BUILDING PERFORMANCE

Consultation submission form

Building Code update 2021

Building Code operating protocols

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

New Zealand Government

Contents

How to submit this form

This form is used to provide feedback on proposals found within the consultation documents:
› Building Code update 2021 – Issuing and amending acceptable solutions and verification methods
› Building Code operating protocols – Referencing standards and a tier framework to support standards in the Building Code system

When completing this submission form, please provide comments and reasons explaining your choices. Your feedback provides valuable information and informs decisions about the proposals.

You can submit this form by 5pm, Friday 28 May 2021 by:
› email: buildingfeedback@mbie.govt.nz, with subject line Building Code consultation 2021
› post to: Ministry of Business, Innovation and Employment, 15 Stout Street, Wellington 6011
or: Ministry of Business, Innovation and Employment, PO Box 1473, Wellington 6140

Your feedback will contribute to further development of the Building Code. It will also become official information, which means it may be requested under the Official Information Act 1982 (OIA).

The OIA specifies that information is to be made available upon request unless there are sufficient grounds for withholding it. If we receive a request, we cannot guarantee that feedback you provide us will not be made public. Any decision to withhold information requested under the OIA is reviewable by the Ombudsman.

Submitter information

MBIE would appreciate if you would provide some information about yourself. If you choose to provide information in the "About you" section below it will be used to help MBIE understand the impact of our proposals on different occupational groups. Any information you provide will be stored securely.

A. About you

Name:	Sam Archer
Email address:	Sam.archer@nzgbc.org.nz

B. Are you happy for MBIE to contact you if we have questions about your submission?

☒ Yes ☐ No

C. Are you making this submission on behalf of a business or organisation??

☒ Yes ☐ No

If yes, please tell us the title of your company/organisation.

New Zealand Green Building Council

D. The best way to describe your role is:

☐ Architect

☐ BCA/Building Consent Officer

☐ Builder or tradesperson (please specify below)

☐ Building product manufacturer or supplier (please specify the type of product below)

☐ Designer (please specify below)

☐ Engineer (please specify below)

☐ Residential building owner

☐ Commercial building owner

☒ Other (please specify below)

☐ Prefer not to say

Please specify here.

Director at Not-for-profit

Proposal 1. Energy efficiency for housing and small buildings

To make buildings warmer, drier, healthier and more energy efficient, we are considering options to increase the minimum insulation levels for roof, windows, walls and floors for new housing and small buildings. The options for minimum insulation levels vary across the country so that homes in the coldest parts of New Zealand will need more insulation than those in the warmest parts. As part of this, we are proposing to issue new editions of Acceptable Solution H1/AS1 and Verification Method H1/VM1 for housing and small buildings.

Questions for the consultation

1-1. Which option do you prefer? (Please select one)

☐ Status quo

☐ Option 1. Halfway to international standards

☐ Option 2. Comparable to international standards

☒ Option 3. Going further than international standards

Is there anything you would like to tell us about the reason(s) for your choice?

Introduction

NZGBC supports the ambition and intended outcomes of Option 3 (while noting that in the long-term, we must be prepared to go beyond the standards linked to this option). However, we do not believe fixed R-values are the best way to achieve the outcomes sought. By taking this pathway, there is a risk of perverse outcomes. NZGBC would prefer to see a rapid move towards a performance-based approach as detailed in the Building for Climate Change (BfCC) programme (please see responses to 1-3 and 1-4 for further detail).

The ambition behind Option 3 provides the only acceptable outcomes for New Zealand buildings

Setting a goal of lifting standards only halfway to comparable international standards is completely unacceptable to NZGBC and it should be completely unacceptable to government, to industry and to the New Zealand community.

Forty percent of New Zealand's existing homes are damp and mouldy and, according to OECD standards, New Zealand homes are poorly constructed and heated, and standards are less stringent than those of many other OECD countries. We need, at the very least, to be truly comparable with international standards that are recognised as appropriate and fit for purpose, if we are to build the healthy homes Kiwis deserve. We need to go further than comparable international standards if we want to achieve the energy efficiency that will help us achieve our emissions reduction targets and if we want to reduce energy bills for kiwi households.

The description of Option 3 indicates our minimum standards for insultation would be lifted beyond those of comparable countries, but this is only partly true. Analysis in the consultation paper shows that some of the requirements would surpass the requirements of countries used as comparisons (Australia, England, Wales & Ireland, and California).

