

Meeting Date: 10 August 2022

PRESENTATION FROM THE INFRASTRUCTURE COMMISSION

SECURITY AND RELIABILITY COUNCIL

This paper provides the SRC with information about the Infrastructure Commission and its role in the transition to a low emissions future for New Zealand.

Note: This paper has been prepared for the purpose of the Security and Reliability Council (SRC). Content should not be interpreted as representing the views or policy of the Electricity Authority.

The Infrastructure Commission

- 1.1.1 As part of its theme of climate change for the August meeting, the SRC has asked the secretariat to invite the Infrastructure Commission to present on its work relevant to the New Zealand electricity sector.
- 1.1.2 The Infrastructure Commission was established in 2019. Its purpose is to improve New Zealanders' lives through better infrastructure.
- 1.1.3 Infrastructure is defined as "A system of inter-connected physical structures that employ capital to provide shared services to enhance wellbeing"¹
- 1.1.4 Infrastructure is made up of layers of connected systems and networks. These deliver services we depend on like power, water, transport, healthcare and education. A common factor is it allows us to share resources so we can be more connected, healthier, smarter and innovative.²
- 1.1.5 Electricity (energy) infrastructure (together with telecommunications) is different from most other infrastructure, as it is operated commercially, with funding sourced from charging consumers. Their investments are financed from private sources and independent regulators constrain their revenue and/or prices.³
- 1.1.6 The aim of the presentation is to provide the SRC with an understanding of the Infrastructure Commission's work and how the Infrastructure Commission, through *Rautaki Hanganga o Aotearoa* (New Zealand's Infrastructure strategy) is guiding the sector to ensure a better future for New Zealand.
- 1.1.7 The presentation will give an overview of the Infrastructure Commission's work and how that is evolving. The Infrastructure Commission will also outline what it sees as the electricity industry's role in assisting the transition to increased renewable energy and what issues it considers need to be managed to ensure reliable supply during the transition to a low emissions future.
- 1.1.8 The Infrastructure Commission has also been asked to give its view of what the SRC needs to be aware of when advising the Authority Board.
- 1.1.9 This presentation complements presentations by MBIE and the Climate Change Commission at this meeting, all of which are focusing on the various roles of industry and regulators in meeting the government's aspirations, as New Zealand transitions to a low emissions future.
- 1.1.10 The Chief Executive of the Infrastructure Commission will attend and present and be available for questions.

Questions for the SRC to consider

The SRC is asked to consider the following general questions.

¹ [About Us | New Zealand Infrastructure Commission, Te Waihanga](#)

² Rautaki Hanganga o Aotearoa (New Zealand Infrastructure Strategy), at p19

³ Ibid, at p20

- Q1. What questions does the SRC have for the Infrastructure Commission?**
- Q2. What gaps, if any, in the Infrastructure Commission's approach does the SRC consider should be addressed?**
- Q3. How can the SRC support the Infrastructure Commission to monitor progress toward the country's goals?**
- Q4. What advice, if any, does the SRC wish to provide to the Authority?**

Appendix A: Presentation from the Infrastructure Commission

Resilient energy systems

**New Zealand Infrastructure
Strategy - Rautaki Hanganga o
Aotearoa
2022 – 2052**

**Ross Copland
Chief Executive, Te Waihanga
10 August 2022**



Te Kāwanatanga o Aotearoa
New Zealand Government

Disclaimer - This presentation contains general information and is not formal advice. It is recommended that you seek independent advice on any matter relating to the use of the information. We will not be liable for any loss or damage whatsoever arising from the use of the information.

Rautaki Hanganga o Aotearoa:

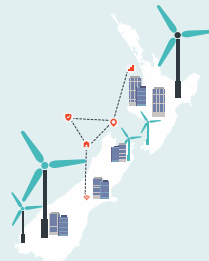
A strategy for



**Net-zero
carbon emissions**



**Flourishing
towns and
regions**



**Attractive and
inclusive cities**



**A circular
economy**



**Resilience to
shocks and
stresses**

Looking Ahead:

The infrastructure challenge



We need to spend **\$60 on maintenance** and renewal for every \$40 we spend on new infrastructure



Infrastructure construction costs have risen **60% faster than prices** elsewhere in the economy



New Zealand will have a shortfall of **118,500 construction workers** in 2024



Half of population growth will be in **five major centres**



New Zealand's population will grow to **6.2 million people** (or more) over 30 years



