Submission to the New Zealand Infrastructure Commission on the Draft National Infrastructure Plan

From: Islands for the Future of Humanity (NZ Registered Charity)
Date: 27 July 2025
Re: Draft National Infrastructure Plan - Global Catastrophic Risk Resilience Considerations

Contact person: [redacted]
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Executive Summary

We commend the New Zealand Infrastructure Commission for developing a comprehensive Draft National Infrastructure Plan that addresses critical global and systemic challenges including demographic transitions, climate change adaptation, and value-for-money infrastructure investments. However, we respectfully submit that the Plan has a **significant gap in considering resilience to global catastrophic risk (GCR) beyond climate change** and natural hazards.

While the current plan marks an important step toward greater resilience, it remains grounded in a largely reactive model that addresses risks after they emerge. To genuinely safeguard New Zealand's future, we need to adopt a more forceful and forward-looking approach, one **that prioritises planning and preparedness before disruption occurs**. This means shifting our focus toward anticipatory action, scenario-based planning and sustained investment in infrastructure and systems that can withstand a range of catastrophic events. By doing so, we can reduce long-term costs, protect essential services, and ensure communities are better equipped to respond and recover when crises arise.

This submission recommends incorporating infrastructure investments that would enhance New Zealand's resilience to low-probability, high-impact global catastrophic scenarios including nuclear conflict, extreme pandemics, supply chain collapse, space weather events, and other systemic risks that could severely disrupt global trade and connectivity for extended periods.

This submission is largely based upon our 'NZCat' 2023 Report "Aotearoa New Zealand, Global Catastrophe and Resilience Options." Which deals extensively with infrastructure strategies for addressing these global catastrophic risks.

Overall, long-term assessment management plans should foster infrastructure designed for global system failures.

We would be pleased to provide additional technical detail on any of our recommendations and do a presentation to the Commission on the topic of "building infrastructure resilience in NZ to global catastrophic risks". Thank you for this opportunity to submit in writing.

https://adaptresearchwriting.com/2023/11/16/main-report-aotearoa-nz-global-catastrophe-and-resilience-options/

Introduction

Our organisation, Islands for the Future of Humanity is a non-partisan collaborative think tank (registered as a charity in NZ). We develop resilience options to help ensure island nations can weather the impact of global catastrophes. Our work includes evidence-based research reports, empirical studies, and events promoting approaches to mitigate risks such as nuclear war or extreme pandemics. We consider that the NZ Infrastructure Commission is a key organisation for building resilience against future catastrophes - and so especially welcome this opportunity to submit.

Strategic Context

Several global trends suggest that future global shocks are probable. NZ has experienced a history of global shocks. These include the Great Depression and World War II, the 1966 wool price shock, oil shocks, global financial crises, and pandemics, among others. NZ's National Security Long-term Insights Briefing identifies increasing global competition, advancing technology, climate change, and pandemics. Furthermore, the Ministry of Foreign Affairs and Trade cites global shifts from rules to power, from economics to security, and from efficiency to resilience. We are also witnessing shifts toward regionalism and conflict, potentially exacerbated by competition over resources including food, water, energy, hardware, data, and expertise. There is division, mis- and dis-information, and people and institutions appear less willing to engage on cooperative endeavours. Overall, the number and severity of risks is increasing, systems emerging are more susceptible to catastrophic failure, and knowledge of some risks, such as climate change is becoming more secure, and their impacts more likely.

The world is entering a phase of global systemic risk, where the functioning and availability of critical global infrastructure, goods, and services, upon which NZ depends, cannot be guaranteed.

This is all due to the rising potential for cascading and amplifying failures across overly interdependent global systems. We are in the era of global polycrisis, where systemic risk and risk of cascading global system collapse is prevalent, and NZ is not immune.

In this context, New Zealand must prioritise resilience to future global catastrophes not through reactive processes of "building back better," but by "building forward better" to ensure the essential needs of its population are protected under any global conditions. Arguably, this is one of the core responsibilities of the government and it is vital that the government actively engages with citizens on how best to achieve this.

