Proposal for Change

National Construction Code

Subject/topic: Embedding a definition of zero carbon buildings in the NCC

Volume/standard	Provision
NCC Volume One	Clause J1O1 Clause J1P1 Schedule 1 Schedule 2
NCC Volume Two	Clause H6O1 Clause H6P1 Clause H6D1 Clause H6D2 Schedule 1 Schedule 2
NCC Volume Three	N/A
ABCB standard	New standard: Zero Carbon Buildings

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The proposal

What is the proposal?

This proposal is one of two Proposals for Change which comprise the submission from Climateworks Centre. This document should be considered alongside our proposal on embedding whole life cycle carbon assessments in the NCC.

In this proposal, we call for Climateworks Centre's Definition of Zero Carbon Buildings (the 'Definition') to be embedded in the NCC 2025 update. To do this we propose new clauses in the Functional Statement for Part J Energy Efficiency. Embedding the Definition will support alignment of NCC provisions with the updated Trajectory for Low Energy Buildings for building classes included in the provisions updated in NCC 2025.

For building classes not included in updates to provisions in NCC 2025, we also propose the development of a referenced publication, guided by the ABCB, to provide a Voluntary Zero Carbon Homes Standard to align the NCC 2025 Performance Standards for non-residential buildings, the updated Trajectory for Low Energy Buildings to zero carbon buildings, and standards for residential buildings.

The Definition should apply to all Building Classes via:

- Objectives
- Functional Statements
- Mandatory minimum Performance Requirements
- Verification Methods
- Deemed-to-Satisfy Provisions, to apply to all residential and non-residential Building Classes, including mixed-use buildings, and buildings with multiple classifications
- any updated referenced documents, such as the Australian Standards.

To achieve this outcome, Climateworks proposes the following modifications and/or additions to existing NCC provisions, highlighted in green text:

Vol 1, Clause J1O1

Modify:

(b) reduce upfront embodied carbon and greenhouse gas emissions, with zero greenhouse gas emissions from a building's operational phase; and

Vol 1, Clause J1P1

Add:

(2) Decisions made at each design phase must comply with the ABCB Standard for Zero Carbon Buildings

Vol 1, Schedule 1

Add:

Zero Carbon Buildings

Zero carbon buildings are all-electric and produce no net emissions over their entire lifecycle. To achieve this, all decisions made at each design phase should reduce energy demand and carbon emissions. A zero carbon building involves choices made on the following, as expanded upon in the ABCB Standard for Zero Carbon Buildings: planning and design decisions, form, thermal shell, materials, electrified appliances and services, and operation.

Vol 1, Schedule 2

Add:

ABCB - 2025 - Zero Carbon Buildings - J1O1, J1P1, J2D1, Schedule 1 - H6O1, H6P1, H6P2, H6D2, Schedule 1 - N/A - N/A

Vol 2, Clause H6O1

Modify:

(b) reduce upfront embodied carbon and greenhouse gas emissions, with zero greenhouse gas emissions in the operational phase and a requirement for all-electric buildings; and

Vol 2, Clause H6P1

Add:

(4) Decisions made at each design phase must comply with the ABCB Standard for Zero Carbon Buildings

Vol 2, Clause H6P2

Add:

(3) Decisions made at each design phase must comply with the ABCB Standard for Zero Carbon Buildings

Vol 2, Clause H6D2

Add:

(1)

(c) complying with the ABCB Standard for Zero Carbon Buildings

(2)

(c) complying with the ABCB Standard for Zero Carbon Buildings

Vol 2, Schedule 1

Add:

Zero Carbon Buildings

Zero carbon buildings are all-electric and produce no net emissions over their entire lifecycle. To achieve this, all decisions made at each design phase should reduce energy demand and carbon emissions. A zero carbon building involves choices made on the following, as expanded upon in the ABCB Standard for Zero Carbon Buildings: planning and design decisions, form, thermal shell, materials, electrified appliances and services, and operation.

Vol 2, Schedule 2

Add:

ABCB - 2025 - Zero Carbon Buildings - J1O1, J1P1, J2D1, Schedule 1 - H6O1, H6P1, H6P2, H6D2, Schedule 1 - N/A - N/A

New Standard: Zero Carbon Buildings

Create a new Standard based on Climateworks' definition of zero carbon buildings transcribed below, into which can be embedded the relevant Performance Requirements, Verification Methods and Deemed-to-Satisfy Provisions.