However, even at Option 3, some of the proposed requirements will barely meet some of these countries' requirements, let alone surpass them. In the analysis of Option 2, some of the requirements, particularly for underfloor and wall insulation, fall well short of the standards required in comparable climate zones.

There are many reasons why we can't afford to settle for anything less than Option 3. These include:

- New Zealand has an energy equity problem. Too many households must spend high proportions of their incomes heating cold, inefficient homes. If we are serious about tackling poverty and improving the lives of all Kiwis, we must ensure our future housing stock does not shackle households to high energy bills.
- According to health statistics, 20 New Zealand children are dying every year, while another 30,000 are hospitalised from issues related to poor housing.[1] We can't afford for our new homes to become the cold, damp unhealthy homes of the future because of a woefully inadequate Building Code.
- New Zealand has a clear and legislated goal of achieving a net zero carbon economy by 2050. If we are to achieve this, we must make drastic improvements to energy efficiency in our homes and reducing carbon emissions related to the housing sector.
- The housing sector represents a huge opportunity for improving energy efficiency and reducing the nation's energy demand. If we significantly improve energy efficiency in new homes, we will help to reduce peak demand, free up energy capacity for new technologies such as electric cars, and reduce the urgency for developing new energy generation.
- While there may be some initial challenges for manufacturers and suppliers, lifting minimum standards will create opportunities to provide the materials we need to achieve better outcomes.

Mismatched policies

NZGBC is surprised and disappointed that the proposals for changes to the Building Code do not align with those of the BfCC programme (please see our response to 1-3 and 1-4 below for further comment).

There is no link between the proposed H1 changes and the proposals outlined in the BfCC Transforming Operational Emissions consultation. The two approaches are fundamentally at odds. The H1 changes are based on fixed R-values whereas the BfCC proposals are performance based (kWh/m2 of heating demand). NZGBC has undertaken some preliminary analysis which shows a significant problem arising from the disparate approaches.

NZGBC has modelled three homes with both Option 2 and Option 3 scenarios based on Auckland conditions. These give an average annual heat demand of 42 and 28 kWh/m2 respectively. This is considerably less than the proposed first BfCC cap of 60 kWh/m2 meaning that the implementation of BfCC could see an unintended reduction in required insulation. This will inevitably lead to confusion and frustration for industry.

The confusion between the H1 changes and BfCC is further compounded by the wording in this consultation which states that:

> "…Increasing the level of insulation in buildings represents the first step in the Building for Climate Change programme of work which will continue to transform housing and construction for New Zealanders."

The BfCC Transforming Operational Emissions paper, by contrast, stated that the first step would require that:

> "All new buildings must report against operational efficiency requirements at consent and code compliance stages."

[1] NZ Herald. *Child deaths linked to unhealthy housing 'unacceptable' – health minister*. 30 August, 2017.https://www.nzherald.co.nz/nz/child-deaths-linked-to-unhealthy-housing-unacceptable-health-minister/YJ2MZ7Y4WT2FFI7FYSWQQFQKCY/

However, there are no proposals in these H1 changes to require modelling of overall heating demand, electricity demand or any of the energy demand metrics in the BfCC consultation.

We understand that MBIE would like to implement quick improvements to the acceptable solutions under the current H1 clauses and that requiring energy modelling would entail changes to the primary legislation. However, this mismatch will provide unnecessary regulatory uncertainty for the industry and needs to be addressed, particularly if the intention is to launch the BfCC's first step shortly after the H1 changes come into effect.

NZGBC strongly suggests that MBIE publish further proposals that clarify how these immediate changes to H1 will dovetail with BfCC. NZGBC makes the following suggestions:

a) Indicate that the R-values being put forward in these H1 changes will become R-value *minimums* (i.e., no element to be allowed, on average, to drop below these values) in any future updates to the Building Code brought about under the BfCC programme. This is similar to the 'limiting fabric parameters' in the England and Wales (E&W) Building Regulations which have minimum R-values similar to Option 2 as shown in the table below. This would have the effect of not allowing performance to worsen under the BfCC performance-based approach. Under this approach we would recommend Option 2.

		MBIE proposed Option 2 schedule R-values					
Element	**E&W minimum R-value average for each element**	**Zone 1**	**Zone 2**	**Zone 3**	**Zone 4**	**Zone 5**	**Zone 6**
Roofs	5.0	R5.0	R5.4	R6.0	R6.6	R7.0	R7.4
Walls	3.25	R2.4	R2.6	R2.8	R3.2	R3.5	R3.8
Gnd floor	4.0	R1.9	R2.2	R2.5	R2.8	R3.2	R3.6
Window	0.5	R0.39	R0.42	R0.45	R0.49	R0.55	R0.62

b) Consider how the first BfCC cap could set higher standards, equivalent to the proposed second cap for the warmer New Zealand climates, i.e., 30 kWh/m^2 in climate zone 1 and 2, and halfway (for example, 45 kWh/m^2) for climate zones 3 and 4. This would ensure that the implementation of BfCC is not less stringent than these H1 proposals.