The context points to a narrowing window of opportunity to secure the goods and services needed for resilience-focused infrastructure. This includes both the strategic thinking and expertise required to design effective solutions and the practical, on-the-ground capability to

deliver them. This heightens the urgency to accelerate delivery potentially through prudent borrowing and by deprioritising “nice-to-have” projects in order to advance the critical infrastructure New Zealand will rely on in a potentially transformed global context in the decades ahead. Beyond procurement, it is essential to identify and empower the right experts, engineers, planners, systems thinkers and community leaders and provide them with the mandate, resources and institutional support to lead this work at pace. Their efforts must be insulated from short-term political cycles, enabling continuity, strategic focus and enduring public trust

The Case for Global Catastrophic Risk Infrastructure Planning

The Draft Plan contains a section laying out the relationship between Infrastructure and Economic Growth (p.15). While insightful, this section misses the crucial fact that Infrastructure that is resilient to a range of global catastrophic risks, not just climate change and local natural hazards, prevents slowing of economic growth by acting to **avert the iterated expenses of repair, recovery, and unplanned transformations, which operate as a drag on compound growth**. Investment in resilience infrastructure projects tends to offset anything up to 10 to 15 dollars of downstream harm for each dollar invested. This is a key factor determining economic growth.

The Draft Plan correctly identifies that "nothing is more certain than maintenance and renewals" and emphasises the need for resilient infrastructure. However, while it addresses conventional natural hazards and climate change, it does not adequately consider scenarios where NZ might face prolonged isolation from global supply chains and systems. Nor does it consider, for example, the likes of NEMA’s new Space Weather Plan (relating to potentially catastrophic solar storms) and the implications therein for catastrophic and prolonged electricity failure.

NZ’s current key vulnerabilities include:
- 99% dependence on liquid fuel imports (as examined in the recent NZ National Fuel Security Study, and marginally addressed in the new Draft National Fuel Security Plan)
- Heavy reliance on overseas cloud providers and digital infrastructure (and a risk of loss of sovereignty, as we saw in microcosm with the ICC losing Microsoft email access).
- Limited domestic manufacturing of critical components
- Centralised infrastructure systems vulnerable to cascading failures
- Insufficient inter-island and trans-Tasman transport redundancy

Research suggests that nuclear war scenarios alone could cause over NZ$1 trillion in damages to NZ, even without direct targeting. When considering the aggregate probability of multiple catastrophic risks, the economic justification for resilience investments beyond climate change and local natural hazards becomes compelling, especially given that many investments provide co-benefits during normal operations and for climate adaptation.

Key Infrastructure Investment Recommendations

The following are all infrastructure projects that we recommend (and all could be added to the Infrastructure Priorities Programme - to which we would have submitted ourselves if we had more resources).

Energy Security and Fuel Independence

Current Gap: The Plan focuses on decarbonisation but lacks consideration of energy independence from global supply chains during extreme disruption scenarios.

Recommendations:
- Develop a minimum domestic biofuel production capacity, including biodiesel/renewable diesel refining capability (this can be integrated with the Draft National Fuel Security Plan)
- Establish biofuel feedstock production infrastructure (estimated 1-7% of grain-farmed land for canola)
- Implement more distributed fuel storage systems rather than centralised facilities
- Accelerate electrification of transport, rail, and coastal shipping as alternatives to fuel-dependent systems (but be aware that some global catastrophes may disable electrical systems for long periods of time)
- Invest in micro-grids and distributed renewable energy generation with battery storage to avoid catastrophic system-wide outages.

See our peer-reviewed research on mitigating liquid fuel supply risks for agricultural production.
https://onlinelibrary.wiley.com/doi/abs/10.1111/risa.14297

Food System Resilience

Current Gap: Limited consideration of food security infrastructure for scenarios involving global agricultural disruption or trade isolation (and inability to access industrial inputs to agriculture).

