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23 June 2023

BRANZ submission on He Pou a Rangi | Climate Change Commission's draft advice to inform the strategic direction of the Government's second emissions reduction plan

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INTRODUCTION

The Building Research Association of New Zealand (BRANZ) welcomes the opportunity to provide a submission on the Climate Change Commission's draft advice to inform the Government's second emissions reduction plan.

Adapting to our changing climate and its impacts is the most significant opportunity for Aotearoa New Zealand. It is essential to support a just and equitable transition that allows us to prepare for the future and address the most pressing risks facing our country. We think there is more that can be done to effectively equip New Zealanders to respond to the risks arising from our changing climate.

BRANZ is committed to working with our broad network of construction and science system stakeholders to support them on the resultant actions to achieve the Government's aspirations and goals addressing the impacts of climate change and reducing emissions. We will use our unique perspective, which encompasses both the building and construction, and research, science and innovation (RSI) systems, to contribute to this important work.

In this submission, we provide some background on BRANZ's role. This background aims to provide the contextual lens through which we provide more detailed responses to the draft Plan. We look forward to continuing the productive, open, and constructive relationships across government and industry to contribute to this important work. Reducing emissions and adapting to the impacts of climate change, are challenges too important to leave to individual agencies to tackle alone.

ABOUT BRANZ

BRANZ¹, is a multi-faceted, science led organisation. We use independent research, systems knowledge, and our broad networks to identify practical solutions that improve Aotearoa New Zealand's building system performance. BRANZ is driven by the knowledge that to thrive as a society, New Zealanders need a built environment that is safe, healthy and performs well. Our vision is to ***Challenge Aotearoa New Zealand to create a building system that delivers better outcomes for all.***

To do this, BRANZ cultivates strong relationships with industry, government and building users through collaboration and facilitating the sharing of insights, opportunities and ideas. These relationships underpin the range and depth of BRANZ's knowledge and ability to understand the linkages and interactions that influence the building system.

BRANZ undertakes and commissions research, funded by the Building Research Levy, which is both practical and drives positive building and construction system change. This work helps improve industry practices around the performance of buildings and how we use them, through to informing policy and legislation and all points in between.

Our contribution to the knowledge base on climate change

BRANZ has been at the forefront of research addressing the built environment's contribution to climate change and has been helping to drive evidence-based policy by providing expert advice. BRANZ has a history of engaging in climate change research since the year 2000 when we released the seminal *Implications of Climate Change for the Construction Sector report*.

Today BRANZ continues that legacy through both our research and sustainability action as a business. This includes the BRANZ-led multi-year research programme: Transition to a zero-carbon built environment². We regularly contribute our research knowledge to the policy development process through engaging with officials and providing submissions to consultations and we recommend the Commission refers to these in the drafting of the final advice to Government³.

We are also creating new pathways to help support the building and construction system to address and adapt to climate change and other environmental issues. For example, over the course of 2021, BRANZ led the Environment Workstream of the Construction Sector Accord⁴. This work developed a *Construction Sector Environment Roadmap for Action* which had actions to support the construction sector to achieve three important goals to be achieved by 2050. These goals are: Zero-carbon construction, circulate construction economy and regenerative construction.

We continue to contribute to the Construction Sector Accord actions of the second Transformation Plan, and support through research the implementation of MBIE's Building for Climate Change Programme. From our research, we know however, that more work and resource is needed to support industry to transition from its current state, if it is going to get anywhere near those 2050 goals. There are multiple challenges to be overcome.

¹ <https://www.branz.co.nz/>

² <https://www.branz.co.nz/environment-zero-carbon-research/transition/>

³ Relevant submissions include those on Climate Change Commission's Call for Evidence (2019); Climate Change Commission's Draft Advice (2021); Ministry of Business Innovation & Employment's (MBIE) Building for Climate Change, programme – Whole-of-Life Embodied Carbon Emissions Reduction Framework; Transforming Operational Efficiency and H1 consultation (2021); Ministry for the Environment' Transitioning to a low-emissions and climate-resilient future plan (2021) and Kia urutau, kia ora: Kia āhuarangi rite a Aotearoa / Adapt and thrive: Building a climate resilient New Zealand – Draft National Adaptation Plan (2022).