Additional notes regarding the Cost Benefit Analysis (CBA) released to NZGBC through an Official Information Act (OIA) request

The CBA carried out by BRANZ in support of the H1 consultation has a number of areas that we think need improvement before a final decision is made by MBIE on which option to choose:

1) No carbon pricing was assumed in any of the CBA work carried out. While New Zealand does not currently have a carbon pricing mechanism that would affect the cost of fuel for householders, we do have international commitments to reduce emissions. Therefore, these carbon reductions, if not carried out in the building sector, would have to be made elsewhere in the economy. The BRANZ CBA work is narrowly focussed on the cost benefit to building owner/developers and householders without considering the wider impact on the New Zealand economy. It is a significant omission that the carbon emission reductions and carbon pricing

impacts of these policy changes were not quantified in the consultation. A carbon price should be added to the CBA work.

2) While the cost benefit ratios in the analysis were not very high, the important point is that the Net Present Value of many of the individual measures was positive. These options have a negative marginal abatement cost, reinforcing the point that NZGBC consistently makes: that energy efficiency should be prioritised. The marginal abatement 'cost' of some of the R-value improvements was of the order of negative $500 - $2000 per tonne, meaning that New Zealand is saving money while reducing carbon emissions. This is in stark contrast to the estimated marginal abatement costs of decarbonising the electricity supply. The Ministry for the Environment estimated these costs to be around $50 - $500 per tonne.[2]
We note that some of the measures (notably underslab insulation) are shown in the BRANZ analysis to have relatively high cost of carbon. We would like to see further engagement with industry to interrogate these costs and benefits further: i.e. are these the cost accurate, are there learning rates, different techniques for insulating slabs that would have better payback?

3) Discount rates. While a 6% discount rate is current Treasury advice, this is a very high rate for policy related to environmental or social benefit by international standards. The UK, by comparison uses a discount rate of 3% for the first 30 years and then declines this further for subsequent years to account for the intergenerational impacts of policy (i.e., future generations don't have a say). At the very least, NZGBC believes MBIE should present a sensitivity analysis with a discount rate of 3%. Better still, MBIE (and probably MfE) should lobby Treasury to update their guidance on CBA relating to policies with environmental and social benefit.

4) Learning rates. Experience from the UK and elsewhere shows that the cost of higher performance buildings reduces with scale.[3] This is referred to as 'learning rates' in the economic literature. No learning rates were assumed in the modelling.

5) Impact on electrical infrastructure. The reduction in peak electricity demand brought about from energy efficiency improvements will have a clear impact on the cost/benefit (CBA) of each of the options and must be included in the analysis. Excellent work by the University of Otago shows up to an 80% reduction in peak electricity demand through energy efficiency.4 Concept Consulting (for EECA) also quantify the financial benefit of demand reduction on infrastructure.5 This is a crucial argument that is totally ignored in the analysis and H1 proposals.

On a related note, the R-values published as being representative of the England and Wales requirements understate the insulation values required. MBIE has published the limiting fabric values. These are the R-values that no element, on average, can drop below.

[2] Ministry for the Environment. 2020. Marginal abatement cost curves analysis for New Zealand – Potential greenhouse gas mitigation options and their costs. https://environment.govt.nz/assets/Publications/Files/marginal-abatement-cost-curves-analysis_0.pdf

[3] Zero Carbon Hub, Sweett Group. 2014. Cost analysis: Meeting the Zero Carbon Standard. https://www.zerocarbonhub.org/sites/default/files/resources/reports/Cost_Analysis-Meeting_the_Zero_Carbon_Standard.pdf

[4] Jack. M., Stephenson, J., Anderson, B., 2021. Decarbonising NZ's energy system through demand-side intervention – Submission to Climate Change Commission advice consultation. https://eprints.soton.ac.uk/448287/1/NZCCCSubmission_Jack_et_al.pdf

[5] Concept Consulting Group. 2018. https://www.eeca.govt.nz/assets/EECA-Resources/Research-papers-guides/Concept-electricity-efficiency-report.pdf