115,000 more homes are needed to fix the current housing crisis



There is a **75%** chance of an Alpine Fault earthquake by 2070



By 2050 **one in four NZers** will be over the age of 65



\$90 billion to fix up water networks



\$5 billion of council infrastructure is exposed to sea level rise



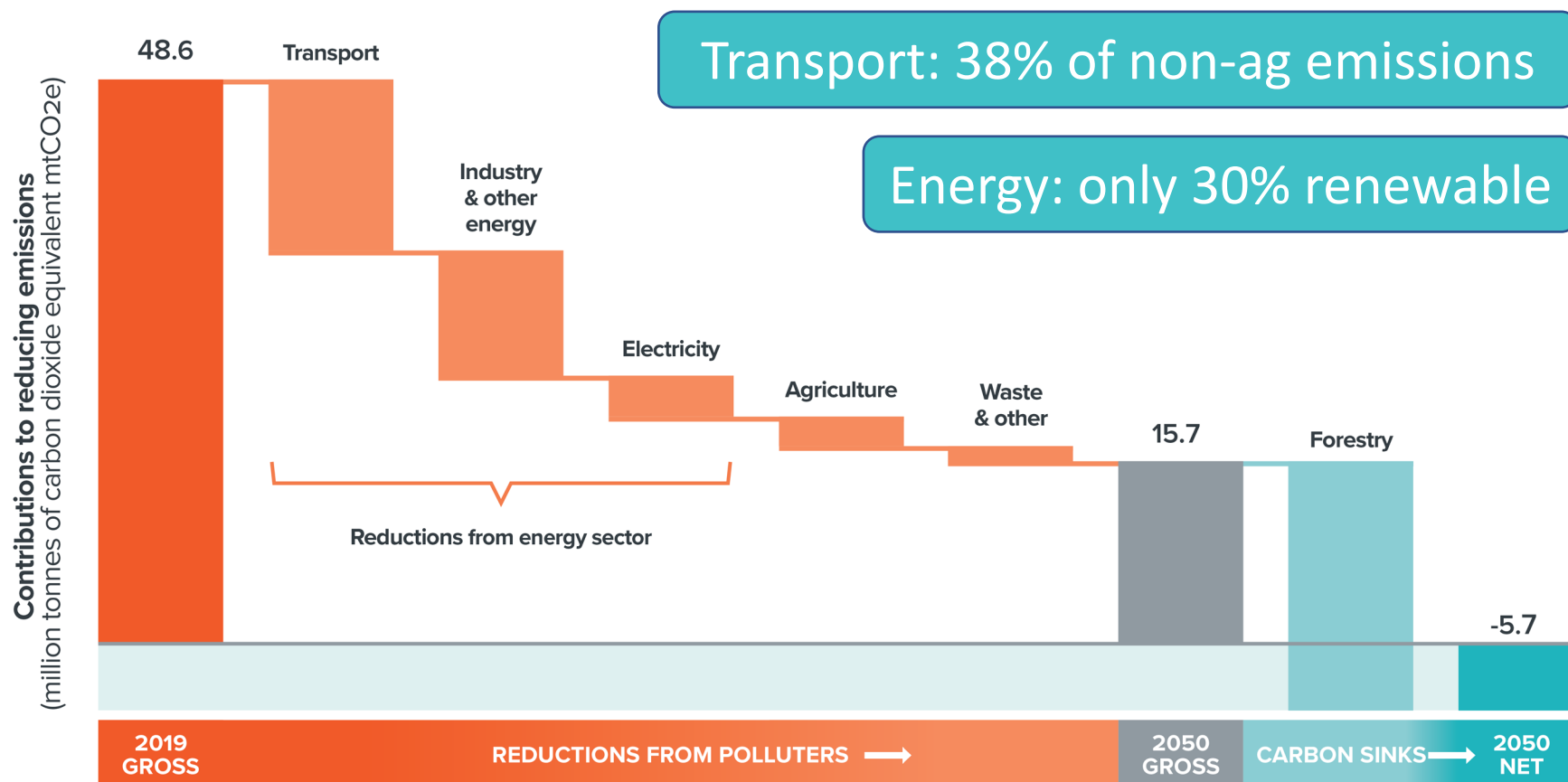
Electricity generation capacity needs to **increase by 170%**



The average Auckland commuter spends over **5 days in traffic** per year

Climate change is an infrastructure problem

Contributions to reducing emissions (million tonnes of carbon dioxide equivalent)