Recommendations:
- Establish essential local food processing facilities, including enhanced wheat milling capacity
- Prioritise robust infrastructure in near-urban areas (renewable electricity grid, water supply for irrigation, rail transport links) to facilitate post-catastrophe food supply
- Consider urban agriculture infrastructure, including water planning and processing facilities
- Ensure development preserves highest quality soils in near-urban areas, and invest in food waste to bioenergy/fertiliser for supply chain resilience
- Develop infrastructure supporting diverse alternative protein production (eg, seaweed)

See our peer-reviewed research on catastrophe resilience through urban and near-urban agriculture, efficient crop selection, and necessary infrastructure.
https://adaptresearchwriting.com/2025/05/07/catastrophe-proof-food-security-for-new-zealand-blending-near-urban-agriculture-strategic-crop-selection-and-biofuels-as-insurance-against-global-catastrophes/

Digital Sovereignty and Communications Backup

Current Gap: While cybersecurity is mentioned in the Draft Plan, there's insufficient focus on reducing dependence on overseas digital infrastructure.

Recommendations:
- Invest in domestic cloud services and data centers (North and South Island)
- Develop government-controlled open-source technology stack as backup to foreign-controlled systems
- Establish local internet exchange points (IXPs) and backup satellite/microwave communications
- Create physical repositories for critical technical knowledge storage
- Implement resilient electrical systems through system hardening, geographical distribution, and regulatory reforms
- Explore the feasibility and costs of producing a NZ-specific large language model (LLM) trained on all written NZ materials (and perhaps learning from the indigenous LLM project being undertaken by the United Arab Emirates)

Transport and Connectivity Resilience

Current Gap: Limited consideration of transport systems that can function during complete global supply chain breakdown (eg, limited liquid fuel, absent global shipping). A lack of robust Trans-Tasman trade infrastructure owned and operated by NZ. Need for coordination with Australia on supply of complementary goods and services to leverage each other's strengths in a catastrophe.

Recommendations:
- Major investment in rail infrastructure and coastal shipping as alternatives to road trucking
- Develop resilient inter-island transport options beyond current ferry system vulnerability
- Establish regional transport hubs supporting localised transport and reducing long-distance dependencies
- Consider Trans-Tasman trade infrastructure coordination with Australia for exchange of complementary goods and services

Resilience to Severe/Catastrophic Pandemics

Current Gap: NZ has very limited spare hospital bed capacity, no established permanent quarantine facilities, no capacity to produce pandemic vaccines, and no mask production capacity (the last factory to produce masks recently closed). This is in the context of the likely increasing risk of both natural and bioengineered pandemics (references available on request).

Recommendations:
- Explore the feasibility and cost of expanding spare hospital bed capacity and testing capabilities and facilities for pandemic contingency purposes

- Explore a Trans-Tasman pandemic treaty with Australia that covered both shared quarantine facilities and NZ access to new mRNA pandemic vaccines (eg, from the manufacturing capacity being built in Melbourne)
- Explore the feasibility and cost of establishing a permanent quarantine facility capacity (eg, at a military facility such as Ohakea air base).
- Explore the re-establishment of an on-shore mask production capacity (or alternatively near-shoring with access to Australian products).

Integration with Existing Plan Framework

These recommendations align with and strengthen the Plan's existing framework:

Establish affordable and sustainable funding: GCR resilience investments provide exceptional return-on-investment when considering trillion-dollar damage scenarios and multiple risk benefits.

Clear the way for infrastructure: Spatial planning should incorporate GCR resilience considerations, and policy stability should include long-term catastrophic risk governance and planning.

Start with maintenance: Asset management should consider infrastructure designed for independent operation during global system failures, ensuring maintenance of what NZ needs in the absence of global supply.

Right-size new investment: Project appraisal should evaluate resilience benefits against extreme scenarios, not just conventional cost-benefit analysis, invest in red-teaming capability and exercises as part of national infrastructure.

Specific Sectoral Recommendations

Electricity and Gas (Section 7.4): The forward guidance noting significant investment needs for decarbonisation should explicitly include distributed generation, micro-grids, and fuel independence considerations.

