



# Submission Form

## Building for Climate Change

### 1. Contact details (optional)

Name:	Sam Archer
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### 2. Are you making this submission on behalf of a business or organisation?

No

Yes (please tell us which Company/Organisation you are making this submission on behalf of)

New Zealand Green Building Council

### 3. Would you like to:

Remain anonymous in the published consultation summary report  No  Yes

Receive a copy of your own submission  No  Yes

Receive future updates on Building for Climate Change programme  No  Yes

### 4. Are you willing to be contacted in relation to your submission if MBIE has questions about your response?

No  Yes

### 5. The best way to describe your role is:

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Architect                          | <input type="checkbox"/> Building owner   | <input type="checkbox"/> Geotechnical Engineer        |
| <input type="checkbox"/> Building Consent Authority/Officer | <input type="checkbox"/> Electrician      | <input type="checkbox"/> Structural Engineer          |
| <input type="checkbox"/> Builder                            | <input type="checkbox"/> Engineer – other | <input type="checkbox"/> Plumber/Gasfitter/Drainlayer |
| <input type="checkbox"/> Building product/material supplier | <input type="checkbox"/> Fire Engineer    | <input checked="" type="checkbox"/> Other             |

**To submit this form via email:**

Once you have completed the form, you can email it to [BfCC@mbie.govt.nz](mailto:BfCC@mbie.govt.nz), with "Submission" in the subject line.

**To submit a print copy of this form:**

You can post or courier your submission to:

<p>Via Courier:</p> <p>Building System Performance Ministry of Business, Innovation and Employment Building for Climate Change Submission 15 Stout Street, Wellington 6011</p>	<p>Via Post:</p> <p>Building System Performance Ministry of Business, Innovation and Employment Building for Climate Change Submission PO Box 1473 Wellington 6140</p>
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## Overarching approach of the Building for Climate Change programme

6. Do you agree or disagree that the Building and Construction Sector needs to take action to reduce emissions?

Strongly disagree     Disagree     Neither     Agree     Strongly agree

Please tell us why.

The NZGBC strongly agrees that the building and construction sector needs to take action to reduce emissions.

The Intergovernmental Panel on Climate Change (IPCC) has set out that we have only a short window to radically reduce emissions if we want to keep warming to 1.5 degrees. That window closes in 2030. The IPCC state that holding temperature rises to 1.5 degrees, requires slashing emissions by 45 percent from 2010 levels by 2030.

In 2018 consultants, thinkstep, on behalf of the NZGBC, calculated that the built environment contributes up to 20% of NZ's GHG emissions in a combination of operational emissions and embodied carbon emissions.<sup>1</sup>

In 2019, the NZGBC launched the *Net zero carbon roadmap for Aotearoa*.<sup>2</sup> This roadmap sets out the steps NZ needs to take to make all our buildings zero carbon by 2050 and all new buildings zero carbon by 2030. The *Net zero carbon roadmap for Aotearoa* aligns with the World Green Building Council's *Advancing Net Zero*<sup>3</sup>, a global project working towards total sector decarbonisation by 2050.

The NZGBC commends the NZ Government on the proposed frameworks and looks forward to working further with MBIE in their design and implementation and to assisting industry to adapt to the changes.

7. What support do you think you or your business would need to deliver the changes proposed in the frameworks?

Capacity building for industry will be the most important factor for successfully transforming operational and embodied emissions. Industry, especially small/sole operators are going to need significant support to understand and adapt to the changes required.

There are also many in the industry considering or already delivering projects that go beyond minimum standards. It is important that government finds ways to encourage more of this. In Australia, the use of a NABERS commitment and/or Green Star certification is permitted to form part of a submission for the building code. Enabling this kind of approach in NZ would:

<sup>1</sup> thinkstep. 2018. The carbon footprint of New Zealand's 2050 built environment. [https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment\\_id=2635](https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment_id=2635)

<sup>2</sup> NZGBC. 2019. Net zero carbon roadmap for Aotearoa. [https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment\\_id=3000](https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment_id=3000)

<sup>3</sup> <https://www.worldgbc.org/advancing-net-zero>

- make it easier for clients/project stakeholders to achieve both compliance with code and a higher voluntary benchmark. Ensuring such projects do not need to do twice the calculations/documentation will assist greater uptake and better outcomes.
- encourage above building code performance by showing industry the higher standards that could be achieved and creating more demand from buyers and tenants.