A zero carbon building has all of the below:

PLANNING AND DESIGN DECISIONS for location, construction, future maintenance and renovations to maximise a building's longevity and long-term safety for occupants, including prioritising resilience (i.e. ability to withstand or quickly recover from power outages and extreme weather events such as prolonged heatwaves, bushfire, cyclones, droughts, floods)

AND

FORM (i.e. building's orientation to the sun, overall shape, and arrangement of internal rooms) designed to suit local climate temperatures and harness renewable energy, sized to be an efficient use of space and materials, and able to be maintained safely

AND

THERMAL SHELL (i.e. external walls, ground floor and roof) designed, constructed and upgraded using a fabric-first approach to reduce the amount of energy needed to heat, cool and operate the building, therefore reducing the size of appliances needed to maintain safe indoor temperatures and air quality

AND

MATERIALS (i.e. all components used in a building plus its external spaces and structures on-site) have low overall embodied energy and carbon emissions (meaning the energy used and emissions released to produce or dispose of building materials, and construct, upgrade or demolish a building), calculated over their lifecycle, or are reclaimed materials, and are durable

AND

ELECTRIFIED APPLIANCES AND SERVICES (i.e fixed appliances) which are: fully powered by renewable energy generated/stored on-site or purchased from a renewable energy source, and optimised for a renewable energy grid (i.e. minimise energy demand and operable at times of peak solar generation)

AND

OPERATION (i.e. control of building's features and fixed appliances) is simple and user-friendly on a day-to-day basis and for maintenance or repair by occupants, tradespeople or building managers.

The current problem

What problem is the proposal designed to solve?

Buildings contribute around a fifth of Australia's greenhouse gas emissions and 55 per cent of Australia's total electricity consumption (Climateworks Australia 2020; Harrington & Toller 2017). As Australia decarbonises in line with the Paris Agreement and its Nationally Determined Contributions, the building sector has an opportunity to play a significant role by reducing energy demand and resultant emissions across the economy. According to Climateworks' modelling, the building sector can reach net zero emissions ahead of other energy demand sectors like industry and transport by adopting energy efficiency improvements and electrification powered by renewables, making the achievement of Australia's international commitments easier and more cost-effective. However, the key challenge facing the sector is achieving widespread deployment of relevant solutions, such as double glazing, heat pumps, and electric appliances (Climateworks Australia 2020:40). The building industry will struggle to transition without having zero carbon minimum performance requirements for new buildings in the NCC in place well before 2030 (International Energy Agency 2021:144). Such requirements will provide structure and confidence for high performers and industry leaders to innovate rather than being held back by a lack of regulation.

Updated Performance Requirements for residential and non-residential Building Classes are being proposed in alternating cycles of NCC updates (NCC 2022 featured updates to Performance Requirements to residential Building Classes, and NCC 2025 is proposed to focus on updates to requirements for non-residential Building Classes). Alternating updates on

different Building Classes is insufficient to achieve the level of action required to decarbonise the buildings sector to reach Australia's legislated net zero targets. Delaying updates to regulation creates the risk of reducing the industry's ability to transition to zero carbon minimum performance requirements due to insufficient warning, and delays the benefits to public health and wellbeing that would otherwise be achieved through upgrading residential building energy performance. Improving performance requirements now also reduces the number of expensive and difficult retrofits needed in the future.

In addition, the energy efficiency of Australia's current building stock is poor in comparison with international jurisdictions. This leads to higher bills for consumers and leaves households exposed to energy price hikes, adverse health outcomes from exposure to extreme temperatures, poorer thermal comfort and productivity, and a perpetuation of social inequality. Without the Definition being included in the next NCC update, there is a risk that new building stock will 'lock in' emissions and associated negative externalities.

What evidence exists to show there is a problem?

Modelling published by Climateworks Centre in the *Decarbonisation Futures* report (2020) indicated that to limit global heating to either 1.5°C or 2°C, overall building emissions must approach 0 $MtCO_2e$ by 2040. Across all modelled scenarios, the building sector must achieve emissions reductions of over 60 per cent by 2030 compared to 2020 levels (Climateworks Centre 2020:93). To meet these levels of emissions reductions, residential building energy intensity must decrease at a faster rate than commercial buildings – a 44-48% decrease for residential buildings and a 16-25% decrease for commercial buildings energy intensity by 2030 compared to 2020 levels (Climateworks Centre 2020:91); this pathway cannot be met if updating Performance Requirements for residential Building Classes is delayed until NCC 2028.

The objective

How will the proposal solve the problem?

While it has been stated that NCC 2025 will consider changes to non-residential Building Classes, this focus should not limit the ambition of NCC 2025 to also consider updates to Performance Requirements for residential Building Classes. To provide greater foresight and advanced warning for industry, updates to Performance Requirements for non-residential Building Classes in NCC 2025 should be aligned to zero carbon buildings, plus updates to

achieve zero carbon aligned Performance Requirements for residential Building Classes should be forecast to come into effect in NCC 2028.