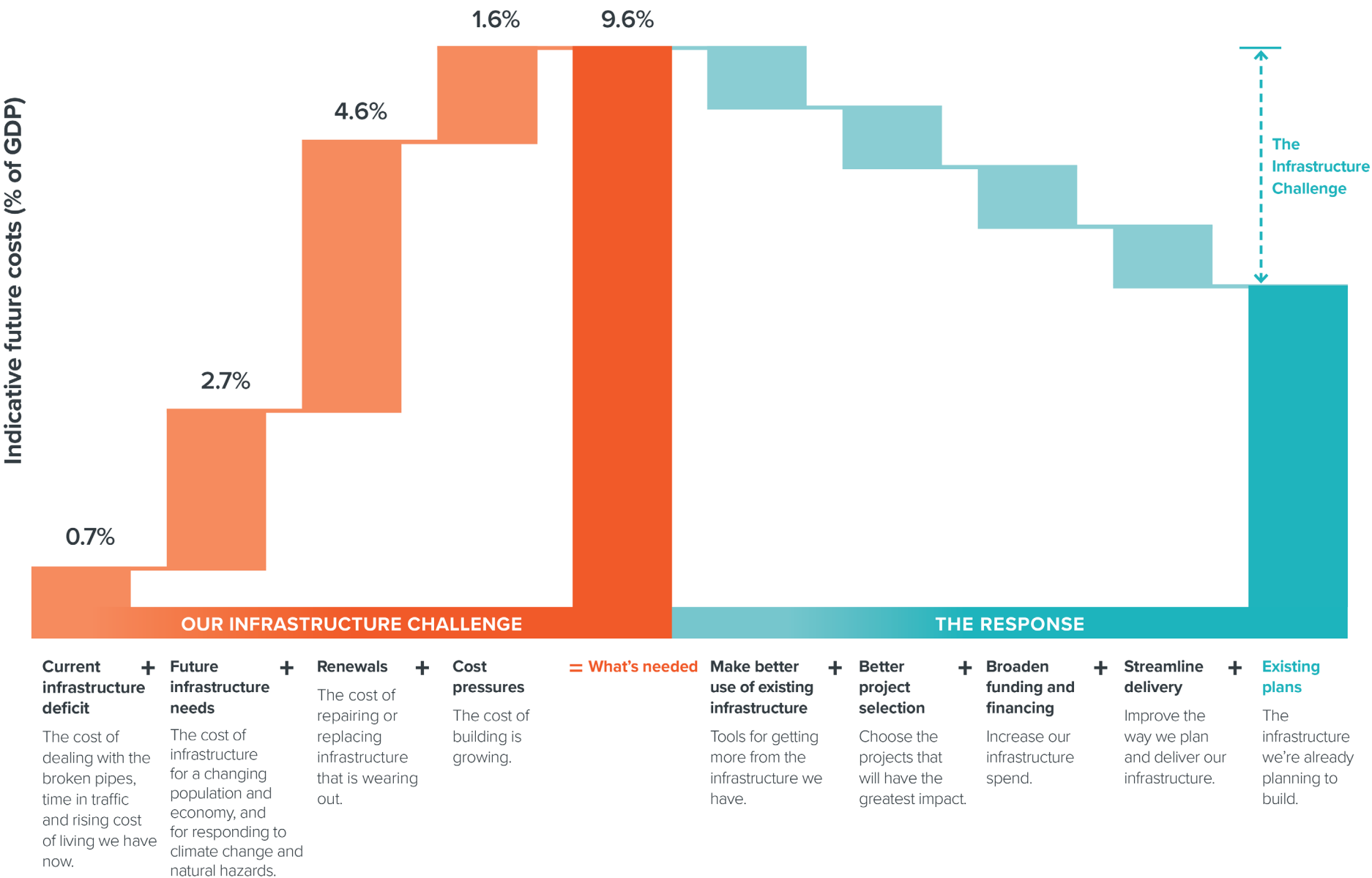


Our infrastructure is vulnerable to hazards

National State Highway network and observed shallow earthquakes from 2010 to 2020



Source: Adapted from Geonet (2021)



Current infrastructure deficit
The cost of dealing with the broken pipes, time in traffic and rising cost of living we have now.

+ Future infrastructure needs
The cost of infrastructure for a changing population and economy, and for responding to climate change and natural hazards.

+ Renewals
The cost of repairing or replacing infrastructure that is wearing out.

+ Cost pressures
The cost of building is growing.

= What's needed

Make better use of existing infrastructure
Tools for getting more from the infrastructure we have.

+ Better project selection
Choose the projects that will have the greatest impact.

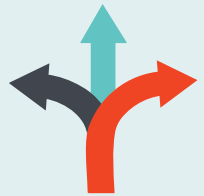
+ Broaden funding and financing
Increase our infrastructure spend.

+ Streamline delivery
Improve the way we plan and deliver our infrastructure.

+ Existing plans
The infrastructure we're already planning to build.

The Case for Change

Lift the performance of infrastructure



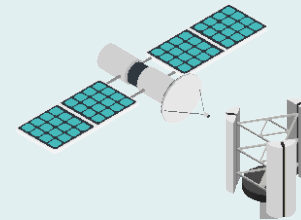
**Better
decision making**



**Improve funding
and financing**



**An enabling
planning
and consenting
framework**



**Accelerate
technology use**



**Build workforce
capability and
capacity**

How resilient is our energy supply chain?

The Electrification of Everything

Southland milk and meat plants to electrify coal-fired boilers in a bid to decarbonise industrial process heat

Southland reporter · 15:33, Sep 30 2021



new zealand
autocar
magazine

HOME NEWS REVIEWS ELECTRIC COMMERCIAL INDUSTRY BIKES CLASSICS MOTORSPORT

Home > Electric

NZ electric vehicle sales soared in 2021, but still 'not enough' for govt targets

Words: Matthew Hansen

February 2, 2022



Land bought for \$1 billion bid to turn Southland into global IT hub

Tom Pullar-Strecker · 05:00, Jan 17 2022



KAVINDA HERATH / STUFF

Datagrid has revealed the location for its Southland data centre between Taylor Rd and Flora Rd East in

