



Australian  
Institute of  
Architects

# SCIENCE AND HEALTH TARGETS IN SOUTH AUSTRALIA'S RESIDENTIAL SECTOR



DON'T LEAVE HEALTH TO A GAME OF CHANCE.

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**SA CHAPTER- L2/15 LEIGH STREET, ADELAIDE**

**20 July 2023**

## AIA TRAJECTORY

Architects working with regenerative principles and first nations people

## SA PROPOSED TRAJECTORY 2024 OCTOBER 1ST

### NCC 2022 adopt 7-star Whole of Home and condensation.

Include **Passivhaus as an alternative method of NCC 2022 compliance** specifically providing a optional safeguard for climate zone 59 occupants while regulation develops.

**No offsets** in star ratings for PV

**No new gas connections.** Subsidise gas disconnections to existing.

**And,**

**Ecological impact** of buidlings are measured at planning and required planting regeneration to offset emissions are adopted onsite or within 1km. Landscape Architects should be engaged to work with the native flora and fauna and ratio of revegetation that needs to occur.

**Existing homes** that are 5 years old and providing rental accomodation have 6-star NatHERS Certified minimum energy, water targets. Those older than 5 years are required to provide solar panels and battery storage and disconnect from gas.

**Mandatory disclosure** should be publicly visible through a deidentified State Government database to provide future predictions of homes not yet ready to withstand acute heat and cool shock.

**Or,**

Adopt only condensation provisions and require hygrothermal assessments across all new class 1a from October 1st and if mould risk is identified, the design needs to be improved to achieve a risk free construction thourgh the hygrothermal assessor.

From **April 1st 2025, adopt remaining NCC 2022 7-star housing.**

No offsets in star ratings for PV

**No new gas connections.** Subsidise gas disconnections to existing.

Include **Passivhaus as an alternative method of NCC 2022 compliance** specifically providing a optional safeguard for climate zone 59 occupants while regulation develops.

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## 2025 - 2026 NCC

**April 1st 2025. Start mandatory reporting on LCA using RapidLCA through PlanSA.** Include housing policy updates to include LCA in councils. No set emissions reduction targets to be mandated.

**April 1st 2026, Mandatory RapidLCA emissions reduction targets** to be introduced through PlanSA application process, i.e. 80% reduction on 2005 emissions.

**April 1st 2025, include mandatory disclosure** of energy compliance and whole of home certificates to occupants and provide **incentives** to achieving **95% net-zero** without offsetting.

**And,**

**Jan 1st 2025 - Include climate risk calculations** on top of operational energy (compliance) at planning level using the Governments urban heat mapping to test thermal resistance against the World Health Organisation benchmarks.

**Jan 1st 2025 - Prioritise proactive rectification** works to existing assets in high climate risk councils using the Governments flood mapping to test water shedding etc.

**Ecological impact of buidlings are measured** at planning and required planting regeneration to offset emissions are adopted onsite or within 1km. Landscape Architects should be engaged to work with the native flora and fauna and ratio of revegetation that needs to occur.

**Commercial NCC 2025** provisions for water shedding, condensation and weather resistance adopted without transition period and included in all council and community buidlings in high climate risk areas.

**Existing homes** that are providing rental accomodation have minimum energy, water and waste targets.

**Mandatory disclosure** should be publicly visible through a deidentified State Government database to provide future predictions of homes not yet ready to withstand acute heat and cool shock.

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## 2028 NCC HOUSING

**Adopt 8+ star and NCC provisions for Whole of Home and increase condensation and water shedding requirements.**

**All new homes to have airtightness testing after first fix and after construction** by an ATTMA professional, and behavioural occupancy certificate provided at practical completion.

**Homes achieving above 9 Stars with 80%** natural renewable materials as their base construction method, receive incentive for achieving net-zero water and waste.

**All new houses that are designed 100% renewable net-zero carbon for energy, water, waste and off-grid, are incentivised for operational monitoring for indoor air quality and ventilation.**

Homes to achieve high targets for removing excess finite materials from the **circular economy** and **incentives** for designed for manufacture, assembly and disassembly.

**Existing homes** in high risk areas to be incentivised for flood and heat risk mitigation.

**Existing homes** that are providing rental accomodation, have targets lifted.

**Mandatory disclosure** should be publicly visible through a deidentified State Government database to provide future predictions of homes not yet ready to withstand acute heat and cool shock.