⁴ <https://www.constructionaccord.nz/transformation-plan/environment/>

BRANZ FEEDBACK ON THE 2023 DRAFT ADVICE TO INFORM THE STRATEGIC DIRECTION OF THE GOVERNMENT'S SECOND EMISSIONS REDUCTION PLAN

Below we provide more specific perspectives and/or references to work that we have done, supported and funded through the Building Research Levy that is of relevance to the chapters and recommendations.

Chapter 6: Maintaining and Enhancing Wellbeing Through the Transition

Proposed Recommendation 6

Enable a fair, inclusive, and equitable transition for New Zealanders by expanding the scope of the Equitable Transitions Strategy to include compounding impacts of climate change and adaptation as well as mitigation.

BRANZ supports the proposed recommendation to expand the scope of the Equitable Transitions Strategy to include compounding impacts of climate change and adaptation as well as mitigation. We note the Commission's narrative on the role of small-to-medium enterprises. We also think it is important for the expanded strategy to include the role of key sectors, and in particular building and construction. This will be critical to support the transition that is needed.

We know that the construction industry is unprepared to make these transitions. BRANZ recently completed a national survey of 308 construction industry participants, who were predominately employed in the construction trades, as well as in architecture and design. This survey found that:

- 67% had no knowledge at all about calculating greenhouse gas emissions, and
- 50% had no knowledge at all about transition planning, such as retrofitting an existing building to be zero carbon.

Conversely, participants saw industry as not at all competent when it came to understanding embodied carbon. In terms of industry zero-carbon and sustainable practices and experience of enacting these practices:

- Over half of the sample (57%) had no experience in carbon foot printing of design, calculating greenhouse gas emissions (73%), and transition planning (59%)
- the only area where expert knowledge closely matched in-depth experience was in relation to reducing energy demand through passive solar design.

Industry participants responded with what they believed to be the greatest barriers to zero-carbon construction:

- inertia/disinterest from others was ranked highest (28%)
- lack of information: "I don't know what to do" (26%)
- time: "We are too busy with current workloads to do anything about climate change" (23%)
- resources: "Our company doesn't have the resources to support our development in this area" (20%).

When asked about the current education and training for industry on zero-carbon and sustainable construction, the participants were largely neutral (40%) or were somewhat dissatisfied (34%) or extremely dissatisfied (15%) with what is available.

49% of our sample were somewhat or extremely dissatisfied with current education and training on zero carbon and sustainable construction. Therefore, there is a need for government to address equity issues with the uptake of available resource and tools within the construction sector to support the transition to zero carbon construction.

Please refer to:

Lockyer, O. & C. MacGregor (2022) *The Future of Work: Equipping construction professionals with the skills to transition to zero carbon*. SR477 Judgeford, New Zealand, BRANZ Ltd, soon to be on our website at: <https://www.branz.co.nz/pubs/research-reports/>.

Proposed Recommendation 7

Make use of existing mechanisms to manage impacts of climate policies in the interim, rather than delaying climate action.

BRANZ supports the use of existing mechanisms to assist and manage impacts of climate policies. We note that Industry Transformation Plans (ITP) seek to create Government and industry partnerships to grow and transform sectors of the economy with significant potential to contribute to a high productivity, high wage, low emissions economy. The ITP for the construction sector is the Construction Sector Accord. We encourage the Climate Change Commission to suggest to government that the Construction Sector Accord expand its action on climate change, as we highlighted in the Construction Sector Environment Roadmap for Action. In particular taking a greater role in preparing for the implementation of large-scale upskilling in industry to address zero carbon construction and ultimately work towards a circular construction economy.

We also think that there is more that can be done to coordinate the existing mechanisms to ensure that goals are developed in common and there is good communication where appropriate.

Chapter 8: Built Environment

Proposed Recommendation 10

Implement an integrated planning system that builds urban areas upward and mixes uses while incrementally reducing climate risks.

BRANZ is currently undertaking and funding research by external organisations that could help inform work in the area of urban development and reducing emissions.

The project *Communities under Construction* (to be completed end of 2023) highlights some key issues. An integrated planning system that focuses on building urban areas 'up rather than out' requires comprehensive planning to combine a diverse range of land uses while also managing climate risks. The following points apply to planning medium density housing developments in Aotearoa New Zealand, as well as broader climate change considerations.