However, the England and Wales approved document (equivalent to Acceptable Solutions) is performance based and requires the home to have lower heat demand than an equivalent reference home. The reference home has the following R-values (adjusted to account for the 1.15 'fiddle factor' in the UK code and shown compared to the limiting fabric values):

	Limiting fabric values for E&W published in the MBIE consultation	Actual required R-values to meet E&W BC compliance
Roofs	5.0	6.7
Walls	3.25	4.8
Gnd floor	4.0	6.7
Window	0.5	0.6

1-2. For your preferred option, how quickly should this change come into effect?
(Please select one)

☐ 12 months ☒ 24 months ☐ 36 months or more ☐ Not sure/No preference

Is there anything you would like to tell us about the reason(s) for your choice?

The consultation sets out three possible implementation timeframes of 12, 24 and 36 months with the suggestion (alluded to in the consultation document) that the tougher Options 2 and 3 would require longer lead-ins.

NZGBC supports a stepped approach/trajectory and our preferred timeframe depends heavily on the relationship between these proposals and the BfCC proposals. We had expected that the first BfCC cap might be implemented by 2024 at the latest, noting the UN recommendation to halve greenhouse gas emissions by 2030. If the BfCC is to be implemented in a timely manner, then the longer lead-in (36 months) would likely coincide with (or very shortly precede) the first BfCC cap.

Our preferred approach would be:

a) Option 2 within 24 months, on the proviso that there is clear commitment that this would be shortly followed (i.e., within 12 months) by the first BfCC step (modelling only/no targets) and the second BfCC cap (30kWh/m2 heating demand) 12 months after that. It is critical that the H1 section of the Building Code and the BfCC programme should be aligned and clearly "talk to each other" to avoid any confusion and frustration for industry.

b) Failing the communication of clear timeframes to deliver BfCC, then NZGBC's preferred approach would be Option 3 within 36 months, with the longer lead in time to allow industry to gear up for the necessary changes in traditional New Zealand housebuilding methods.

1-3. If there are factors we should consider to progressively phase in your preferred option, please tell us below.

These factors may include material availability or affordability, regional differences in the requirements, different building typologies or other considerations.

As noted in our response to question 1-1, NZGBC favours a rapid transition towards performance modelling as proposed by the BfCC programme rather than fixed R-values.

While addressing insulation is a critical and welcome step for improving the Building Code, NZGBC has concerns that the following issues have not been included in the H1 proposals and we see a real need for further work on these:

- Neither airtightness nor thermal bridges are addressed. These become proportionately more important as insulation levels ramp up.
- Ventilation, interstitial condensation and surface moisture are not addressed. The current proposals risk perverse outcomes if these factors are not considered alongside insulation.
- Other elements such as heating, hot water efficiency and lighting efficiency which also affect energy use (and therefore fuel poverty) and carbon emissions are not mentioned.
- Assessing the risk/mitigating overheating for compact dwellings should also be addressed.

NZGBC notes that these issues may be addressed by the BfCC programme, but the two programmes must be well aligned and able to communicate this. We would appreciate further clarification and/or confirmation of how these issues will be addressed and by which team/programme.

The CBA work carried out by BRANZ for MBIE demonstrates the problems with fixed R-values. The apartment shows very low to negative cost-benefit-ratios: its compact form factor means it inherently has a good thermal performance meaning additional insulation is less beneficial. A performance-based approach would allow more compact typologies such as apartments to have lower insulation levels.

The R-values proposed for Option 3 also increase risk of overheating in compact dwellings such as apartments, and assessing the risk of (or mitigating) overheating is not included in the H1 proposals.

Furthermore, the elemental CBAs (cost benefit of each measure) show wide variation: a performance target (kWh/m^2) would allow the market to come up with the most cost-effective package of insulation measures for a particular building which would significantly improve the economics.

While noted in the consultation we would like to reiterate the importance of aligning improvements in insulation levels with changes to the Building Code clauses and Acceptable Solutions/Verification Methods relating to interstitial condensation, surface moisture and ventilation. The current common New Zealand practice, for example, of insulating concrete cladding internally will increase moisture risk if not addressed.

Finally, the thermal modelling carried out by the CBA shows the limitations of improving insulation alone. The modelling did not show significant improvements in comfort levels (% time above a threshold temperature) and this demonstrates the need to improve other aspects of the building code such as thermal bridges, airtightness, insulation and space-heating (both provision and efficiency).

1-4.

Proposal 1: Energy efficiency for housing and small buildings

Do you support issuing the new editions of H1/AS1 and H1/VM1 as proposed?