- The advice should be directly connected to the NZ Fuel Security Study commissioned by the NZ Government and the important critiques of that study's shortcomings.
- Resilient electrical systems can be built through system hardening, geographical distribution, micro-grids, and regulatory reforms—but require deliberate planning and investment.
- This is particularly salient given NEMA's recent Space Weather Response Plan, which details the potential for weeks or months of electrical outage, but with no plan for preventing or mitigating this.

https://adaptresearchwriting.com/2025/03/05/beyond-90-days-a-critical-analysis-of-nzs-2025-fuel-security-study/

Telecommunications (Section 7.5): The 13% of homes without fibre access represents a critical vulnerability that should be addressed through backup communication systems and domestic digital infrastructure. This is a particular vulnerability in terms of severe pandemics requiring a period of working-from-home and home-schooling.

Land Transport (Section 7.2): Investment planning should prioritise rail and coastal shipping as fuel-efficient alternatives, especially during potential liquid fuel import disruption (eg nuclear war, or a continent-spanning Indonesian supervolcano eruption closing Asian shipping infrastructure).

Water and Waste (Section 7.3): Infrastructure planning should consider water security for food production during global agricultural disruption scenarios (eg, reduced rainfall in nuclear winter scenarios).

Implementation Pathway

We further recommend that the Commission:

1. Add GCR considerations to the Infrastructure Needs Analysis to model infrastructure demands under extreme global disruption scenarios, systemic stresses, and polycrisis.
2. Incorporate catastrophic risk assessment into the Infrastructure Priorities Programme evaluation criteria.
3. Develop cross-sectoral cascade failure modelling and capability (as infrastructure) to understand how (eg, fuel or digital) system failures could impact all other sectors.
4. Establish coordination mechanisms with Australian authorities for Trans-Tasman resilience infrastructure planning.
5. Update forward guidance to include infrastructure investments that provide "alternative capabilities" for extreme scenarios.

Overarching Point: Incorporate Resilience Assessments

- In light of the risks and gaps identified above, we submit that the Infrastructure Commission should consider including more explicit requirements that infrastructure investment decisions must incorporate resilience assessments - across the full range of risks, including global catastrophic risks.
- Such assessments should employ appropriate discount rates when looking at longer term resilience outcomes (eg zero to 1% discount for 30, 50, or 100-year timeframes, so as not to discount future generations' wellbeing to zero).

Critical Infrastructure and Emergency Management

We note that the DPMC consulted on “Strengthening the resilience of Aotearoa New Zealand’s critical infrastructure system” back in 2023, to which we made a full submission, you can read it here.

However, we also note that this consultation does not appear to have led to any legislative progress, and similarly the previous Draft Emergency Management Bill was scrapped in its original form. As such, we are concerned that progress on ensuring New Zealand infrastructure needed to weather global catastrophes is lacking.

The New Zealand Infrastructure Plan needs to be intimately integrated with legislation ensuring the resilience of critical infrastructure in the face of global catastrophe scenarios, and also with policy and legislation around emergency management. These are absolute minimum requirements.

Improved infrastructure risk assessment processes and risk management plans to include catastrophic risk could be facilitated by the institution of a National Chief Risk Officer, or similar, to look across all hazards. The Draft National Infrastructure Plan could acknowledge this.

Conclusion

The Draft National Infrastructure Plan provides an excellent foundation for NZ’s resilient infrastructure future. However, by incorporating global catastrophic risk considerations, and looking beyond NZ’s borders to the global stresses, and systemic risks impacting the world, we can ensure that infrastructure investments not only serve normal operational needs and climate adaptation, but also provide civilisational resilience against low-probability, high-impact scenarios that could otherwise cause catastrophic damage to NZ’s society, wellbeing, and economy.

Such investments represent prudent risk management that protects against multiple catastrophic scenarios while providing co-benefits for energy security, climate resilience, and economic competitiveness during normal operations. We urge the Commission to integrate these considerations into the final National Infrastructure Plan to ensure New Zealand's long-term resilience and prosperity.

As mentioned above, we would be pleased to provide additional technical detail on any of our recommendations and do a presentation to the Commission on the topic of “building infrastructure resilience in NZ to global catastrophic risks”.