The NZGBC looks forward to working with MBIE to help educate and build capacity in the industry. This will need to be a combination of raising awareness, diverse education and training opportunities, sharing industry examples of good/best practice, and government leading by example.

8. Are there any barriers that are currently preventing (or discouraging) you, or your business, taking action to reduce emissions?

No

Yes

Please identify the main challenges.

The NZGBC works closely with industry to help raise awareness and build capacity for more sustainable building practices. The biggest barriers we see industry struggling with are lack of capacity and the costs of doing better.

As discussed above, capacity building will require a multi-faceted approach. The costs of doing better will come down when demand increases for the products and services that deliver greater sustainability. Government leading by example will be a critical component in driving demand for higher volumes of more sustainable goods and services.

9. Do you think the Building for Climate Change work programme should include the following building classifications?

	No	Yes
Housing	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Communal Residential	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Communal Non-Residential	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Commercial	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Industrial	<input type="checkbox"/>	<input checked="" type="checkbox"/>

If you have indicated that you believe one, or more, building classifications **should not** be included, please tell us why

N/A

## Framework: Transforming Operational Efficiency

10. Do you agree or disagree that the Building for Climate Change work programme should include measures to improve the operational efficiency of buildings in New Zealand?

Strongly disagree	Disagree	Neither	Agree	Strongly agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Please tell us why.

The NZGBC strongly agrees that the Building for Climate Change work programme should include measures to improve the operational efficiency of buildings in NZ.

Since it was established in 2005, the NZGBC has introduced Green Star, NABERSNZ, HomeFit and Homestar<sup>4</sup> to the NZ property and construction industry. Collectively, these voluntary rating tools have helped save thousands of tonnes of emissions, reduced demand on the national energy grid, saved millions of litres of water and improved indoor environment quality for countless building occupants and users.

While these achievements are remarkable, a coordinated and consistent national approach to improving the operational efficiency of buildings in NZ is needed to ensure our buildings meet their emissions reduction potential, reduce demand on the grid, mitigate the risks of increasing water demand and scarcity, and provide healthy, safe indoor environments for Kiwis.

11. The Framework proposes that operational efficiency requirements tighten in a series of steps to reduce emissions in the Building and Construction Sector, with the requirements for each step published at the outset and the final step being reached by 2035.

Do you support a gradual introduction of operational efficiency requirements, using a stepped approach?

No  Yes

12. Do you think the timeframe is appropriate?

<input type="checkbox"/> Yes	<input type="checkbox"/> No, it's too short	<input checked="" type="checkbox"/> No, it's too long

Please tell us your ideal timeframe if it's not by 2035.

The NZGBC strongly agrees with a stepped approach to introducing operational efficiency requirements. However, we call for a much more ambitious timeframe and for a 10-year trajectory to ensure new buildings are zero carbon by 2030 to be enshrined in the Building Code.

<sup>4</sup> <https://www.nzgbc.org.nz/>

With the proposed timeframe of 15 years (to 2035) for full implementation of this framework, we believe that it will be too easy for industry stakeholders to delay implementing changes and to put off the upskilling and capacity building needed. Thousands of buildings will be constructed between 2020 and 2035. We must move as quickly as possible to ensure that poor operational efficiency and high embodied carbon is locked in to as few buildings as possible.

The NZGBC proposes the following timeframe:

Step 1: 2022

Step 2: 2024

Step 3: 2027

Step 4: 2030

We also believe that interim targets, with clearly communicated dates/timeframes, should be set. This will keep up momentum and provide additional guidance to industry about what to expect, and what is expected.

The NZGBC suggests that when the finalised stepped plan is released, it could include benchmarks within each step and interim target as 'good', 'better', 'best'. This will help industry understand the benchmark they will need to reach as a minimum, but also show a clear path to best practice and/or being an industry leader.

The NZGBC calls for the proposed stepped plan to be enshrined in the Building Code to ensure complete commitment to the changes and to ensure each stage is achieved on time. The proposed plan should be supported with a consistent and coordinated package for capacity building and a strong and sustained partnership with industry to ensure that there is awareness and understanding of the plan and timeline, what is expected of industry by each of the deadlines and interim targets, and how industry will be supported through each stage.