H1/AS1: ☒ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

H1/VM1: ☒ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

We broadly support the Acceptable Solution and Verification method proposed. The following summarises some changes that we would like to see, however:

a. Window R-values should be real R_{window} values, not default values based on standard window sizes. The window industry has the WEERS system that allows window suppliers to provide an average R_{window} value for the home and this should be the target. This will reduce the use of window suites with excessive framing.
b. If R1.3 is to be retained for ground floors in the warmer climates this should be the calculated slab R-value not the current situation where an un-insulated slab is deemed to satisfy the R1.3 requirement.
c. Given recent evidence from BRANZ, R-value calculations guidance for walls must be updated to reflect the higher quantities of timber found in practice in NZ walls. A default assumption of 30% should be assumed where no evidence is provided to the contrary.
d. Higher R-values in non-traditional (non-timber) construction. Options 2 and (especially) 3 may present risks for medium and higher density housing if thermal bridging and interstitial condensation are not addressed. Concrete clad apartment buildings typically have insulation applied to the inside face of the concrete and the risk of interstitial condensation will increase if this practice continues with higher insulation values. We strongly recommend measures are put in place to push developers towards external insulation of concrete and metal frame buildings.

Acceptable Solution

2.1.4.1 Acceptable methods for determining the thermal resistance (R-values) of building elements are contained in NZS 4214.

We would like to see the Building Code migrate from NZS 4214 to the international standards ISO6946 and ISO13370. These would bring the calculations of thermal performance to match the European standards instead of having our own unique New Zealand methods of calculations. The window and glass industry has already changed over to ISO10077-1 and ISO10077-2 for the calculation of window performance (WEERS) and this would make the calculations compatible. Again, we would expect the BfCC programme to harmonise with international standards and this should be done as part of the H1 update.

2.1.4.7 Concrete slab-on-ground floors are deemed to achieve a construction R-value of 1.3 $m^2 \cdot K/W$, unless a higher R-value is justified by calculation or physical testing.

The above clause should be removed. R-values for slabs should be calculated according to the international standard.

2.1.3.2 The calculation method shall only be used where the window area is 40% or less of the total wall area.

Amend this to reference the window-to-floor area (WTF) rather than window-to-wall (WTW) area. The ratio of WTF area is more closely linked to thermal performance and reduces perverse outcomes with apartments that often have small external wall areas relative to the floor area.

Appendix D.1

This section on the calculation of window R-values should be re-written to exclude the calculation of window R-values (R_{window}) based on standardised frame sizes. The schedule R-value should be based on the area-weighted R-value of all the glazing in the home as calculated by the WEERS system (this system is fully available to all window suppliers in New Zealand). This would take into account the relatively poor performance of windows with high quantities of framing relative to glazing in the actual home. Remove the performance tables in Subsection D.1.3.

Verification Method

D.1.6 Thermal zones

Noting the BfCC proposals where thermal modelling of homes will become standard (hopefully) we believe that full dynamic multi-zone modelling of homes will be too onerous for the majority of mainstream housebuilders.

MBIE should amend this section to allow simpler single zone models of homes, such as PHPP (and NZGBC's ECCHO tool based on PHPP), that have been shown to be compliant with ASHRAE 140. NZGBC notes that single zone models may not be best placed to assess overheating risk in particular rooms/zones, but they are adequate to assess overall heating and cooling loads. The UK Standard Assessment Procedure is a monthly single zone modelling tool used for compliance with the UK Building Code and is considered to be adequate for homes.

NZGBC implores MBIE to consult with a number of industry stakeholders between now and release of this Verification Method to agree on a 'National Calculation Methodology' for homes that would include thermal demand (heating/cooling) but also overall energy and carbon emissions. This will be required for BfCC and it would be beneficial to align these H1 code changes with that model to allow the sector to quickly get up to speed with modelling homes.

D.2.2 Windows

Amend this to reference the window-to-floor area (WTF) rather than window-to-wall (WTW) area. The ratio of WTF area is more closely linked to thermal performance and reduces perverse outcomes with apartments that often have small external wall areas relative to the floor area.

1-5. What impacts would you expect on you or your business from the proposed options?
These impacts may be economic/financial, environmental, health and wellbeing, or other areas.

There will be initial cost implications in implementing the changes we must have for our homes and buildings and the NZGBC recognises that this may be unwelcome for some, especially given the acute pressure New Zealand's housing market is currently under.