Data centre could be mining cryptocurrency in Central Otago by October

Debbie Jamieson · 13:57, Apr 03 2022



CHE BAKER/STUFF

HW Richardson takes 'uncommercial' plunge into hydrogen



Brent Melville
Fri, 17 Jun 2022

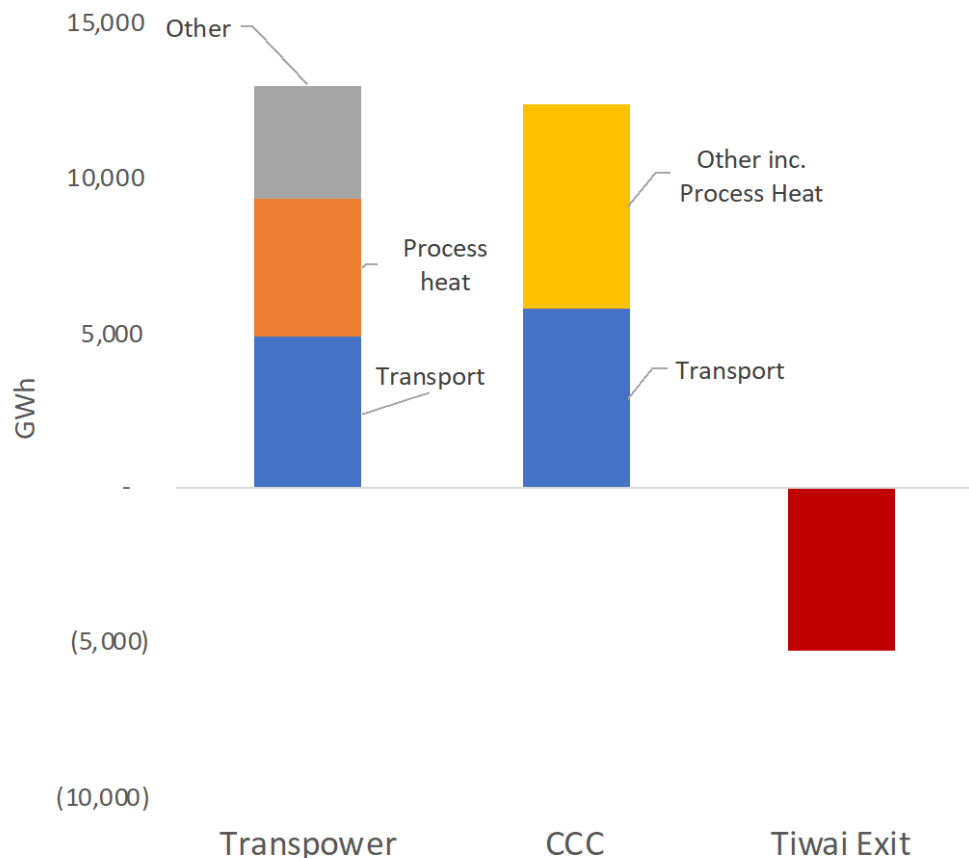


Anthony Jones says HW Richardson is taking the lead on hydrogen adoption. (Image: HWR)

The Electrification of Everything

Sources of Demand Growth 2021-2035

Climate Change Commission, Transpower



More of society and the economy reliant on electricity.

"There is clear evidence that New Zealanders have higher expectations of security of supply than the current standard provided for, and the costs to consumers of non-supply were higher than previously thought. Ultimately, however, the level of security of supply is dependent on what consumers are prepared to pay."

Report of the Electricity Shortage Review Committee - 1992

Network seismic resilience

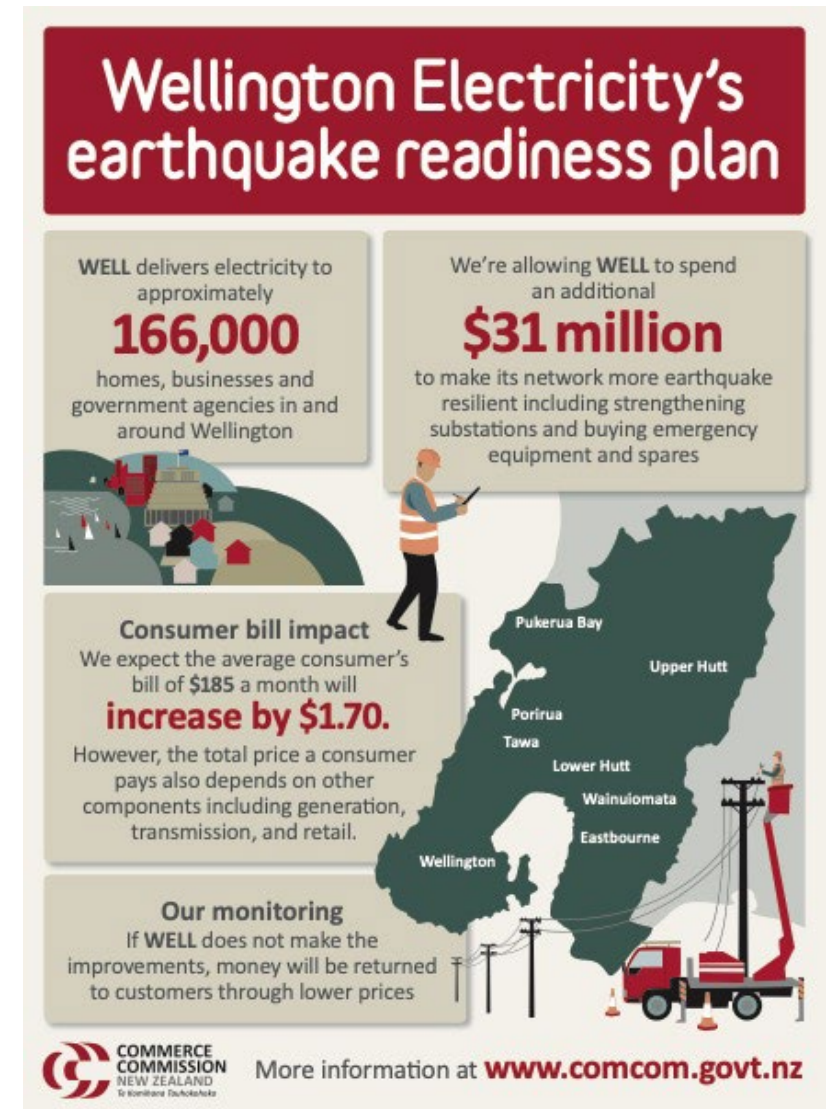
Government Policy Statement—Resilience of Electricity Services in the Wellington Region

*“Lifeline utilities are **expected to respond to any material change in hazard information** (such as changes in the hazard environment or new information regarding risks and vulnerability).... Electricity services, in particular, are **essential to the normal functioning of businesses and households**.... lifeline utilities that are regulated under Part 4 of the Commerce Act **should be able to recover reasonable costs** arising from their duties under the CDEM Act.”* Source: <https://gazette.govt.nz/notice/id/2017-go4910>

Will other network companies ultimately face these costs?