When it comes to climate change risks, no two regions are the same and each development requires an individualised assessment. A tendency to flood, experience slips, and sea-level rises will inform the planning and design process, particularly where the medium density housing typography may pose egress challenges.

While recent debate has mostly focused on zoning and land use policies to encourage mixed-use development and vertical growth, water – whether an excess or lack thereof – remains a largely underexplored area. In-depth analysis of soaks and impervious surfaces is lacking, while poor water infrastructure has stymied developments on New Zealand's city fringes.

Compact urban design principles that minimise sprawl and maximise efficient land use have the potential to promote walkability and reduce transportation emissions. However reduced requirements to provide green spaces, along with roading widths which are unsuitable for buses, remain a problematic aspect of some Auckland-based developments. A mixture of incentives and regulations may partially address these issues, however international evidence suggests expensive climate-

resilient practices are predominantly passed on to the buyer, while incentives (such as density bonuses) tend to be internalised.

BRANZ has funded the following projects to support our Transition to a Zero Carbon Built Environment research project to achieve its aim: by 2050 the building and construction industry is delivering net-zero carbon buildings in an affordable way. Please contact BRANZ to find out more about the following projects:

- Reducing Greenhouse Gas Emissions in Communities, WSP New Zealand Ltd – the recently completed technical report to be released soon.
- Best-practice Urban Form for Emission Reduction, University of Canterbury – scheduled to finish early-2024.
- Pathways to Net-zero Buildings and Communities, University of Canterbury – scheduled to finish mid-2025.
- Climate Impacts of Medium Density Housing Expanded Assessment Tool, Beacon Pathway – scheduled to finish end of 2023.

Proposed Recommendation 11

Incentivise comprehensive retrofits to deliver healthy, resilient, low emissions buildings.

BRANZ supports actions and incentives to address emissions reduction from our existing building stock. Massey University and BRANZ research has found that the climate impact of New Zealand residential buildings in 2018-2050 is projected as 170 MtCO₂eq, with pre-existing residential buildings contributing 63% of the total climate impact. Of that 63% detached housing is the largest contributor (77%), followed by Medium Density Housing (14%), and Apartments (9%) (McLaren, et al., 2020)⁵.

Given the high impact of pre-existing dwellings, understanding what a low carbon retrofit means in terms of emissions (especially embodied carbon emissions) is critically important. BRANZ is currently undertaking research that will help fill this knowledge gap and create guidance for the building and construction industry. This research, *Low Carbon retrofitting solutions for our changing climate* and associated guidance is expected to be completed in 2024.

Proposed Recommendation 12

Prohibit the new installation of fossil gas in buildings where there are affordable and technically viable low emissions alternatives in order to safeguard consumers from the costs of locking in new fossil gas infrastructure.

The restriction on gas connections is intended to include:

- ***New buildings, whether in new subdivisions or in existing centres where gas is piped.***
- ***Network piped gas and delivered LPG bottles.***

BRANZ supports efforts to prohibit the new installation of natural gas in buildings in an effort to reduce operational carbon within dwellings. Operational energy use is a significant contributor to a building's carbon footprint. McLaren and others⁶ have found that 59% of a residential building's carbon footprint over 90 years relates to energy use, such as plug loads from appliances, space heating and cooling and lighting. The Commission's recommendation will bring Aotearoa New

⁵ McLaren, S. J., Chandrakumar, C., Dowdell, D., Bullen, L., & Jaques, R. (2020, November). Application of absolute sustainability assessment to New Zealand residential dwellings. In *IOP Conference Series: Earth and Environmental Science* (Vol. 588, No. 2, p. 022064). IOP Publishing.

⁶ Ibid.

Zealand in line with policies in other comparable countries such as Canada and the United Kingdom. While addressing operational carbon in new dwellings is critically important, BRANZ research undertaken by Roman Jaques and Louise Bullen⁷ found that "operational energy use is the largest contributor to the total cumulative 2020–50 carbon footprint and this is predominantly made up on pre-existing dwellings". We encourage the Commission to explore what incentives and policy options could be made available to support the transition of existing dwellings away from using natural gas and other initiatives, such as energy and carbon certificates to reduce operational carbon in existing dwellings. BRANZ also recommends the Commission encourages the Government to continue to invest in initiatives to inform and educate consumers on how to identify energy efficient appliances through EECA's Equipment Energy Efficiency initiative and to ensure that minimum Energy Performance Standards (MEPS) and mandatory Energy Performance Labelling (MEPL) initiatives used and enforced.