Research and experience from other countries that have made improvements to their building standards show that while costs may initially be high when changes to regulations are introduced, they generally fall again once new practices become embedded and when increased demand and supply of new products is brought on by wide-scale change Research from the UK in 2014 showed that the cost of building to the Zero Carbon Standard for homes roughly halved from cost estimates published in 2011[6] (please also see our response above at 1-1 regarding learning rates).

The key driver of the proposed changes is to improve energy efficiency of new homes and make them warmer, dryer and easier to heat and cool. While there will be some additional upfront cost involved, lifting

[6] Zero Carbon Hub, Sweett Group. 2014. Cost analysis: Meeting the Zero Carbon Standard. https://www.zerocarbonhub.org/sites/default/files/resources/reports/Cost_Analysis-Meeting_the_Zero_Carbon_Standard.pdf

the standards of our homes and improving energy efficiency will reduce energy bills over the life of the home. In addition to easing pressure on household budgets, the potential avoided costs in relation to future hospital admissions and ongoing health issues caused by damp, cold homes, as well as the disadvantages to education and employment opportunities that are caused by inadequate housing, are almost incalculable.

The Intergovernmental Panel on Climate Change has set out that the world needs to halve emissions by 2030. As we have set out in our submission, the improvements proposed in the options 2 and 3 present some of the better carbon reduction opportunities for Aotearoa, significantly better than building more renewable generation. The technology for these carbon reduction steps is readily available now and will help free up electricity that other sectors that need it such as the transition to electric vehicles.

1-6. Is there any support that you or your business would need to implement the proposed changes if introduced?

☒ Yes ☐ No ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

NZGBC notes that industry will need reasonable lead-in time and excellent preparation ahead of any changes. There must be regular, clear communication from Government regarding all aspects of the changes and the timeframes in which they are to occur.

An information and training programme should be tailored to each impacted group, including architects, designers, builders, manufacturers and suppliers, and rolled out across New Zealand through a range of mediums to ensure that the changes are both widely understood.

NZGBC welcomes the opportunity to work with Government to assist with information and training opportunities for industry.

Proposal 2. Energy efficiency for large buildings

To make buildings warmer, drier, healthier and more energy efficient, we are proposing to increase the minimum insulation levels for roof, windows, walls and floors for large buildings. The proposed minimum insulation levels will vary so that buildings in the coldest parts of New Zealand will need more insulation than those in the warmest parts. As part of this, we are proposing to issue a new Acceptable Solution H1/AS2 and Verification Method H1/VM2 for large buildings.

Questions for the consultation

2-1. Which option do you prefer? (Please select one)

☐ Status quo

☐ Option 1. 10% reduction in energy use for heating and cooling

☐ Option 2. 20% reduction in energy use for heating and cooling

☒ Option 3. 25% reduction in energy use for heating and cooling Is there anything you would like to tell us about the reason(s) for your choice?

As with proposal 1 we support the *ambition* of Option 3, but not the implementation. Fixed R-values for commercial buildings suffer from even larger potential perverse outcomes than residential buildings.

The proportion of total energy consumption (and therefore carbon emissions) arising from R-values alone is much lower in commercial buildings compared with residential buildings. These buildings are, more often than not, cooling dominated and the H1 proposals fixate on reducing heat loss.

Other factors, entirely (or substantially) absent from these H1 proposals, but with equal importance for emissions (and thermal comfort) include:

- Orientation
- Window shading
- Glazing solar transmission
- Form factor (the ratio of external envelope to floor area)

As with the residential proposals, we would like to see a swift transmission to modelling / dynamic simulation of energy use in commercial buildings. Given the (typically) increased expertise of building design consultants involved in commercial buildings NZGBC would like to see the Acceptable Solution phased out leaving just the verification method. At the very least, in the interim, the schedule and calculation methods should be made unavailabe for larger projects (say greater than 1000m^2) where thermal modelling is becoming more prevalent. Better still, we would like to see the current two-model (reference/actual building) verification method re-written to streamline it with the Building for Climate Change single model heating/cooling demand proposals. This would prepare the market for BfCC programme which will build on thermal demand modelling to include overall energy consumption.

Proposal 2: Energy efficiency for large buildings

2-2. For your preferred option, how quickly should this change come into effect?
(Please select one)

☐ 12 months ☒ 24 months ☐ 36 months or more ☐ No preference

Is there anything you would like to tell us about the reason(s) for your choice?