Landscape Architects should be engaged to work with the native flora and fauna and ratio of revegetation that needs to occur.

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## EXECUTIVE SUMMARY

Recommendations made in this document, form a researched position that energy efficiency and condensation mitigation in the NCC 2022 play an important role in the delivery of a healthy and equitable future. As does the concurrent planning and staggered implementation of increased standards for housing, mandatory disclosure and reviewing or reinvigorating supply chains based on achieving science.

Whilst it is acknowledged that the National approach to the NCC 2022 may vary State to Territory, South Australia has an opportunity to use exemplar studies spanning the last 5+ years to provide a supportive position for residential building carbon reform. In this transition, the revisiting of historical and tested natural forms of construction.

As we advocate for the right to fair, continuous supply of 100% renewable energy to homes which are thermally performant, and ready for extreme heat and cool, we are reminded of those currently in housing which falls short of even the minimum (indoor dampness, mould and indoor air quality conditions) set by the World Health Organisation.

Our call for mandatory disclosure of current operational energy and embodied carbon disclosure through the planning application process also supports our ongoing efforts to work with the supply chains, specifying low embodied materials and working through bespoke contexts.

We advocate and lobby for whole site analysis for regenerative architecture that accounts for the ecological impact of the built form and overall reduction in the need to 'offset with nature' and carbon credits.

*Previous page. Figure 1: Recommended trajectory to support housing health, science-based targets for Adelaide addressing twin crisis.*

## Houses should be required to meet condensation requirements of NCC 2022 from October 1st, 2024 (as the bare minimum), to protect the large number of homes going through at or under 6 stars using the alternative methods. The NCC 2019 is current resulting in houses are falling short of the World Health Organisations targets for dampness and mould<sup>1</sup>.

In very basic terms, **condensation** within buildings is caused by water vapour transferring through walls, roof and floor constructions and the conditions of that vapour meeting potential humidity of indoor conditions. The conditions can depend on things like humidity or pressure, temperature, wind and capillary action amongst other reasons. It can either be controlled through adopting a building wide strategy for health and airtightness in the case of the Passivhaus Standard. Or the construction should be done so in a manner that allows materials to breathe based on their chemical makeup. The NCC 2022 specification for a class 4 vapour barrier for this climate zone represents one method that is to aid in the prevention of condensation and mould conditions.

Regulations need special considerations for materials and their vapour permeability. In the case of some rapid form prefabrication using structural insulated panels or Expanded Polystyrene (which have a non-breathable core) it is recommended that regulation should mandate undergoing a hygrothermal analysis and dictate that the system may need to adopt an airtight (below 3ACH@50Pa) approach with mandatory mechanical ventilation. Often these construction systems are rapidly assembled and can offer some benefits in cold climate, a bit like an esky. There is added consideration here for the source of petrochemical based insulative foams which are fossil fuel derived despite the benefits of insulation. However, comparing to natural wood fibre insulation boards for instance, have less resistance to acute heat stress at high temperatures.

Mould formation has a high occurrence in buildings in Adelaide's NatHERS climate zone 59 (hills and southern regions generally), and poorly built volume homes in these areas, can experience winter indoor temperatures below 18C and where there is high water vapour and humidity. These conditions impact the surface and interstitial layers of the construction and the air quality inside the home. A monitored study of homes in Adelaide by Dr Lyrian Daniels also provided actual data on how frequently the homes were underperforming against the World Health Organisations, minimum standards.

Due to the topography in Adelaide, NatHERS climate zone 59 for the hills and east of the city, including Mount Barker, has significant climate risk if:

- the building envelope air sealing and insulation levels are not balanced to achieve an indoor minimum temperature and continuous ventilation rate
- if areas such as concrete slabs and footings are not insulated and allow thermal bridging to occur.

This can reduce lifespan of products, adding considerable risk to bushfire compliant materials also becoming compromised. Commonly during NatHERS simulation, adding the slab insulation to the NatHERS ratings for climate zone 59 increases the star rating as the software recognises the significant and sudden cooling of surfaces exposed to increased water vapour in the air.

This is also true on the outskirts of climate zone 16 toward areas like Belair which are simulated under flatter, warmer conditions which are not reflective of the Bureau of Meteorology statistics.

Both climate zones have demonstrated indoor conditions away from healthy range in studies where indoor monitoring was placed inside homes<sup>2</sup>.