How are we measuring and applying resilience (and its costs) in lifeline utilities?

Source: Te Waihanga



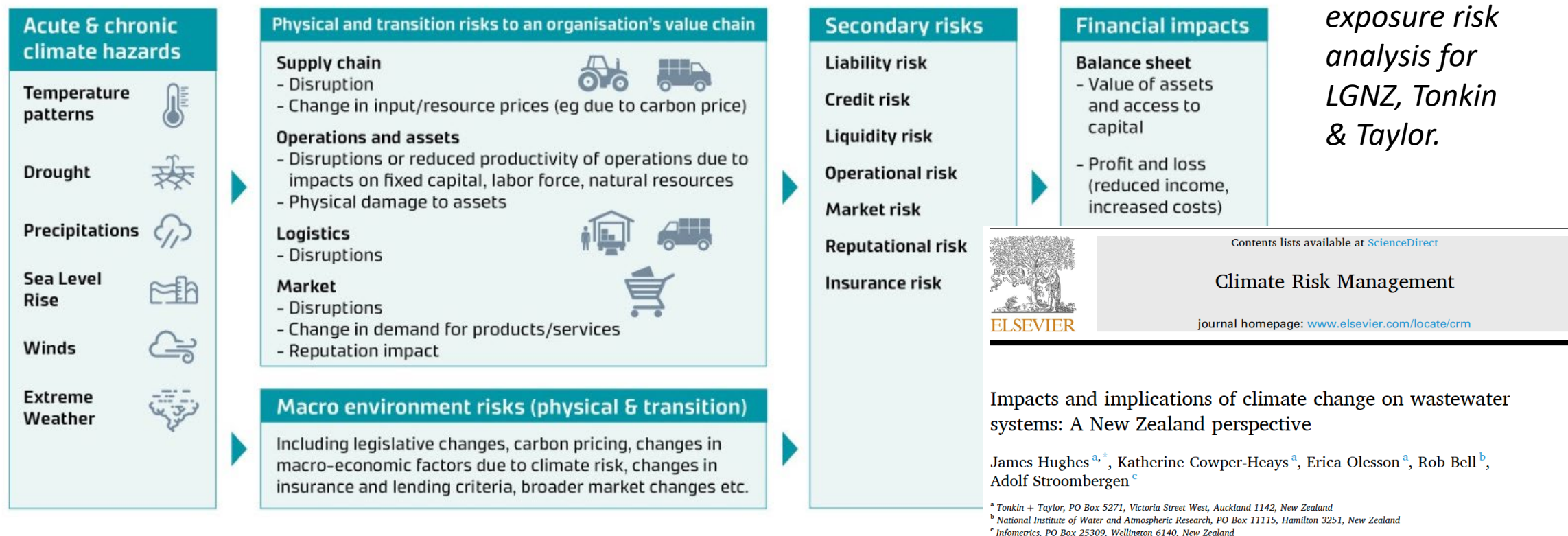
Resilience standards for infrastructure

- **Expectation of resilience now extends beyond seismic to climate as well**
- **Not just EDBs, but generation as well (generation included in the definition of energy as a lifeline utility in Draft National Adaptation Plan (p65 Draft NAP))**
- **What level of resilience are we aiming for? What will it cost? What data/frameworks are needed to ensure consistency?**
- **Proposed objectives for infrastructure under draft NAP:**
 - **Reduce the vulnerability of exposed assets**
 - **Ensure all new infrastructure is fit for the future climate**
 - **Use renewal programmes to improve our ability to adapt**
- **Critical actions from the draft NAP (led by Te Waihanga):**
 - **Develop a methodology for assessing impacts on physical assets and the services they provide**
 - **Scope a resilience standard or code for infrastructure**

Electricity System Resilience – who has the system view?