As with our residential submission, this depends on the interaction between these H1 proposals and BfCC programme. If the first BfCC cap is to be enacted quickly (i.e. within 36 months), then we suggest abandoning these proposed H1 updates in favour of a more holistic energy modelling approach.

2-3. If there are factors we should consider to progressively phase in your preferred option, please tell us below.
These factors may include material availability or affordability, regional differences in the requirements, different building typologies or other considerations.

None

2-4. Do you support issuing the new editions of H1/AS2 and H1/VM2 as proposed?

H1/AS2: ☒ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

H1/VM2: ☒ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

See NZGBC response to section 1-4 (residential) for similar concerns:

1) Real Window R-values rather than standardised
2) Migrate from NZS 4214 to the international standards ISO6946 and ISO13370 for the calculation of R-values
3) etc

2-5. What impacts would you expect on you or your business from the proposed options?
These impacts may be economic/financial, environmental, health and wellbeing, or other areas.

None

2-6. Is there any support that you or your business would need to implement the proposed changes if introduced?

☐ Yes ☒ No ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

Proposal 3. Energy efficiency for heating, ventilation, and air conditioning (HVAC) systems in commercial buildings

Currently, there is no acceptable solution or verification method issued for the energy efficiency of heating, ventilation and air conditioning (HVAC) systems in commercial buildings (Clause H1.3.6 of the Building Code). We are proposing to issue a new Verification Method H1/VM3 will establish a baseline and standardised procedures that will help building designers and building consent authorities demonstrate and verify the compliance of this clause.

Questions for the consultation

3-1. Do you support issuing the new edition of H1/VM3 as proposed?

☒ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

As with our other consultation responses we believe HVAC energy efficiency should be regulated through performance based energy modelling in line with the Building for Climate Change programme. We still think there is value in having minimum standards as set out in the proposed H1/VM3, however this should be indicated as a back-stop; i.e. a floor below which energy efficiency standards cannot drop.

3-2. Do you think the proposed Verification Method H1/VM3 covers all important aspects of energy efficiency of HVAC systems in commercial buildings?

☒ Yes ☐ No ☐ Not sure/no preference

If there are aspects that you think should be included, please tell us below.

The proposed Verification Method minimum requirements for energy monitoring (section 12) should be amended to bring it in line with NABERSNZ monitoring requirements. Metering should align with the NABERSNZ rules where sub-metering is required to differentiate loads dedicated to tenants or base building. At minimum, there must be sub-metering separating the loads from tenant-controlled activities for lighting and power within the rentable areas and base building requirements for common areas.

The NZGBC and EECA carried out a metring report in 2018 which highlighted the amount of additional sub-meters an existing office building would require to reach NABERSNZ base building requirements. Of the ten buildings assessed six buildings required less than ten additional sub-metering points, while the rest require between 11 to 32 sub-metering points.

3-3. What impacts would you expect on you or your business from the new H1/VM3?
These impacts may be economic/financial, environmental, health and wellbeing, or other areas.

3-4. Do you agree with the proposed transition time of 12 months for the new Verification Method H1/VM3 to take effect?

☒ Yes, it is about right
☐ No, it should be shorter (less than 12 months)
☐ No, it should be longer (24 months or more)
☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

Proposal 4. Natural light for higher-density housing

We are proposing to issue new acceptable solutions and verification methods for G7 Natural Light to adopt new compliance pathways for higher-density housing. The new pathways are more suitable for these types of buildings. As a consequence of the change, the scope of the existing documents are proposed to be limited.

Questions

4-1. Do you support issuing the new G7/AS1, G7/AS2, G7/VM2 as proposed?

G7/AS1: ☐ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

G7/AS2: ☐ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

G7/VM2: ☐ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

4-2. What approach do you think we should take for G7/VM1?

☐ It should be revoked ☐ It should remain as is

☐ It should be amended ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

Proposal 4: Natural light for higher-density housing

4-3. What impacts would you expect on you or your business from the new editions of G7/AS1, G7/AS2, G7/VM1, and G7/VM2?

These impacts may be economic/financial, environmental, health and wellbeing, or other areas.

4-4. Do you agree with the proposed transition time of 12 months for the new G7/AS1, G7/AS2, G7/VM1, and G7/VM2 to take effect?

☐ Yes, it is about right

☐ No, it should be shorter (less than 12 months)

☐ No, it should be longer (24 months or more)

☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

Proposal 5. Weathertightness testing for higher-density housing

We are proposing to issue a new edition of E2/VM2 to reference BRANZ Evaluation Method EM7 Performance of mid-rise cladding systems (version 3, June 2020). This update version of EM7 is easier for test laboratories, cladding system suppliers, and building designers to use than the previous version. The new version does not significantly change the minimum performance requirements of the test method, and existing tested cladding systems will not need to be retested.