## Materials, diversion from fossil-fuel extraction and implications under climate risk

Climate risk is also not currently considered in the CSIRO weather data, therefore predictive bench lines are important for councils and local governments to identify the trajectory and status of housing performance in their districts. Overlays of specific policy regarding climate risk should be driven from the local government authority. Current CSIRO NatHERS climate files are out of date and development is underway for including some level of climate risk in the simulations. The [City of Vincent in Western Australia](#) has used RapidLCA as part of the planning submission which has seen disclosure reporting and improvement in CO2 emissions and freshwater use reductions since implementation. Fees vary depending on building typology, however for some residential it starts at \$100 for the online simulation. Also, the price reduces the more emissions that are verified as being lowered.

There has been a recent study via Envirotecture who simulated four scenarios that cross over energy efficiency and embodied carbon in 'The Little Pot o Gold'. The third party verified study, highlighted the need to review the preferential treatment by NatHERS software for 'thermal mass' if included in a rating for the purpose of increasing the star rating, which subsequently increased the embodied carbon of a project. The study simulates the same fully compliant Liveable Housing Design home, in each state/territory at Passivhaus level compliance at low, medium and high embodied carbon, and then as close to 10 NatHERS stars. The highest embodied carbon project demonstrated was at the highest NatHERS star ratings, indicating in their view that the software was seeking more 'thermal mass' in the form of bricks and concrete in the simulation.

It should be noted that there we found no evidence to support local thermal performance assessor's (TPA's) having more knowledge of what construction methodology can achieve higher star ratings in Adelaide climate zones. Though it may be expected local TPA knowledge can aid achieving improvements more efficiently, the Institute would encourage seeking alternative or historical methods of construction which might have a more regenerative, non-fossil fuel application. The Institute is not aware of whether strawbale, hempcrete wood insulation products are included in conversations with governing bodies, however, strongly encourages thinking about what materials the supply chain will need to provide for planning the trajectory to lower emissions by 2030. These constructions all have a high thermal insulation/resistance (R-value). Otherwise, planning the trajectory could be short-sighted and understanding what constitutes 'appropriate construction methodology', which from a volume standpoint, largely considers methods delivering volumes of homes. Typically brick veneer and lightweight cladding in Adelaide with minimal insulation, leaves occupants out in the cold. It questions also, **why waste so much thermal mass on the outside when strategically placing it on the inside in winter sunlight with better airtightness, could reduce supply chain and skill shortages? Dramatically lower embodied carbon of the construction sector across the whole of Adelaide.**

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<sup>1</sup> World Health Organization. Regional Office for Europe. (2009). WHO guidelines for indoor air quality: dampness and mould. World Health Organization. Regional Office for Europe.

<https://apps.who.int/iris/bitstream/handle/10665/164348/9789289041683-eng.pdf?sequence=1&isAllowed=y>

<sup>2</sup> Science Direct & University of Adelaide. Daniel, Lyrian. Bake, Emma. Williamson, Terry. (2019) Cold Housing in mild-climate countries: A study of indoor environmental quality and comfort preferences in homes, Adelaide, Australia.

Interestingly, there is a history of high star rating houses in Adelaide, strawbale the cheapest and best performing for this climate zone, was out of the scope in Envirotech's simulations. As an alternative construction, and historically tested in this climate zone with Christies Walk, The Barn and numerous others, should be seen by planning sectors to be a quick win for both low operational and embodied carbon. Newer, 'sit-ups' strawbale prefab panels are also on the market with limited issues with thermal bridging. An example of this that would work well in the Adelaide Climate zone is a project by Talina Edwards, in Victoria. The Huff'n'Puff Strawbale house<sup>3</sup> is off grid, the biological/chemical makeup of strawbale is both an insulation system and provides breathability. For additional airtightness for certification, there is a weathertight membrane on the outside of the building and the lime render provides airtightness on the inside. This methodology is also suitable also for suburban construction and within smoke and particle range of bushfires.

This NatHERS preference for mass material is summarised some local Adelaide understanding in the TPA space, that journeying to 7 stars under the NCC 2022 is a positive move. However, concurrent with this move, we need to move faster on condensation mitigation to increase building lifespan, include Lifecycle Assessment (LCA) in planning a design, and propose using an already tested method, the Passivhaus standard, as an alternative pathway to building compliance to reduce climate risk immediately. Although inclusion of this alternative state variation to the NCC, won't immediately fix the issues of some of the poor health outcomes of the volume market, government affiliations could then use this to pivot minimum performance policy criteria based on their actual environmental context. Bodies such as Renewal SA and Government Housing bodies should be key stakeholders here. Passivhaus has been adopted in NSW which has similar mould and climate risk to Adelaide and improves the lifespan of materials. As the next expected NCC housing iteration will not be until 2028, and possibly adoption after transition periods in 2029, to not implement a strategy now for climate resistance is going to lead to a generation of stranded assets not able to be retrofit.

To highlight some of the issues in maintaining the current NCC 2019 for energy and condensation, a scenario is proposed. A 6-star NatHERS home that might be maintained without mould and constructed to an 'as-built' rating, the occupant/builder would need to ensure **behaviour change considering** (but not limited to):

- ensure that the building is sealed moderately airtight approximately 4-5 ACH@50Pa and remains continuously conditioned with fresh air 24 hours a day and is automatically purged of humidity and excessive mould conditions.
- has automation and sensors that advise people immediately when there is the need to extract the indoor air to the outside, when they are not home the house needs to be able to fluctuate ventilation accordingly.
- ensure a dehumidification strategy is in place. ventilation will only work if the pressure in the outside air remains a lower humidity than is created inside a home in winter with cooking, washing, hanging clothes to dry, sleeping etc.
- Use a class 4 membrane for the walls and undertake a Hygrothermal simulation. Sometimes reflective foils which aren't breathable have been shown to create condensation conditions in construction and need adequate ventilated cavities.

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<sup>3</sup> Passive House Database (2023) ID 7237. Huff'n'Puff Strawbale Passivhaus. [https://passivehouse-database.org/index.php?lang=en#d\\_7237](https://passivehouse-database.org/index.php?lang=en#d_7237)

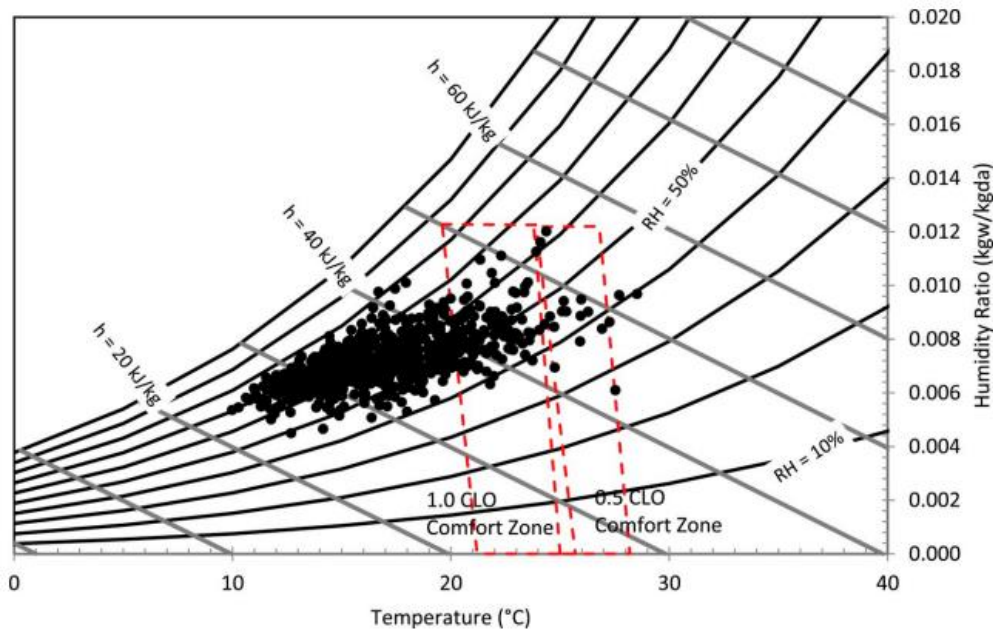


Image above: Indoor environmental conditions at the times that thermal comfort vote surveys were completed compared with the ASHRAE Standard 55-2017 acceptable comfort zone for conditioned spaces. Courtesy of: Science Direct & University of Adelaide. Daniel, Lyrian. Bake, Emma. Williamson, Terry. (2019) Cold Housing in mild-climate countries: A study of indoor environmental quality and comfort preferences in homes, Adelaide, Australia

To propose a trajectory for the implementation of science-based targets we also need to understand, consumer behaviour and barriers in understanding can't be resolved at a lower NCC Star-level.

**All suburbs in Adelaide should be transitioned away from gas connection, and no new house should be allowed to include gas in their homes and the inclusion assumes that occupants will adequately ventilate the home** during use of appliances and the like. One small leak undetected could have years of health and on scale, and forcing mandatory gas infrastructure into suburbs and homes, a larger economic and health impact.

To assume that all occupants, can and are physically able to operate their homes at the level required to ensure their indoor temperatures maintain the air quality and humidity that keeps the homes mould and condensation free, is leaving health to a game of chance.

## Australian Building Codes Board (ABCB) and Greenhouse and Energy Minimum Standards (GEMS) reporting highlighted ‘energy rating tools’ as the enabling mechanisms for addressing climate change. Current legislation permits homes to gain compliance, potentially under 6-stars which does not use an energy rating tool ‘certification’ and well below indoor thermal comfort conditions throughout the year.

The COAG’s Trajectory for Low Energy Buildings is currently under the process of industry review to update the content. It does stipulate the aims of the policy to “**improve people’s comfort and health**” to “assist in lowering peak demand”, “reduce carbon emissions”, “lowering energy bills”<sup>4</sup>. It also notes in the Addendum, initiatives to improve the energy efficiency of existing buildings which can be done simultaneously when retrofitting<sup>5</sup>.

There is a difference between a building that uses a software tool to establish benchmarks against the NCC and those that are certified through NatHERS. It is important to make this clear to consumers and not greenwash.

Under NatHERS, there is the ability to design out some perceived costs of some alterations to 7-star housing. Involving architects and design professionals early in project planning, the following items (but not limited to) could be considered and are highly effective in achieving a higher star rating and in some do not require cost escalation:

- Undertake the initial NatHERS assessment based on the design of the house planning the spaces to use northern passive solar entry into conditioned rooms. Plan non-conditioned wet areas to the southwest and isolate thermally.
- For optimisations of new house plans compartmentalise and insulate based on levels of activity.
- Ensure all bedrooms have ceiling fans and are appropriately sized.
- Strategically place thermal mass in the form of concrete, stone, rammed earth and brick where it receives direct sunlight in winter, spring and autumn only. Do not put around the exterior of the rest of the building. Especially on the southern walls, where it will continue to be cool all year around.
- Use variable shading devices not only for summer, but the option for shading in spring and autumn also.
- Do not specify evaporative cooling to the building. There are a high number of buildings in the volume home market that specify evaporative cooling, which is not rewarded and contributes to indoor humidity in SA’s climate zone during summer conditions when the homes are shut, and the heat gets high enough to create mould.
- Make all areas smaller with wider transition areas suitable for LHD and reduce surface area of the building through clever design and understanding air dynamics.
- Disallow vented tiled roof. Design a warm roof insulated and sealed away from the ceiling plane to allow future retro-fit and adaption.
- Reduce the surface area to floor ratio.



This can drive highly successful outcomes from regional renewal and growth LGA projects.

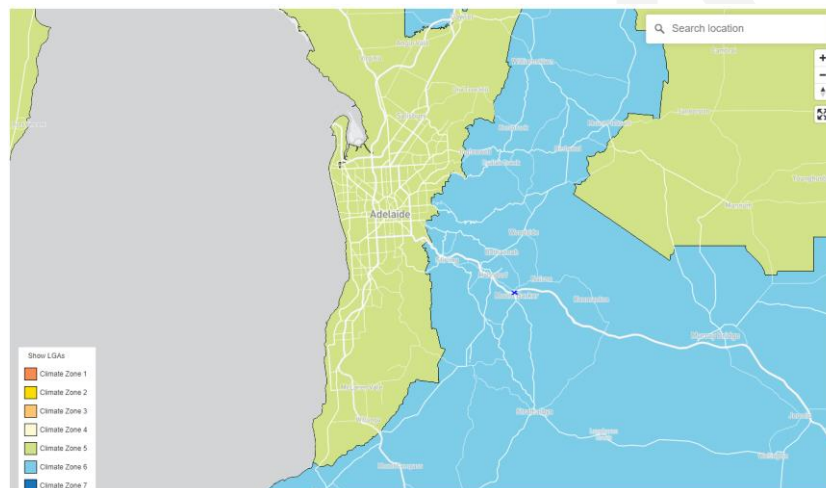
The requirements of the NCC 2022 including the Whole of Home assessment, also noted through the process of calculation, the decision making for hot water provisions and solar.

This requirement at Building Rules Consent allows certainty for designers to specify and model conduits and service lines within the construction drawings, without the need to undertake amendments when a provisional sum in the building contract provides a substitution.

The COAG Energy Council Report for Achieving Low Energy Homes (2021) cites 7 stars under the Potential Trajectory for Low Energy Homes, and considering opportunities for *'building sealing, while addressing any ventilation and condensation impacts'*<sup>6</sup>. It also notes that for based on the NCC climate zones, it is 'cost effective from 2022 for new class 1 dwellings to be built to at least:

- between 6.5 and 7 stars for NCC climate zone 6,
- 6.5 stars equivalent in NCC climate zone 5<sup>7</sup>

*Image below: NCC Climate zone map indicating Adelaide Hills sits within climate zone 6, and the flatter Adelaide suburbs climate zone 5. NatHERs and BOM both indicate risk conditions in climate zone 6 and are potential mould growth areas due to the colder weather and limited duration between seasons to provide the annual drying out time for the construction to self-regulate.*



<sup>4</sup> COAG Energy Council (2018) Trajectory for Low Energy Buildings

<https://web.archive.org/awa/20210603110748mp> /<https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/Trajectory%20for%20Low%20Energy%20Buildings.pdf>

<sup>5</sup> COAG Energy Council (2019) Addendum to the Trajectory for Low Energy Buildings - Existing Buildings.

<https://www.energy.gov.au/government-priorities/energy-ministers/energy-ministers-publications/trajectory-low-energy-buildings>

<sup>6</sup> COAG Energy Council Report (2021) Report for Achieving Low Energy Homes.

<https://web.archive.org/awa/20210603110759mp> /<https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/Report%20for%20Achieving%20Low%20Energy%20Homes.pdf>

<sup>7</sup> COAG Energy Council. (2018) Report for Achieving Low Energy Homes.

<https://web.archive.org/awa/20210603110759mp> /<https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/Report%20for%20Achieving%20Low%20Energy%20Homes.pdf>

**Although easy to have an emotional response to climate change targets, the construction, architecture, and planning sectors need to work collaboratively and achieve outcomes for community health and well-being. Third party verification is vital in any effective relationship and provides transparency to cost vs benefit.**

The validity of data used to undertake cost vs benefit analysis should come from industry wide recognised institutions that currently consult heavily with the Government. We believe that smaller entity sizes providing supporting costing data, may not have third party verified baselines on which to work from nor adequately provide transparency of expertise in the NatHERS software which is the driver of the NCC 2022 change. In experience both in context of the climate zone, and the software itself, could result in misleading information and possible detrimental health outcomes for residences.

Costs should be provided from non-construction and third party verified research bodies that have the resource capability or experience with materials specified in the cost vs benefit studies of 7-Star and Whole of Home.

Current consultations on costing have been provided by reputable sources for the ABCB, COAG and the National Energy Productivity Plans. These are from associations and bodies such as:

- ASBEC: Built to Perform Report
- Climate Works: Built to Perform Report
- ABCB: Both current and previous costing reports for thermal and condensation improvements.
- AECOM: Report for achieving low energy homes<sup>8</sup>.

Supporting suppliers that have already changed manufacturing processes and supply chains to the requirements of NCC, need to be able to obtain benefit from implementing on October 1st, 2024, without risk of further delays and financial risk. Supporting earlier development of the manufacturing skills needed to reach net zero by 2030.

As the industry progresses to 2030 and beyond, it is expected that international investment may be required for trainers for verified natural material and product installation. Progressing towards the government's endorsement of residential mandatory disclosure of building and thermal performance construction. The UK is an exemplar in supply chain transition to natural materials and are already providing local investment in training. Supporting our transition for knowledge should be sourced from existing markets and adapted with government support for local conditions.

Delaying NCC 2022 based on supply chains for volume home builders should instead be supported to improve their knowledge on condensation and thermally performant construction methods. Some of which do not require brick layers and the like which are in short supply.

## Mandate disclosure and transparency of 'whole of home' and other ratings of all new houses through the planning consent process from October 1st, 2024, regardless of the implementation of the NCC 2022 and LHD.

