BRANZ on H1 proposal

Recently, BRANZ responded to MBIE's consultation document *Building Code update 2021*. This article provides an overview of the BRANZ response to *Proposal 1 Energy efficiency for housing and small buildings*.

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THE MBIE consultation document was seen as the first step to making buildings warmer, drier, healthier and more energy efficient.

Three progressive options were proposed to increase the minimum insulation levels for roofs, windows, walls and floors for new housing and small buildings. Also, a new more-disaggregated climate zone map to better recognise variations in climate around New Zealand was proposed.

Proposed changes to insulation levels

This is a summary of proposed changes to the current minimum thermal insulation levels:

- Option 1: Halfway to international standards - increase the minimum insulation to a level that is approximately half of that from other parts of the world with similar climates.
- Option 2: Comparable to international standards - increase the minimum insulation to a level comparable with other parts of the world with similar climates.
- Option 3: Going further than international standards - this would put New Zealand's minimum insulation levels ahead of other parts of the world with similar climates.

Implications of the three options on heating

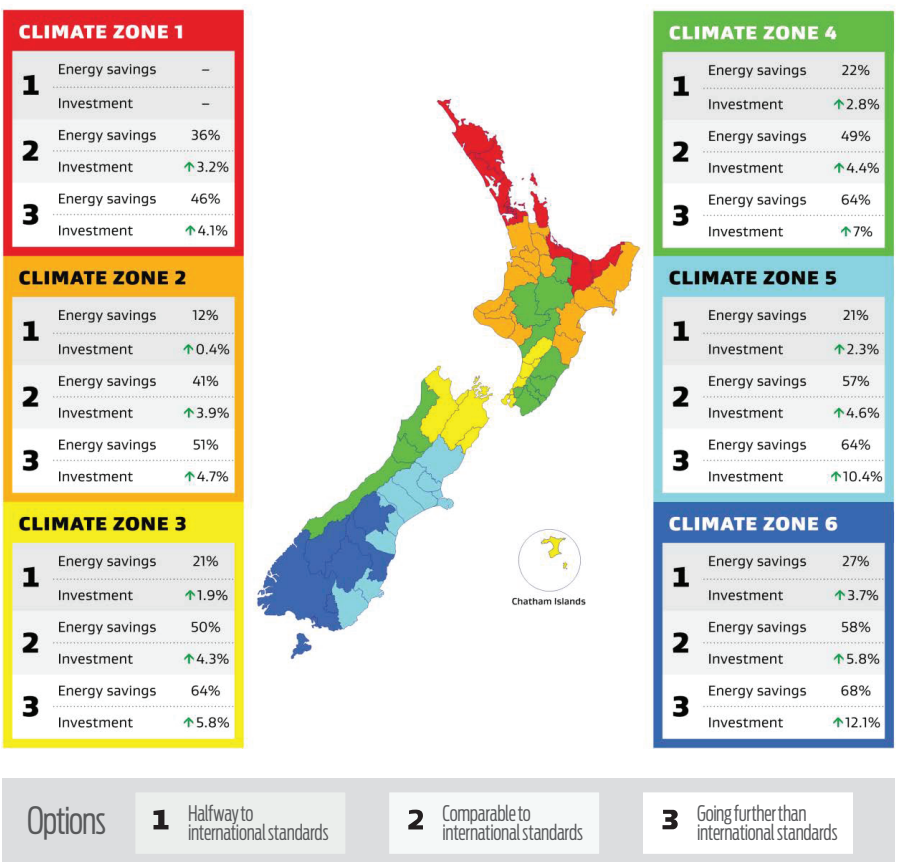

Figure 1: The three proposed options on conditioning energy use and investment cost (Source: MBIE).

and cooling energy use and investment cost can be seen in Figure 1.

Better options available

BRANZ supports MBIE's intent to greatly improve the energy efficiency of new dwellings. This is essential given the multitude of benefits for occupant health, running costs and lifetime climate change impact.

However, BRANZ recommended that MBIE take a more nuanced approach to energy efficiency for housing as there are better options available than just addressing elemental insulation examination - that is, the schedule method - in isolation. This would result in a much better outcome for all New Zealand. There are three main reasons for not relying on the schedule method approach:

- It treats dwellings as an overly simplistic thermal system that does not adequately address issues such as overheating, thermal mass, ventilation and airtightness.
- Recent research findings are undervalued, with some key building science developments not considered.
- There needs to be more alignment to the *Building for climate change* (BfCC) framework, which has a progressive approach and should be reflected in the proposed changes.

BRANZ alternative pathway

Based on this, BRANZ has provided an alternative pathway to improving energy efficiency in new residential buildings:

- The schedule method needs to be retired - only methods that examine the thermal efficiency of houses more holistically and comprehensively should be allowed. Part of this is assessing both heating and cooling needs to ensure year-round comfort targets are met. There are good computer-based modelling tools to deliver such assessment that are already widely used overseas.
- New Zealand needs to progress to performance targets (kWh/m²/yr) for thermal demand. However, detailed modelling by an independent third party is needed to establish viable target values that reflect the local climate. A regionalised thermal performance target using the proposed energy units in the the BfCC document makes more sense and is better aligned globally.
- The progression of new energy efficiency/thermal performance requirements needs to be clearly signalled well in advance. This means providing a roadmap that would signal both the level of desired performance and when changes will occur. This is essential to give the industry adequate lead-in times to plan/resource and adapt to changes effectively.
- It has been recognised that the window/wall junction detail is complex and has important implications for thermal and weathertightness performance. Currently, most window installation details are less than ideal. The recently developed evaluation methods to improve installed glazing performance should be utilised.
- Start implementing alternative design solutions that will deliver better thermal performance. Research found a significant lack of thermal performance in light timber-framed walls. Even relatively simple single-storey buildings of modest dimensions with well-installed insulation struggle to achieve thermal performance currently prescribed in the schedule method. It is going to be even harder to deliver higher thermal performance in walls, floors and ceilings unless design solutions accommodating more insulation and significantly reducing thermal bridging are implemented. This will not be achieved by simply increasing R-value requirements and using traditional methods of construction.
- Thermal losses through wall/floor/ceiling/roof junctions play an increasingly important role as these element insulation levels rise. Ideally, there should be Acceptable Solutions outlining junction details that have heat losses under a set threshold for industry to reference. BRANZ has been working with Passive House Institute New Zealand over the last year to provide reasonably comprehensive high-performance construction junction details in the form of a free reference book. This could be easily adapted to a Verification Method/Acceptable Solution.
- There needs to be explicit guidance to minimise risk of interstitial condensation in building assemblies. Those with a higher level of thermal performance are likely to be more susceptible to interstitial condensation. It is critical to ensure that the new alternative design solutions do not inadvertently create a system where the potential to accumulate moisture outweighs the ability of the assembly to dry.
- Energy models used need to apply more sophisticated methods for determining energy loss due to infiltration/air leaks.
- With the introduction of higher thermal-performance design and specification, some extra checks will be needed in situ both during and post-construction to ensure a quality build results in the expected thermal performance.
- We need to account for both the upfront - embodied - carbon within the materials selected to achieve the new energy efficiency targets as well as the ongoing carbon emissions. BRANZ and Massey University have calculated that, from 2020–2050, building materials in new-build dwellings will contribute between 37% and 50% of the total carbon impact, with the remaining emissions from operational energy. Efforts should focus on reducing both.

BRANZ is committed to creating better outcomes for all. We look forward to the opportunity to work with MBIE and others to further develop resources such as roadmaps, tools and models that would support warmer, more energy-efficient homes for all New Zealanders.

For more See the BRANZ submission at www.branz.co.nz/H1-submission.