Questions for the consultation

5-1. Do you support issuing the new edition of E2/VM2 as proposed to cite BRANZ EM7 version 3?

☐ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

5-2. What impacts would you expect on you or your business from the new edition of E2/VM2?

These impacts may be economic/financial, environmental, health and wellbeing, or other areas.

5-3. Do you agree with the proposed transition time of 12 months for the new Verification Method E2/VM2 to take effect?

☐ Yes, it is about right

☐ No, it should be shorter (less than 12 months)

☐ No, it should be longer (24 months or more)

☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

Proposal 6. Standards referenced in B1 Structure

We are proposing to amend referenced standards in the acceptable solutions and verification methods for clause B1 Structure. The amended references include new versions of AS/NZS 4671, AS/NZS 5131, AS/NZS 2327, the NZGS document "Field Description of Soil and Rock – Guideline for the field descriptions of soils and rocks in engineering purposes". Previous versions of these documents are currently referenced by the acceptable solutions and verification methods.

Questions for the consultation

6-1. Do you support the amendment of B1/AS1, B1/AS3 and B1/VM1 as proposed to include the following referenced standards and document?

AS/NZS 4671: 2019 Steel for the reinforcement of concrete:	☐ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference
AS/NZS 5131: 2016 Structural Steelwork – Fabrication and Erection:	☐ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference
AS/NZS 2327: 2017 Composite structures – Composite steel-concrete construction in buildings Amendment 1:	☐ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference
Field Description of Soil and Rock – Guideline for the field descriptions of soils and rocks in engineering purposes, New Zealand Geotechnical Society Inc., December 2005:	☐ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

Proposal 6: Standards for citation in B1 Structure

6-2. What impacts would you expect on you or your business from the referencing of these standards and document?

These impacts may be economic/financial, environmental, health and wellbeing, or other areas.

6-3. Do you agree with the proposed transition time of 12 months for the new Acceptable Solutions B1/AS1 and B1/AS3 and Verification Method B1/VM1 to take effect?

☐ Yes, it is about right

☐ No, it should be shorter (less than 12 months)

☐ No, it should be longer (24 months or more)

☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

Proposal 7. Editorial changes to Acceptable Solution B1/AS1

We are proposing to amend text within Acceptable Solution B1/AS1 to make editorial changes in regards to geotechnical requirements. Editorial changes may include obvious errors in the text, typos, spelling mistakes, incorrect cross-references, changes in the formatting, minor clarifications of text with minor to no impact, or other items related to current document drafting practices.

Questions for the consultation

7-1. Do you support the amendment of B1/AS1 to address the editorial changes to geotechnical requirements as proposed?

☐ Yes, I support it ☐ No, I don't support it ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

Building Code operating protocols

We are seeking feedback on two draft operating protocols that are intended to provide transparency and certainty around the work MBIE does as the building and construction regulator. The two operating protocols for this consultation are:

› Referencing standards in the Building Code system

› Tier framework to support standards in the Building Code system

Questions for the consultation

1. Do you agree with the proposed criteria for referencing a standard in the Building Code system?

These proposed criteria include: alignment to the Building Code, in scope, clear, specific, implementable in New Zealand and available.

☐ Yes, I support them ☐ No, I don't support them ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

2. Do you agree with the proposed criteria for deciding the tier status of standards?

Risk severity:	☐ Yes, I agree with the criteria ☐ No, I don't agree ☐ Not sure/no preference
Contribution to the Building Code:	☐ Yes, I agree with the criteria ☐ No, I don't agree ☐ Not sure/no preference
Design focus:	☐ Yes, I agree with the criteria ☐ No, I don't agree ☐ Not sure/no preference

Is there anything you would like to tell us about the reason(s) for your choice?

3. Which standard(s) and their proposed tier status particularly impact you and why?

4. Is there anything else you would like to tell us about these protocols for the use of standards in the Building Code system?

New look for Building Code documents

1. Is there anything you would like to tell us about the new look of acceptable solution and verification methods?

Thank you

Thanks for your feedback, we really appreciate your insight because it helps us keep pace with modern construction methods, the needs of New Zealanders and ensure buildings are safe, warm, dry, healthy and durable.

To help us continue to improve our Building Code update programme, we would appreciate any suggestions or comments you may have on what's working and how we can do better.

Please leave your feedback below: