. Below we're seeking feedback on why we need a National Infrastructure Plan. We also want to test our thinking on our long-term needs and make sure we have a clear view of what investment is already planned.

Section one: Why we need a National Infrastructure Plan

A National Infrastructure Plan can provide information that can help improve certainty, while retaining enough flexibility to cancel or amend projects as circumstances or priorities change.

1. What are the most critical infrastructure challenges that the National Infrastructure Plan needs to address over the next 30 years?

Please note: All responses in this submission are drawn from the "Aotearoa NZ Catastrophe Resilience Project" Main Report (2023). The report is appended to this submission. Authors of the report are: Matt Boyd, Ben Payne, Nick Wilson, Sam Ragnarsson, with acknowledged contributions from Simon Terry. The main authors of the report state they have no conflicts of interest pertaining to NZ Infrastructure.

Based on the NZCat report, the most critical infrastructure challenges include NZ's extreme dependence on complex interconnected systems and vulnerability to global disruptions. The report identifies four core sectors requiring urgent attention: food/agriculture, energy, transport, and ICT/digital infrastructure. A key finding is that failure in one sector can cascade to others due to critical interdependencies. The infrastructure plan must address not just the resilience of existing infrastructure but also develop "resilience infrastructure" - alternative systems and capabilities needed to maintain basic functions during global catastrophes. This includes developing local biofuel production capacity, strengthening coastal shipping assets, building domestic digital/cloud infrastructure, and ensuring robust food production and distribution systems that can function with minimal external inputs.

2. How can te ao Māori perspectives and principles be used to strengthen the National Infrastructure Plan's approach to long-term infrastructure planning?

The NZCat report highlights that Māori worldviews and approaches offer valuable perspectives on long-term resilience and sustainability. Māori intergenerational views naturally lead to a strong focus on sustainable infrastructure practices that ensure future generations can thrive. The report notes that marae already serve as crucial civil defense infrastructure during disasters, and there are important connections between Māori and core infrastructure sectors. Mātauranga Māori could help shift thinking away from industrial "solutionism" toward more sustainable and resilient approaches that recognize natural constraints. The infrastructure plan should formally investigate productive convergences among the Māori economy, marae-based systems, infrastructure resilience, and community needs while strengthening linkages between national/local government and iwi/marae.

Section two: Our long-term needs

The National Infrastructure Plan will reflect on what New Zealanders value and expect from infrastructure. To do this, the Plan needs to consider New Zealanders' long-term aspirations and how these could be impacted over the next 30 years.

3. What are the main sources of uncertainty in infrastructure planning, and how could they be addressed when considering new capital investments?

According to the NZCat report, major sources of uncertainty include the risk of global catastrophic events that could severely disrupt or destroy critical infrastructure, complex interdependencies between systems that make cascading failures difficult to predict, and increasing global instability affecting supply chains and availability of expertise. The report recommends addressing these uncertainties through: systematic national risk assessment that includes global catastrophic risks; scenario planning and "red-teaming" of infrastructure systems under extreme conditions; ensuring redundancy and local alternatives for critical systems; and developing infrastructure that supports basic needs even in extended trade isolation. Cost-benefit analyses should account for the aggregate likelihood of severe disruptions across multiple hazards when evaluating infrastructure investments.

Section three: What investment is already planned

We already gather and share data on current or planned infrastructure projects through the National Infrastructure Pipeline. This data, alongside other information gathered by the Treasury or published by infrastructure providers, helps to paint a picture of investment intentions.

4. How can the National Infrastructure Pipeline be used to better support infrastructure planning and delivery across New Zealand?

The Pipeline should incorporate insights from the NZCat report by prioritizing projects that enhance national resilience against major disruptions. This includes investments in "resilience infrastructure" identified as crucial gaps, such as biofuel refineries, coastal shipping assets, domestic cloud computing facilities, and distributed food production/distribution systems. The Pipeline should evaluate projects not just on standard metrics but also on their contribution to ensuring basic needs can be met during extended catastrophes. It should promote infrastructure diversity and redundancy while reducing critical dependencies on external systems. The report suggests allocating a percentage (e.g., 1%) of major infrastructure project budgets specifically for analyzing and enhancing resilience against global catastrophic risks.

Section four: Changing the approach

We have used our research and publicly available information on infrastructure investment challenges to identify key areas for change. The next question and the following three pages seek further detail on the three themes in section four of our paper. Within each of the three themes, we explore some topics in more detail, outlining the evidence, discussing the current 'state of play', and asking questions about where more work is needed.

5. Are we focusing on the right problems, and are there others we should consider?

The NZCat report suggests current infrastructure planning may not adequately address the risk of global catastrophic events that could cause extended disruption or destruction of critical systems. While climate change and local natural hazards receive attention, other major risks like nuclear war, extreme pandemics, or massive volcanic eruptions that could severely impact infrastructure are often overlooked. The report recommends broadening the scope to include: infrastructure needed for basic survival during extended trade isolation; alternatives to current centralized systems; infrastructure supporting regional self-sufficiency; and systems that can function with minimal external inputs. Planning should consider not just making existing infrastructure resilient but developing alternative capabilities for worst-case scenarios.

Changing the approach — Capability to plan and build

Section four looks at changes that we can make to our infrastructure system to get us better results. We've broken these changes down into three themes: capability to plan and build, taking care of what we have, and getting the settings right.

For the first theme, we look at three key areas:

- Investment management: Stability, consistency, and future focus
- Workforce and project leadership: Building capability is essential
- Project costs: Escalation means less infrastructure services.

Investment management: Stability, consistency, and future focus

We're interested in your views on how we can address the challenges with government infrastructure planning and decision-making.

6. What changes would enable better infrastructure investment decisions by central and local government?

The NZCat report recommends establishing overarching governance of global catastrophic risks through a Parliamentary Commissioner for Extreme Risks or Chief Risk Officer to ensure coherent long-term infrastructure planning. This should be supported by a systematic and public National Risk Assessment that helps prioritize infrastructure investments based on their contribution to national resilience. The report suggests infrastructure decisions should be informed by analysis of capabilities needed to maintain basic functions during extended catastrophes. Local governments need risk information and resources to develop appropriate infrastructure solutions for their communities. Investment decisions should consider co-benefits across multiple hazards and risks.

7. How should we think about balancing competing investment needs when there is not enough money to build everything?

Drawing from the NZCat report, investment prioritization should consider the aggregate likelihood and consequences of major disruptions across multiple hazards. Infrastructure that helps ensure basic needs (food, water, energy, communications) can be met during extended catastrophes should receive priority. The report recommends cost-benefit analyses that account for co-benefits across multiple risks and hazards - for example, investments in local biofuel production could provide resilience against trade disruption while supporting climate goals. Infrastructure diversity and redundancy may seem inefficient but become valuable insurance against major systemic failures. Community engagement through mechanisms like citizen assemblies could help inform prioritization decisions.

Workforce and project leadership: Building capability is essential

We're interested in your views on how we can build capability in the infrastructure workforce.

8. How can we improve leadership in public infrastructure projects to make sure they're well planned and delivered? What's stopping us from doing this?

The NZCat report identifies the need for bipartisan, long-term governance of major risks affecting infrastructure, potentially through a Parliamentary Commissioner for Extreme Risks or Chief Risk Officer. This would help overcome short-term political cycles that can impede important long-term infrastructure planning. The report recommends developing comprehensive sector-specific resilience strategies (for energy, transport, food/agriculture, ICT/digital) that guide infrastructure development. Project leadership needs access to systematic risk information through a public National Risk Register. Regular scenario exercises and "red-teaming" of infrastructure plans could help identify weaknesses before they manifest in actual crises.

9. How can we build a more capable and diverse infrastructure workforce that draws on all of New Zealand's talent?

Based on the NZCat report, NZ needs to develop and retain expertise crucial for maintaining critical infrastructure, especially during potential isolation from global expertise and supply chains. The report recommends developing domestic capabilities in areas like biofuel production, digital infrastructure maintenance, and resilient agricultural systems. It suggests creating a "health sector reservist army" model that could be adapted for infrastructure - training people in basic infrastructure maintenance and emergency operations. The report also emphasizes the importance of traditional knowledge and local expertise, particularly Māori knowledge of sustainable resource management and community resilience.

Project costs: Escalation means less infrastructure services

We're interested in your views on further opportunities to improve our ability to deliver good infrastructure at an affordable cost.

10. What approaches could be used to get better value from our infrastructure dollar? What's stopping us from doing this?

The NZCat report suggests evaluating infrastructure investments based on their contribution to resilience against multiple hazards and risks. Projects that provide co-benefits across different scenarios (e.g., climate adaptation, disaster response, global catastrophe resilience) offer better value. The report recommends investing in infrastructure that reduces critical dependencies and enables local alternatives - this may seem less efficient in normal times but provides crucial insurance against major disruptions. Cost-benefit analyses should account for the aggregate likelihood of severe disruptions across multiple hazards. The report also suggests exploring regional cooperation, particularly with Australia, to share infrastructure capabilities and expertise.

Page 4 - Taking care of what we've got

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Changing the approach — Taking care of what we've got

The second theme in section four looks at how we can get better at taking care of what we have. It looks at three areas:

- Asset management: Managing what we already have is the biggest task
- Resilience: Preparing for greater disruption
- Decarbonisation: A different kind of challenge.

Asset management: Managing what we already have is the biggest task

Asset management means looking after our infrastructure. We are interested in your views on how we can improve planning for this.

11. What strategies would encourage a better long-term view of asset management and how could asset management planning be improved? What's stopping us from doing this?

The NZCat report emphasizes the need for asset management planning that considers extreme scenarios where replacement parts and expertise may be unavailable for extended periods. This requires maintaining local expertise, stockpiling critical components, and developing alternative maintenance capabilities. The report recommends regular auditing of infrastructure dependencies and vulnerabilities, scenario testing of maintenance capabilities under extreme conditions, and developing plans for operating with reduced functionality when needed. Asset management should consider not just maintaining existing infrastructure but developing alternative capabilities that could be crucial during major disruptions.

Resilience: Preparing for greater disruption

We are interested in your views on how we can better understand the risks that natural hazards pose for our infrastructure.

12. How can we improve the way we understand and manage risks to infrastructure? What's stopping us from doing this?

The NZCat report strongly advocates for a systematic National Risk Assessment that explicitly includes global catastrophic risks and their potential impacts on infrastructure. Current risk assessment often overlooks major cross-border risks that could severely impact infrastructure. The report recommends scenario planning and "red-teaming" exercises to identify vulnerabilities, regular testing of infrastructure systems under extreme conditions, and developing response plans for extended disruptions. Risk management should consider complex interdependencies between infrastructure systems and the potential for cascading failures. The report suggests establishing dedicated governance for major risks through a Parliamentary Commissioner for Extreme Risks.

Decarbonisation: A different kind of challenge

We're interested in your views on how we can improve understanding of the decarbonisation challenge facing infrastructure.

13. How can we lower carbon emissions from providing and using infrastructure? What's stopping us from doing this?

The NZCat report suggests that many measures to enhance resilience against global catastrophes could also support decarbonization goals. For example, developing local biofuel production capabilities, enhancing rail and coastal shipping infrastructure, and promoting distributed energy systems would support both objectives. The report recommends investing in infrastructure that reduces dependence on imported fossil fuels while building resilience against supply disruptions. However, it notes that some seemingly inefficient redundancies may be necessary for true resilience, requiring careful balance between immediate emission reduction goals and long-term survival capabilities.

Page 5 - Getting the settings right

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Changing the approach — Getting the settings right

The third theme in section four looks at how we can get our settings right to get better results from our infrastructure system. It looks at three areas:

- Institutions: Setting the rules of the game
- Network pricing: How we price infrastructure services impacts what we think we need
- Regulation: Charting a more enabling path.

Institutions: Setting the rules of the game

We're interested in your views on what changes to our infrastructure institutions would make the biggest difference in giving us the infrastructure we need at an affordable cost.

14. Are any changes needed to our infrastructure institutions and systems and if so, what would make the biggest difference?

Based on the NZCat report, establishing overarching governance of global catastrophic risks through a Parliamentary Commissioner for Extreme Risks or Chief Risk Officer would significantly improve infrastructure planning. The report recommends developing sector-specific resilience strategies, expanding the definition of critical infrastructure to include needed "resilience infrastructure," and ensuring regular systematic risk assessment that includes major global risks. Institutions need mechanisms for long-term, bipartisan infrastructure planning that transcends political cycles. The report also suggests strengthening coordination between central government, local governments, and communities on infrastructure resilience.

Network pricing: How we price infrastructure services impacts what we think we need

We're interested in your views on further opportunities to improve network infrastructure pricing.

15. How can best practice network pricing be used to provide better infrastructure outcomes?

The NZCat report suggests that pricing mechanisms should incentivize infrastructure diversity, redundancy, and local alternatives that enhance resilience against major disruptions. While this may seem less efficient in normal times, it provides crucial insurance against catastrophic failures. The report recommends considering the full cost of infrastructure dependencies and vulnerabilities when setting prices. For example, pricing could encourage distributed energy systems, local food production capabilities, and regional transport alternatives that reduce critical dependencies on potentially vulnerable centralized systems.

Regulation: Charting a more enabling path

We're interested in your views on further opportunities to improve regulation affecting infrastructure delivery.

16. What regulatory settings need to change to enable better infrastructure outcomes?

Drawing from the NZCat report, regulatory frameworks need to mandate assessment of global catastrophic risks and their infrastructure implications. Regulations should define and protect both critical existing infrastructure and needed "resilience infrastructure." The report recommends updating the Emergency Management Bill to better address global catastrophic risks, strengthening requirements for infrastructure redundancy and local alternatives, and ensuring regulations support community-level resilience initiatives. Regulatory settings should enable rapid adaptation of infrastructure systems during crises while maintaining appropriate safety standards.

Additional information to support our development of the Plan

Section five in the Discussion Document is on the next steps. In this section, we're asking you for any additional comments, suggestions, or supporting documentation that we should consider in our development of the National Infrastructure Plan.

17. Do you have any additional comments or suggestions that you would like us to consider as we develop the National Infrastructure Plan?

Click 'Add another' to add multiple suggestions or comments.

Item 1

The NZCat report emphasizes that infrastructure planning must move beyond making existing systems resilient to developing alternative capabilities needed during major global disruptions. The plan should consider: infrastructure needed for basic survival during extended trade isolation; alternatives to current centralized systems; support for regional self-sufficiency; and systems that can function with minimal external inputs or maintenance. The report recommends extensive community engagement, cooperation with Australia on regional infrastructure resilience, especially to facilitate regional trade in a global catastrophe, and development of comprehensive sector-specific resilience strategies. Infrastructure planning should recognize that the greatest risks may come from rare but devastating events that current planning processes often overlook.

18. Attach any documents that support your submission

Click 'Add another' to add multiple attachments in PDF format.

Document 1

231117 v1 NZCat Resilience Nuclear & GCRs.pdf
Last modified 2023-11-17 12:0:51 pm, file size 6.54 MB

Thank you for your response

Thank you for providing feedback on our Discussion Document. We'll use your comments as we continue to develop the Plan. This will not be the only opportunity for you to provide feedback, but it is an important way to test our emerging thinking on the development of an enduring National Infrastructure Plan.

If you have prepared a submission on behalf of an organisation, you'll need to be an authorised *respondent* to make the final submission. If you entered a new organisation during sign-up, or your organisation does not already have a *Principal respondent* assigned, you will have been asked to nominate yourself or someone else for this role as you started this submission. Our team will have worked to verify these accounts allowing *Principal respondents* to manage access and assignment of requests for information to people within your organisation.

If you require any assistance please reach out to our team at inform@tewaihanga.govt.nz.