The propagation of climate risk for organisations

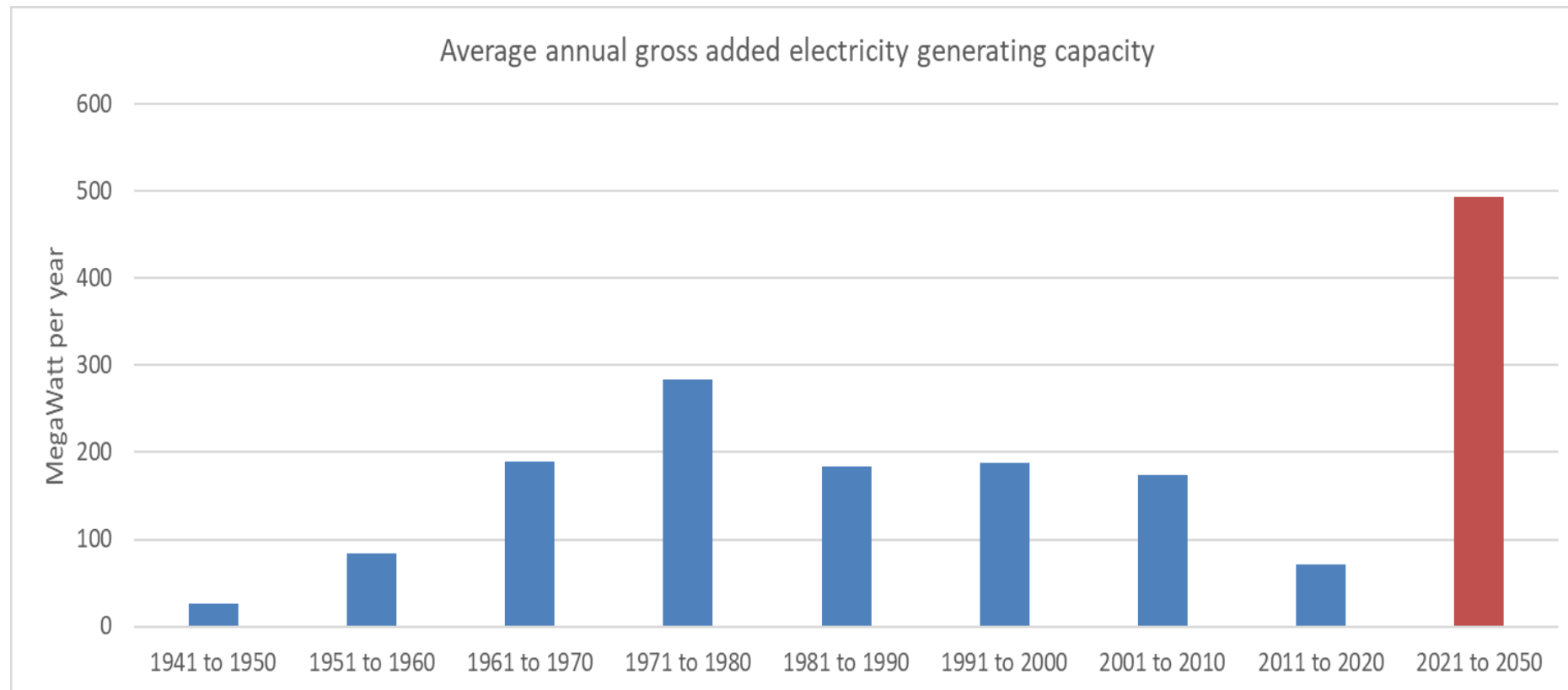
Source:
Climate exposure risk analysis for LGNZ, Tonkin & Taylor.



How can we leverage our energy resources?

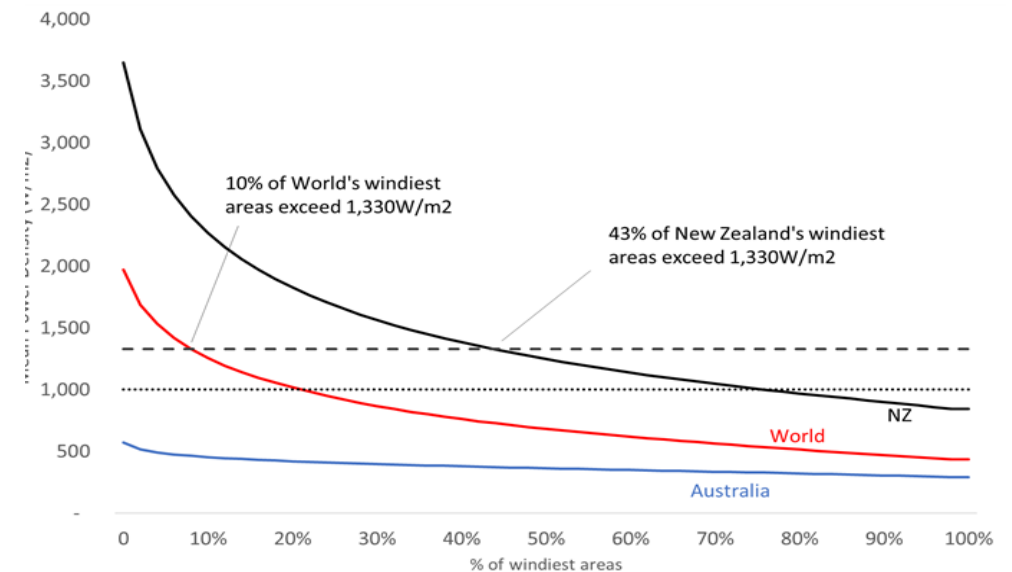
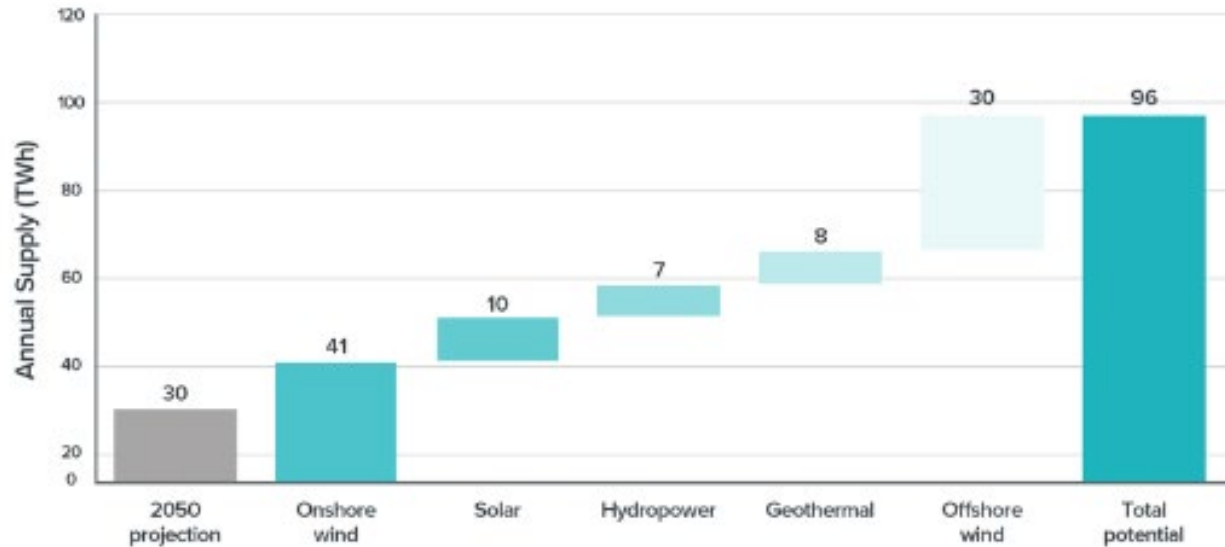
To meet decarbonisation goals, we have a big task ahead of us