We recognise that for many in industry making changes will be challenging, but without an urgent timeline, change will be slow and the challenge of overcoming barriers will simply be pushed out to a later date. The NZGBC is ready to work with industry and government to identify these barriers and to find ways to overcome them now.

The NZGBC welcomes the proposal for public sector buildings to achieve requirements a step ahead of industry (as noted in the proposed Steps 2 & 3). Government leadership and setting high standards for government procurement can have a powerful influence on accelerating change in the industry/market. The NZGBC also calls on government to always build and/or procure beyond the minimum requirements of the building code and commit to using recognised best practice rating systems such as Green Star, Homestar, Living Building Challenge and Passive House.

To ensure that every opportunity for better outcomes and leadership is optimised, local councils should also be able to require higher compliance (e.g. require proposed projects meet Step 3 when Step 2 is the minimum) as part of their negotiation with developers on resource consent for larger subdivisions, or larger commercial projects. For example, a new, 20,000m<sup>2</sup> office tower in downtown Auckland would be able to meet – and should be required to meet – higher standards than the basic Building Code requirements. Currently the Building Act 2004 restricts councils from requiring outcomes beyond the minimum set out in the Building Code.

13. The Framework proposes that a number of building types will be exempt from operational emission reduction requirements.

Do you agree or disagree with the proposal to exclude the following from operational efficiency emission reduction requirements?

	No	Yes
Outbuildings	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ancillary buildings	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Please tell us why.

The NZGBC is comfortable with outbuildings and ancillary buildings being excluded from operational emission reduction requirements.

Introducing the proposed changes will be challenging for industry and government. It is prudent to take a pragmatic approach and focus all available resources and efforts on the asset types/ parts of the building sector that are going to deliver the most substantial outcomes regarding reducing energy use, reducing emissions and improving human health.

The NZGBC does believe that facilities such as cinemas, churches, swimming pools etc. should be considered for inclusion given they have significant energy and water use, and/or potential impact on human health.

**Large and small buildings**

The NZGBC notes that this survey form does not provide an opportunity to make a general comment regarding the size of buildings included within the scope of the plan. Please see comments below that we believe need careful consideration:

- The NZGBC believes that apartments should be considered as small buildings. Apartment buildings are made up of lots of ‘small buildings’ and it would be beneficial to give buyers of apartments transparency around the performance of their own apartment. Any energy modelling framework should be able to cope with apartment typologies.

## Approach

14. The Framework proposes that operational efficiency requirements will only apply to new buildings initially with further work to look at requirements for existing buildings being undertaken at a later date.

Do you support this approach?

No

Yes

Please tell us why.

The NZGBC supports prioritising new buildings in the first iteration of this program.

However, we cannot afford to wait too long to address the existing building challenge. Improving the operational efficiency and reducing emissions of existing buildings will be absolutely critical if NZ is to make progress on reducing our overall emissions, take advantage of the buildings sector's potential for improved energy efficiency, and ensure our buildings are more comfortable and healthy for occupants.

The NZGBC notes that changes to existing buildings will be addressed in future work by the Building for Climate Change programme.

In response to this, the NZGBC proposes two immediate actions:

1. Commit to developing a framework with a clear timeframe for introducing new measures for existing buildings. This framework should be developed alongside the implementation of the proposed measures for new buildings.
2. Commit to introducing energy labelling for both new and existing buildings at point of sale or lease.

The NZGBC strongly advocates the introduction of energy (and health) labelling for both new and existing buildings. NZ is one of the few OECD countries that does not require buildings to have an Energy Performance Certificate at point of sale. Energy performance certificates can drive change several significant ways:

- They create a tool for other policy levers. For example, in the UK, a subsidy was provided for solar PV but only on homes that could demonstrate they were energy efficient, therefore ensuring this low carbon energy was not wasted.
- They raise awareness amongst home buyers/owners and renters about energy efficient and healthier homes and drive demand for better performing homes. Evidence also shows that energy labels influence people to take action to improve the energy efficiency of their home.<sup>5</sup>

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<sup>5</sup> The American Council for an Energy-Efficient Economy (ACEEE) research paper. [https://aceee.org/files/proceedings/2016/data/papers/7\\_218.pdf](https://aceee.org/files/proceedings/2016/data/papers/7_218.pdf)

- Energy labels can also reward energy efficient homes with 3-9% higher sale prices, therefore encouraging owners to invest in energy efficient measures, stimulating local contractors and employment.<sup>6</sup>

It is important that energy/health labels are easy to understand so consumers know what they are getting. 60, 30 and 15 kWh/m<sup>2</sup> for heating is not intelligible to most people, so it could be expressed on a label as a grade or rating. For example, 60 kWh/m<sup>2</sup> = C, 30 = B and 15 = A. That way consumers can ask housebuilders for an A-rated house while the code is still at "C". This scale could be further adapted for use in the future for existing homes, i.e. D = current building code. E = 1978 building code and F and G are older, very poorly insulated homes with poor systems (e.g. uninsulated hot water cylinder etc.).

- They significantly drive awareness and demand for more efficient buildings and tenancies, propelling improved energy performance. For example, in Australia the Commercial Building Disclosure programme requires a Building Energy Efficiency Certificate to be provided for any office space over 1000m<sup>2</sup> at time of sale or lease. New South Wales officials report that the CBD scheme, combined with Government procurement, has gone on to deliver \$1bn in energy savings for businesses and saved enough energy to power 400,000 homes.

These actions will help to ensure that:

- industry is aware that existing buildings will also be an area of focus and improvement in the near future
- the existing buildings sector won't be left behind
- efforts to upskill and educate industry will also benefit existing buildings during the usual cycle of upgrades and improvements
- the effect of creating awareness and demand amongst the wider community for better performing buildings flows into the existing buildings as well as new
- we can begin to accelerate the work desperately needed to improve NZ's poor-quality housing stock and reduce the consequent negative impacts on economic, social and health outcomes.

The NZGBC welcomes the opportunity for further discussion of energy/health labelling and notes that more information can be found in our recent proposal to the NZ Government, *A green recovery*,<sup>7</sup> and our recent *Homestar v5: Scoping paper*.<sup>8</sup>

<sup>6</sup> Energy efficient homes sell for more - international studies on energy efficiency  
[https://www.nzgbc.org.nz/KNOWLEDGEHUB/Story?Action=View&Story\\_id=284](https://www.nzgbc.org.nz/KNOWLEDGEHUB/Story?Action=View&Story_id=284)

<sup>7</sup> NZGBC. 2020. A green recovery: Kick-starting a just transition with healthy homes, providing a multi-billion dollar economic boost. [https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment\\_id=3118](https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment_id=3118)

<sup>8</sup> NZGBC.2020. Homestar v5: Scoping paper.  
[https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment\\_id=3170](https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment_id=3170)

## Caps

The NZGBC notes that this survey form does not provide an opportunity to make more general comment on the caps proposed within the plan. Please see comments below that we believe need careful consideration:

- a. Setting a single energy and emissions target for all buildings will be problematic. The NZGBC strongly agrees that ultimately all buildings must use very low amounts of energy and emit little carbon. However, at the beginning of the trajectory different buildings will use widely varying amounts of energy. For example, an unheated warehouse has a very different energy profile to the trading floor of a bank. This will need to be accounted for in the early stages of the stepped plan to ensure that barriers are not insurmountable for some stakeholders. This will also apply to the water cap. There will need to be some differentiation between buildings.
- b. As above, the targets need to be regionalised initially. 180kWh/m<sup>2</sup> would be extremely easy to achieve in Auckland (and hardly any change from the current settings for Auckland), but more difficult to achieve for a new dwelling in Queenstown, for example.
- c. The proposed targets are expressed as as fixed energy and carbon amounts. This is probably not an issue for residential where the development of a single online modelling tool is proposed. However, for commercial buildings, consultants use (and will want to use) a wide variety of thermal modelling software. Each package has its own quirks and will result in different results for the same inputs.

For this reason, many jurisdictions have used a 'two model' approach where the actual building is assessed against a reference building in the same software package. This method is used by the Building Code of Australia, UK building regulations and Green Star, and the NZGBC recommends taking this approach. It is also fairer on different building types as they are assessed 'against themselves'. For example, an unheated warehouse is assessed against a poorly performing unheated warehouse.

- d. The NZGBC proposes that to go with the caps, it is essential we have a National Calculation Methodology as early as possible: this should be the priority project. Without a National Calculation Methodology, it will be impossible to know how to model the outcomes MBIE is looking for on a level playing field.
- e. In addition to a National Calculation Methodology, a modelling tool for small buildings will be needed. The NZGBC entreats MBIE to work with the sector to design this so that it aligns with current practice (i.e. existing schemes) for the design of performance homes.

15. Do you support a limit on emissions from fossil fuel combustion to operate buildings (e.g. for space and water heating)?

No

Yes

Please tell us why.

The NZGBC agrees that there should be a limit on emissions from fossil fuel combustion to operate buildings.

The *Transforming operational efficiency* discussion paper does not address the issue of summertime overheating, experienced in many homes and buildings across NZ. This issue must be considered, and treated separately from energy, i.e. space heating and cooling loads should not be combined. A risk-based approach to overheating should be employed.

The NZGBC believes that number of caps proposed is too large and complicated. The NZGBC contends that a simple two cap approach would be better, less confusing and result in fewer perverse outcomes. The two areas for which caps should be applied are:

- for space heating (kWh/m<sup>2</sup>)
- for overall carbon emissions (kg.CO<sub>2</sub>-e/kWh). The latter includes fossil fuels and would therefore incentivise their reduction.

The NZGBC also suggests considering including cooking within the fossil fuel cap and looking for additional ways to disincentivise cooking with gas.

#### **Electricity use and peak demand**

The NZGBC notes that this survey form does not provide an opportunity to make comment on energy use and peak demand. Please see comments below that we believe need careful consideration:

- Different end-uses have different impacts on the grid. Hot water is the same all year (especially if hot water timers are used), whereas space heating is much more impactful. The NZGBC suggests that including time-of-use factors in the cap should be considered, i.e. space heating and lighting should be weighted more heavily than hot water. The programme should also consider including incentives for measures that don't impact annual electricity consumption but do impact peak consumption. For example, hot water timers.

16. Do you think that new Thermal Performance requirements based on heating and cooling demand should be introduced to support increased operational efficiency of buildings?

No

Yes

Please tell us why.

Please see comments above.

17. Detailed requirements for the efficiency of fixed services (such as heating and cooling systems, artificial lighting, hot water systems and appliances, ventilation systems etc) are not currently set out in the Building Code.

Do you think that Services Efficiency performance requirements should be introduced to support increased operational efficiency of buildings?

No  Yes

Please tell us why.

The NZGBC does not believe that introducing Services Efficiency performance requirements will lead to better overall outcomes at this time. This approach would be complicated. Some building types would find it difficult to meet proposed benchmarks. So, at the very least, building types would need to be differentiated to begin with.

18. The framework proposes that there are requirements for the plug loads for large buildings\*, but not small buildings. Do you support this approach?

(\*Large and small buildings as defined in the framework scope section)

No  Yes

Please tell us why.

The NZGBC is comfortable with this proposal. Once again we note that it is prudent to take a pragmatic approach and focus all available resources and efforts on the measures that are going to deliver the most substantial outcomes regarding reducing energy use, reducing emissions and improving human health.

19. The Framework proposes that new buildings will not be required to include onsite renewable energy generation or energy storage capacity. Do you agree or disagree with this proposal?

Strongly disagree	Disagree	Neither	Agree	Strongly agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Please tell us why.

The NZGBC strongly agrees that new buildings should not be required to include onsite renewable energy. Onsite renewable energy can be a valuable solution when considered as one component of a building's overall design for optimal energy efficiency and low emissions. However, a policy requiring onsite renewable energy generation may drive perverse outcomes such as unnecessary added costs and 'bolting on' a piece of equipment to what may be a poorly performing building. The NZGBC believes that encouraging design

and construction that leads to greater energy efficiency and lower emissions should be the first priority of this policy.

The NZGBC does consider that incentivising energy storage could be effective in reducing peak grid demand.

20. The Framework currently proposes to exclude the following elements from the Building for Climate Change work programme. Which do you think should be included or excluded?

	Should be included	Should be excluded
Electrical appliance efficiency	<input type="checkbox"/>	<input checked="" type="checkbox"/>
On-site collection and storage of water	<input type="checkbox"/>	<input checked="" type="checkbox"/>
On-site waste water treatment	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Please tell us why.

The NZGBC agrees that these elements should be excluded from the Building for Climate Change work programme.

Electrical appliance efficiency is already addressed by the Equipment Energy Efficiency programme.

As discussed above in relation to onsite renewable energy generation, on-site collection and storage of water and on-site wastewater treatment can both be valuable components in a well-designed approach to a building's overall efficiency and sustainability. However, requiring such components to be included will add cost to projects and may not deliver the most effective outcomes. As above, the NZGBC believes that encouraging design and construction that leads to greater efficiency and lower emissions should be the first priority of this policy.

21. Buildings need to provide suitable indoor environmental quality (IEQ) for good occupant health and wellbeing outcomes. The Framework identifies the following critical IEQ parameters:

- Air temperature
- Relative or absolute humidity
- Ventilation rates
- Surface temperature
- Hygienic surface temperature (avoidance of mould)
- Daylight provision

If there are any additional elements that you think should be considered, please record them in the comment box below.

The NZGBC agrees with the IEQ elements above.

As industry progresses and new homes start to perform towards the lower end of the caps, it will be necessary to include air-tightness as a performance measure. Assuming that the modelling methodology includes an allowance for pressure testing, more air-tight homes are inevitable. Evidence from around the world suggests this will be accompanied by the need for mechanical ventilation of habitable rooms. The NZGBC contends there is evidence for requiring this now. Please see the NZGBC's *Homestar v5: Scoping paper*<sup>9</sup> for more information on this issue.

22. The Framework proposes that the Thermal Performance energy use intensity and services energy use intensity are considered during the consent application process, and when a Code Compliance Certificate is applied for.

Do you think this would impact you or your business/organisation?

No

Yes

Please tell us why.

None for NZGBC, but we note that designing and installing whole-house mechanical ventilation systems in homes is a skilled undertaking, and New Zealand does not currently have the supply chains nor design knowledge widely available across the industry. There are some lessons that need to be learned from other jurisdictions (e.g. the UK) where noisy, poorly commissioned systems and poor occupant training have led to less than ideal outcomes. NZGBC can point MBIE to the relevant research if helpful.

23. If there are any additional tools or support that you think you would need to implement this requirement, please tell us in the comment box below.

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<sup>9</sup> NZGBC. 2020. Homestar v5: Scoping paper.

[https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment\\_id=3170](https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment_id=3170)

## Framework: Whole of Life Embodied Carbon Emissions Reduction

24. Do you agree or disagree that the Building for Climate Change work programme should include initiatives to reduce whole-of-life embodied carbon in New Zealand buildings?

Strongly disagree	Disagree	Neither	Agree	Strongly agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Please tell us why.

The NZGBC strongly agrees that the Building for Climate Change programme should include initiatives to reduce whole-of-life embodied carbon in New Zealand buildings.

Approximately half of the emissions attributed to the built environment (buildings and infrastructure) are embodied in building materials.<sup>10</sup> Reducing embodied carbon is a critical factor in securing a low carbon future for New Zealand.

The NZGBC's Roadmap examines key building materials used in NZ and the role that initiatives such as Environmental Product Declarations will play in reducing embodied carbon in buildings.<sup>11</sup>

**To meet our emission reduction goals, a key objective of the framework is to increase building material efficiency, and reduce construction waste.**

25. What measures, if any, do you think should be put in place to increase building material efficiency? (Select all that apply)

- Update regulatory performance requirements to ensure they are appropriate
- Incentivise 'lean design'
- Remove barriers to the reuse of construction materials
- Other (please specify)

The NZGBC believes that alongside incentivising lean design, designing out waste will be critical. The government will need to invest heavily in education for designing out waste.

This will need to be in partnership with product suppliers and manufacturers but could be challenging as designing out waste reduces the amount of a product needed. Early and extensive engagement with the product supply and manufacturing sector will be critical to bring everyone along on the journey towards greater efficiency and lower emissions.

Another important measure will be to accelerate the demand for pre-fabrication. A high-volume approach will be needed to increase local capacity and supply and reduce the costs

<sup>10</sup> thinkstep. 2019. Under construction: Hidden emissions and untapped potential of buildings for New Zealand's 2050 zero carbon goal. [https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment\\_id=2453](https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment_id=2453)

<sup>11</sup> NZGBC. 2019. Net zero carbon roadmap for Aotearoa. [https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment\\_id=3000](https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment_id=3000)

of this more efficient approach. Central and local government will need to take the lead in their own procurement and in finding ways to incentivise demand for pre-fabrication.

26. What measures, if any, do you think should be put in place to reduce construction waste?

In addition to designing out waste as much as possible, considering access to construction waste recycling/alternative waste streams will be important. Currently construction waste is very difficult/very expensive/almost impossible to recycle outside of a couple of NZ's major cities. This is a major barrier that needs to be considered with a nationwide approach to access, incentives and awareness raising.

27. Using low carbon construction materials and products is identified as another option to reduce whole-of-life embodied carbon emissions.

How could we encourage the use of low carbon construction materials?

The NZGBC believes that encouraging low carbon construction is critical. This will largely mean encouraging and removing barriers to timber construction, particularly for mid- to high-rise projects. In addition to addressing any regulatory barriers to timber construction, NZ will need a robust supply chain for affordable engineered timber.

Government leadership through removing barriers and procurement will be critical to the success of this pathway. The NZGBC believes that the government's commitment to staying one step ahead of industry in the stepped plan proposed will provide excellent opportunities for projects that will become best practice examples for industry.

**The Framework proposes introducing reporting requirements for whole-of-life embodied carbon in buildings, followed by a cap on whole-of-life embodied carbon for new building projects.**

28. Would you support a cap on whole-of-life embodied carbon for new building projects?

Yes

No

Please tell us why.

The NZGBC supports a cap on whole-of-life embodied carbon for new buildings. The NZGBC is committed to achieving zero carbon new buildings by 2030<sup>12</sup>.

A report prepared by thinkstep on behalf of the NZGBC, *Under construction: Hidden emissions and untapped potential of buildings for New Zealand's 2050 zero carbon goal*<sup>13</sup>,

<sup>12</sup> NZGBC. 2019. Net zero carbon roadmap for Aotearoa.

[https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment\\_id=3000](https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment_id=3000)

<sup>13</sup> thinkstep. 2019. Under construction: Hidden emissions and untapped potential of buildings for New Zealand's 2050 zero carbon goal. [https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment\\_id=2453](https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment_id=2453)

focuses on embodied carbon in buildings and identifies how 40% decarbonisation could be achieved in the sector by 2050.

29. Do you think a data repository of embodied carbon from buildings should be established?

Yes  No

Please tell us why.

The NZGBC believes that a data repository of embodied carbon from buildings would be a valuable resource for both government and industry. However, we recognise that there are several issues that would need to be carefully considered to avoid inaccurate data and to incentivise the use of better performing products and suppliers, such as:

- how to calculate supplier-specific EPDs versus industry-wide EPDs.
- what to do about imported products, whether these will have international emissions factors and/or how they will be benchmarked.
- how to manage if a supplier-specific EPD is used for calculation at the time of consent but the product is then substituted during the build.

We also encourage Government to actively consider publishing an anonymised database of buildings, as opposed to materials (as above), submitted for consent. This would include information on floor space, materials used and their respective overall embodied impacts. This would provide valuable case studies for the building industry.

30. If a data repository was established, do you think this information should be able to be accessed by the public?

Yes  No

Please tell us why.

The NZGBC believes that full transparency and making the information accessible to the public will lead to greater opportunities for building industry capacity, raising awareness and increasing specification of low carbon products, and ultimately increasing demand for low carbon products amongst industry and the wider community.

31. Which, if any, of the following factors would make it difficult for people to report the whole-of-life embodied carbon of new buildings, and why?

- Lack of an agreed methodology  Inadequate data quality and availability
- Lack of appropriate tools or software  Administrative burden on businesses
- Other (please specify)

The NZGBC notes that while any of the reasons given above could potentially make reporting whole of life embodied carbon of new buildings challenging, calculating embodied carbon is an established practice and will rapidly become more accessible and affordable if reporting is made a requirement.

All of these barriers can be overcome with good consultation, increased education and training and increased availability of services.

32. What support, if any, do you think will be needed to make reporting embodied carbon a standard part of the design and construction process for every new building project in New Zealand?

To successfully implement the proposed Building for Climate Change work programme and achieve or exceed the 40% decarbonisation potential mentioned previously, the industry will need significant support and education.

Industry will require support for education and training for reporting, as well as to improving understanding about how to design and construct for lower embodied carbon.

The NZGBC considers it essential for MBIE to create an embodied carbon calculation tool (see further comments at Q.38) in consultation with industry experts and launch this with appropriate education and training available.

There will also need to be a significant increase in demand for (and volume of) low carbon materials to begin to improve availability and drive down the costs in comparison to the higher carbon alternatives.

Early and extensive industry engagement will be needed to achieve these outcomes. There is likely to be objections and 'push back' from some suppliers as the cap reduces over time and high carbon construction, such as concrete frame buildings, become untenable.

The NZGBC encourages government to be clear and transparent about the realities of the stepped plan and caps. Industry will need to understand what these changes are going to mean for the sector. For example, industry will need to understand that by a given date, it will be impossible to build a conventional concrete frame office building unless low carbon cement becomes a reality.

**The framework proposes that reporting of whole-of-life embodied carbon for buildings would be carried out as part of the building consent application process.**

33. What impact do you think this proposal will have on the Building and Construction sector?

As noted above, it will be important to understand how allowances made at Building Consent flow through to the actual build. Will projects be able to claim lower embodied

carbon by “promising” to use certain suppliers with lower embodied carbon products? How would this be checked?

A potential solution is for councils to require reporting of “as-built” embodied carbon and proof that this is within a certain percentage of that submitted at building consent. This would have to be backed up with penalties for large deviations from the consented embodied carbon budget.

34. What additional tools or support would be needed to implement this requirement?

35. Do you think that requirements for embodied carbon calculations should only include the initial building life cycle stages (product and construction stage)?

No  Yes

Please tell us why.

The NZGBC believes it is acceptable to only include the product and construction stages of the building life cycle to begin with. Significant education and capacity building will be needed to bring industry along with this change. However, the later building life cycle stages of disposal and closing the loop will need to be addressed in the future.

Creating a clear pathway that focuses on the initial stages in the short term but provides an indication of future work and targets on the rest of the building life cycle will help industry and government to plan.

36. The Framework proposes limiting the type of building components that would be included in an embodied carbon assessment, excluding components with lower emissions (such as internal fittings).

Do you agree with this proposal?

No  Yes

Please tell us why.

The NZGBC supports limiting the type of building components included in an embodied carbon assessment. Including components such as internal fittings adds a much higher level of detail and can become complicated. The greatest value in reporting on, and reducing embodied carbon will be through focusing on the building’s structure and facade.

37. Do you think that reporting on, and ultimately capping, embodied carbon should apply to new building projects only, not refurbishment or demolition projects?

No

Yes

Please tell us why.

The NZGBC agrees with focusing on new build projects, assuming the data shows this to be where the biggest gains will be. The NZGBC notes that refurbishment projects probably account for smaller volumes of new embodied carbon when compared to new builds. Demolition material is usually mostly inert and therefore only a small proportion of total emissions embodied in building materials are from end-of-life<sup>14</sup>.

38. The Framework proposes that a simplified embodied carbon calculation tool could be used for small buildings but more detailed calculations would need to be provided for large buildings\*.

(\* Large and small buildings as defined in the framework scope section)

Do you agree with this proposal?

No

Yes

Please tell us why.

The NZGBC agrees that a simplified embodied carbon calculation tool to use for small buildings will be entirely appropriate given the total embodied carbon, cost and timeframe of smaller projects, as well as industry capacity.

More detailed calculations of large buildings will be necessary given the much higher volumes of embodied carbon and more complex nature of the projects.

39. Any other comments on the proposed frameworks?

The NZGBC supports the proposed frameworks as vital to our joint efforts to achieve decarbonisation, but as noted in our response above, there are several points on which we are calling for greater ambition.

Climate change is the most serious and pressing issue of our time, and the science is clear. The Intergovernmental Panel on Climate Change advises that to achieve net zero emissions by 2050, emissions need to reduce by 50 percent by 2030. There are existing solutions to reduce emissions from buildings and homes, whilst other sectors within Aotearoa will not be able to reduce emissions by 50 percent by 2030. This means that the sector could – and should – be doing some of the heavy lifting required for the 2030 target. The NZGBC believes that requiring and enabling the building and construction sector to reduce emissions over and above 50 percent by 2030 is necessary for Aotearoa’s zero carbon ambitions.

<sup>14</sup> thinkstep. 2019. Under construction: Hidden emissions and untapped potential of buildings for New Zealand’s 2050 zero carbon goal. [https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment\\_id=2453](https://www.nzgbc.org.nz/Attachment?Action=Download&Attachment_id=2453)

Please also see our letter accompanying this submission form for an outline of our priorities for achieving healthy, zero carbon homes and buildings for all New Zealanders.