Climateworks suggests the Definition be introduced as an ABCB Voluntary Standard in NCC 2025 (referred to as 'Standard: Zero Carbon Buildings' in our proposal), and made mandatory with NCC 2028, with immediate adoption and a maximum of two years for implementation. This Voluntary Standard will allow early-moving building developers to refer to a national standard as early as 2025 for zero carbon buildings, while also providing sufficient time for industry to transition towards zero carbon standards for new residential and non-residential buildings. This will enable Australia's new building stock to transition in accordance with our modelled 1.5°C and 2°C pathways and allow Australia to reach its legislated emissions reduction targets.

What alternatives to the proposal (regulatory and non-regulatory) have been considered and why are they not recommended?

Regulation is a powerful tool that governments can deploy to effectively, efficiently and fairly drive change. Regulation is particularly helpful to provide necessary frameworks and rules to achieve a desired goal or objective, establishing the institutional infrastructure required to drive successful, coordinated transition in line with legislated emissions reduction targets, and setting timelines across industry.

Three alternatives to the proposed update are: promoting zero carbon homes through voluntary guidance, leaving the transition to net zero homes up to the market without a definition, or defining zero carbon homes only through the Trajectory for Low Energy Buildings (the 'Trajectory') in the 2024 update. These alternatives are all insufficient to reach the scale necessary to decarbonise the building sector.

1) Voluntary guidance for consumers and builders on zero carbon homes already exists (for example, on the YourHome website run by the Department of Climate Change, Energy, Environment & Water) and is useful but to date has not increased the stock of net zero homes across Australia at scale. Voluntary guidance also already exists for ageing in place for homes via the ABCB Voluntary Standard for Livable Housing Design: Beyond Minimum. We are proposing that zero carbon standards are brought in for all building classes; therefore this proposal calls for the use of voluntary standards by the ABCB as well as provisions within NCC 2025.
2) While some financial institutions have started offering tailored products for lower carbon homes, more action is needed. According to research, there is a clear market failure, with a

mismatch between expectations of consumers who want more energy efficient homes and what is the norm in the building industry (Low Carbon Living CRC & Australian Sustainable Built Environment Council 2019).

3) Climateworks considers that implementing our definition of net zero all-electric buildings in the Trajectory would be beneficial. While there is already a 'Zero energy (and carbon) ready buildings' definition in the Trajectory, zero carbon homes are still not the norm for builders, indicating that regulatory action is also required. The Climateworks definition of net zero buildings is more detailed than the current definition in the Trajectory, so will provide additional guidance. Including the definition in the NCC, aligned with the Trajectory, would reduce uncertainty for industry and promote standardisation across jurisdictions.

   Based on the above points, Climateworks believes that regulation via the NCC will be the most effective option.

The impacts

Who will be affected by the proposal?

The groups affected by the proposal are: construction industry, consumers, manufacturers and installers of products, designers, and regulators.

In what way and to what extent will they be affected by the proposal?

Industry: The phased implementation of zero carbon aligned codes (as a Voluntary Standard in NCC 2025 and mandatory in NCC 2028) will provide sufficient warning for industry – including manufacturers, installers, designers and regulators – to transition to zero carbon buildings and renovations, while also providing guidance for early-movers. Organisations across material supply chains may be impacted if builders shift to different material inputs, which may affect other industries which rely on the same materials. There may also be the need to upskill industry on the elements that constitute zero carbon buildings.

Consumers: The Definition will provide a clear set of zero carbon standards that early-moving consumers can use to base their new builds around, enabling them to clearly communicate their needs with industry.

Once consumers begin living in homes covered by the Definition, they are likely to experience positive impacts through increased quality of life, comfort, better health outcomes, and lower energy bills.

Consultation

Who has been consulted and what are their views?

Climateworks developed the proposed Definition in conjunction with an Expert Advisory Group (EAG) based on best-practice definitions of zero carbon buildings both within Australia and internationally. This included energy efficiency lead representatives from:

- Industry and sector peak bodies and associations, including: Green Building Council of Australia, Energy Efficiency Council, Community Housing Industry Association
- Not-for-profit organisations and research organisations, including: Renew, Climate-KIC Australia, Energy Consumers Australia, Merri-bek City Council, and Brotherhood of St Laurence
- One of Australia's 'big four' major banks.

References

Climateworks Australia (2020) *Decarbonisation futures: solutions, actions and benchmarks for a net zero emissions Australia*, Climateworks Australia, accessed 21 June 2023. https://www.climateworkscentre.org/resource/decarbonisation-futures-solutions-actions-and-benchmarks-for-a-net-zero-emissions-australia/

Harrington P & Toller V (2017) *Best practice policy and regulation for low carbon outcomes in the built environment*, Cooperative Research Centre for Low Carbon Living, accessed 12 July 2023. https://apo.org.au/sites/default/files/resource-files/2017-04/apo-nid232106.pdf

International Energy Agency (2021) *Net zero by 2050: a roadmap for the global energy sector*, International Energy Agency, accessed 27 July 2023. https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf

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