We need to add 500MW, or spend \$700M-\$900M, per annum until 2050 to meet our net zero target



But we have abundant resources...beyond domestic needs.

A globally competitive wind resource could drive international relocation of industries



Source: Te Waihangā, data from Climate Change Commission (2021), Ministry of Business, Innovation and Employment (2020)

Consenting is costly and time consuming

The cost of infrastructure consenting processes



CONSENTING
5.5%
OF PROJECT
COST

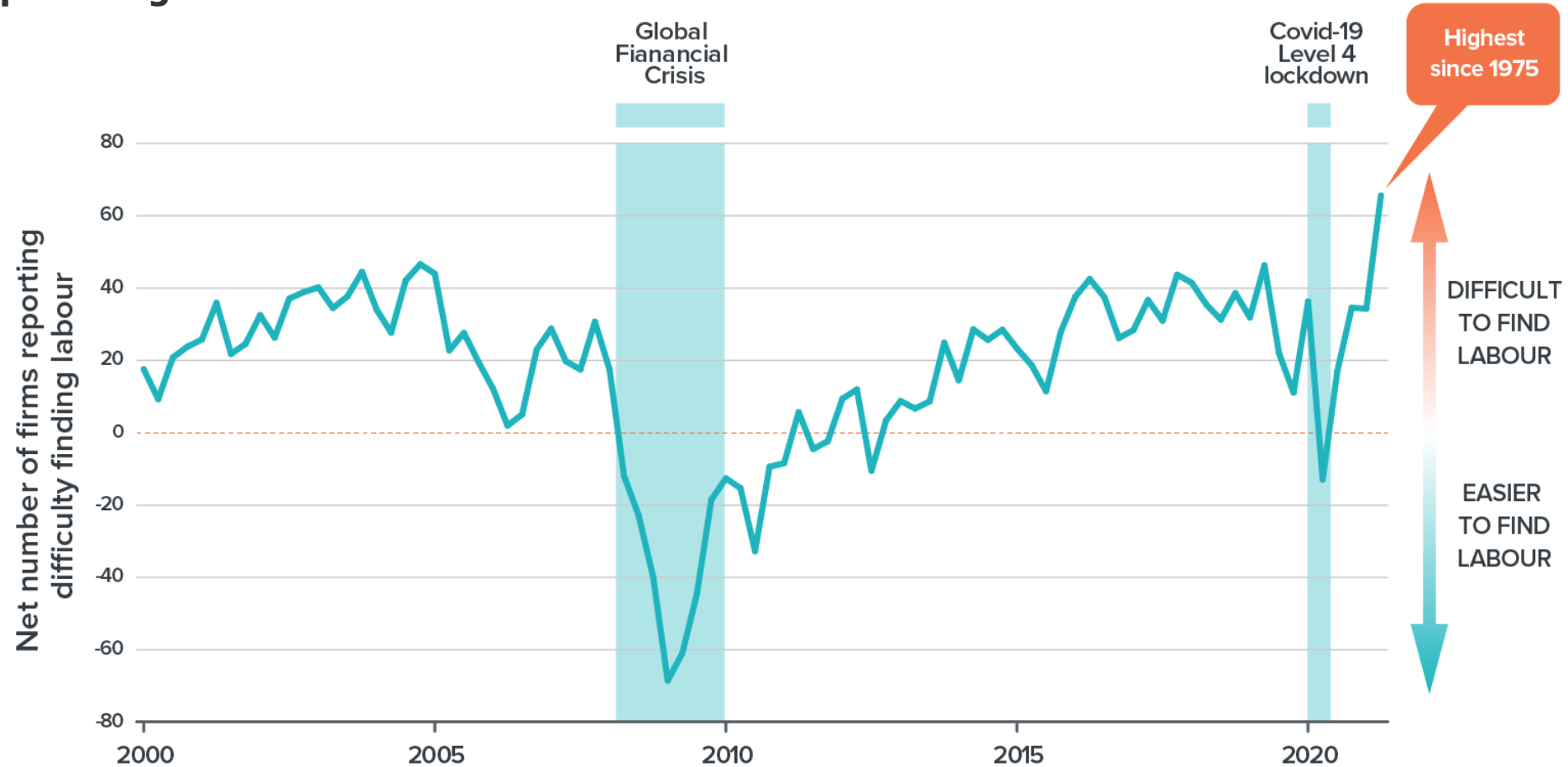
On average the
consenting process
makes up 5.5% of the
cost of infrastructure
projects