Chapter 13: Research, Science, Innovation and Technology

We support the narrative in the Research, Science, Innovation and Technology (RSI&T) chapter and the articulation of some of the challenges for this system. We note the report stops short of providing any recommendations, largely because of the work that is underway to support reform in the RSI&T system through the Te Ara Paerangi – Future Pathways programme.

We recommend the Commission considers the value of a recommendation which encourages better coordination and coherency across the research system on climate research and outcomes and underscores the value of better data and information to support the transition. We hope the Environment and Climate Research Strategy under development will work to address these aspects too.

There is also an important role for independent research organisations, such as BRANZ, to play as key centres of research capability and drivers of impact from research. These organisations have a unique place in the RSI&T system, where they sit independent of both government and industries or sectors they support. They take the long-term strategic view and investment in their research and capability because of that independence sitting at the interface between research, the private sector and government.

We know the research BRANZ has done, and supported others to do, in areas relevant to the Commission's work highlighted in this submission has only been possible because of that position we have in Aotearoa New Zealand.

Chapter 15: Circular Economy and Bioeconomy

BRANZ supports the aspiration of working towards a circular economy, and the development of the circular economy strategy being led by MBIE. The work BRANZ did to lead the development of the *Construction Sector Environment Roadmap for Action* is relevant. A construction sector contributing to a circular economy is one of three key longer-term goals for the sector alongside:

- zero-carbon construction - meeting the obligations under the Climate Change Response (Zero Carbon) Amendment Act 2019 and,

⁷ See: Jacques, R and Bullen, R. Housing stock strategies responding to New Zealand's 2050 carbon target. BRANZ Study Report SR 478. See: <https://www.branz.co.nz/pubs/research-reports/sr478-housing-stock-strategies-responding-to-new-zealands-2050-carbon-target/>

- creating a regenerative construction system – one that creates new and different value so that building and construction activities help the environment and communities within that environment thrive.

By aligning circular economy goals with other wider aims for the built environment, such as movements towards zero carbon construction and ultimately regenerative construction, we can provide the unified vision so that the built environment and construction sector is clear about how it can contribute to Aotearoa New Zealand's climate and environmental commitments.

From our perspective there are several critical barriers to working towards and implementing a circular economy. This includes reliable waste data, infrastructure support and good guidance. We acknowledge the support and leadership the Ministry for the Environment (MfE) and the Construction Sector Accord are taking in this area, including the partnership BRANZ has with MfE to support action on construction and demolition waste.

BRANZ has commissioned several research projects that could assist in providing evidence to help inform the Commission's work to support and encourage achieving a circular construction economy.

Understanding the impact of biogenic carbon especially from timber that is landfilled is a key knowledge gap. BRANZ and Massey University are undertaking a Building Research Levy and MBIE Building for Climate Change programme-funded study called the *Dynamic Life Cycle Assessment*. This study is looking at biogenic emissions and is expected this study will be completed at the end of 2023. We also have an aligned project being undertaken by Tonkin and Taylor Ltd, *Timber Construction and Demolition Waste*, which will provide improved information on timber waste generation both in building construction and demolition, including composition and fate of timber construction and demolition waste. This work is expected to be completed early 2024.

Another key barrier to the circular economy is the waste infrastructure that is required. This includes off-site waste sorting, reverse logistics to enable to the transporting and markets for material re-use. Funded by BRANZ, the Auckland University of Technology is undertaking a project *Understanding and Redirecting Waste in Residential Construction*. This project will help address some knowledge gaps and provide insights to our waste infrastructure and due for completion in early 2025.

And finally addressing plastic waste in construction is also critical. BRANZ is funding Unitec New Zealand Ltd to undertake a research project: *Plastic Waste on Construction Sites: A Co-operative Approach*. This project seeks to understand the plastic waste generated from different construction typologies over the whole construction period to identify the main cause(s) of plastic waste generation, including packaging materials, componentry and building protectors. This work will be completed mid-2024.