New Zealand
infrastructure developers
are spending \$1.29b
annually to consent their
projects

We need 118k more construction workers

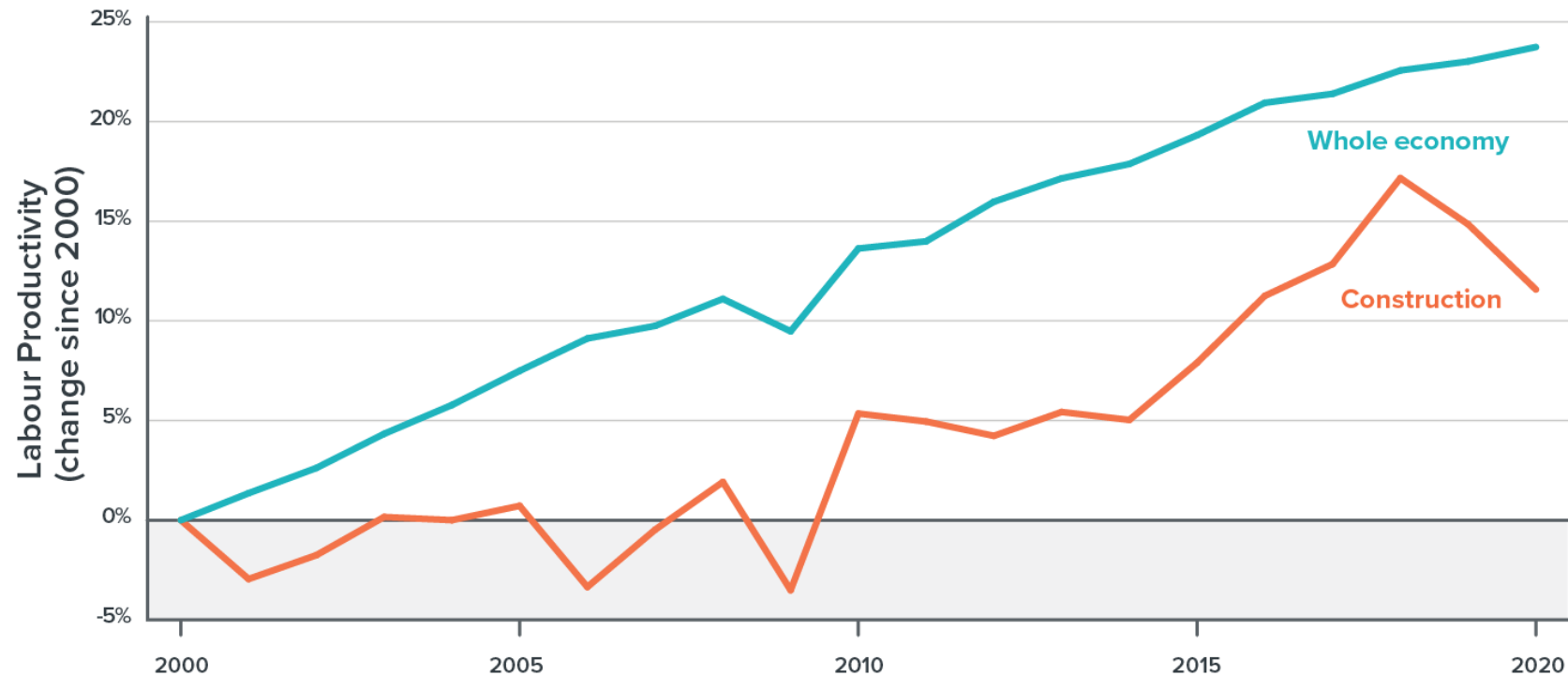
Construction labour shortages are at their highest ever recorded (since 1975), and we face a competitive global market



Source: Adapted from NZIER Quarterly Survey of Business Opinion (2021)

We also have a productivity problem

Labour productivity, construction sector vs whole economy since 2000



Source: Te Waihanga, data from Statistics New Zealand (2021)

Who is safeguarding the resilience of the electricity supply chain?

SRC's Risk Register looks like it takes a whole-of-system view – a useful tool to assess exposure of system to risk:

- More transparency of probability & consequence calculations – materiality is key for SRC, regulators, government and industry
- Be useful to distinguish
 - Root cause from consequential risks – identify systemic risk and interconnectedness of risks
 - Market risks from regulatory/policy risks - ensure consistency in prob/conseq application



Type	Example
Root cause	Unanticipated growth in DG, electrification, EVs
Consequential	LV congestion (M6) LV peak demand (P8), Death spiral (L9) Undersized generation fleet (L5)

Type	Example
Market	Market response to industrial reductions (M1) Undersized generation fleet (L5) Thermal generation (M4)
Regulatory	Review of Tree Regs (M2) RCP3 (M7) EPR implementation (S6) Regulator priorities (S7)