As of October 1<sup>st</sup>, 2024, mandatory disclosure of building performance using methods such as the Victorian Scorecard, NatHERS certificates and future government methods indicated under the National Framework, should be prioritised as part of an 'occupancy certificate' issued and lodged with the PlanSA portal, allowing tracking progress and improvements to building performance. For South Australia, this would require that designers, owners, and builders and required to lodge the same level of disclosure for housing which reports directly from a NatHERs or Passivhaus simulation certificate, the predicted annual consumption of a home.

Ideally, adopted on October 1<sup>st</sup>, 2024, embodied carbon reporting can become part of the lodgement to planning. As a short term 1-to-2-year goal, the Government needs to similarly support a disclosure of embodied carbon and the materials that are contributing to high embodied carbon supply chain. If implemented sooner, this baseline could aid in identifying that bricks and industrialised methods of construction are barriers to getting to net zero with minimal offsets. The City of Vincent<sup>9</sup> in Western Australia is the first council in Australia to do mandate this LCA policy and has made large reduction in carbon emissions through this process. The council uses RapidLCA as a benchmarking tool in most instances.

This process would be forward thinking and position the South Australian government to identify climate risk based on construction methodology, pre-emptive of any code change.

The City of Vincent has provided an '[Environmentally Sustainable Design Information Sheet](#)' on it's website stating targets:

*Is capable of achieving the following performance standards (or an acceptable equivalent approved by the City) through a Target Setting Life Cycle Assessment (LCA) report:*

- 50% reduction in global warming potential when compared against the Perth statistical average for residences; and 50% reduction in net fresh water use when compared against the Perth statistical average for residences.

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<sup>8</sup> COAG Energy Council. (2018) Report for Achieving Low Energy Homes.  
[https://web.archive.org/awa/20210603110759mp\\_/https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/Report%20for%20Achieving%20Low%20Energy%20Homes.pdf](https://web.archive.org/awa/20210603110759mp_/https://energyministers.gov.au/sites/prod.energycouncil/files/publications/documents/Report%20for%20Achieving%20Low%20Energy%20Homes.pdf)

<sup>9</sup>

[Environmentally Sustainable Design Information Sheet Single Houses and Grouped September 2020.pdf \(vincent.wa.gov.au\)](#)  
[https://www.vincent.wa.gov.au/Profiles/vincent/Assets/ClientData/Environmentally Sustainable Design Information Sheet Single Houses and Grouped September 2020.pdf](https://www.vincent.wa.gov.au/Profiles/vincent/Assets/ClientData/Environmentally_Sustainable_Design_Information_Sheet_Single_Houses_and_Grouped_September_2020.pdf)

**Financial assistance should be retained and expanded to support renewable energy for houses with priority to annual 100% renewables. Concurrently, gas should be phased out of all new home builds from October 1st, 2024, supporting a quicker transition to 100% renewables.**

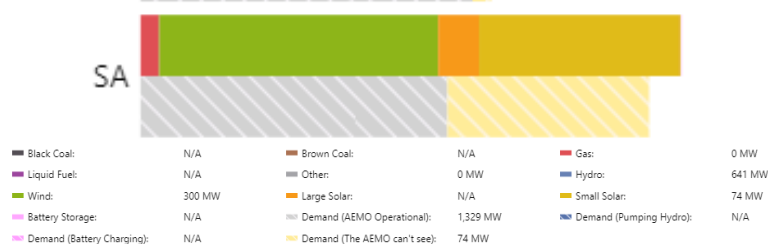
Current NCC 2019 SA exemptions cited by the MBASA for renewable energy, note to ‘offset’ emissions. This does not fully ‘reduce carbon emissions’ and can contribute to larger consumer behaviour preferencing reverse cycle-air-conditioning to run 24 hours a day. Especially in building envelopes that don’t meet a thermally tested solution such as with Passivhaus.

Also, while the grid maintains supply from gas and does not address seasonal fluctuations in thermal comfort, there is a need to ensure building envelope upgrades from the outset, and then compliment with 100% renewable energy supply. The Institute calls for all gas connections to be removed from state planning requirements for new developments, with published studies in Adelaide, demonstrating the monitored homes are not meeting requirements to keep the cold and hot out, increasing closure of fenestrations and increasing 24-hour heating and cooling. These also are more likely to ‘capture’ and not release gas within the home contributing to poor indoor health.

A live supply and demand widget for Adelaide provided by RenewEconomy, notes that during a cold winter day with partial sunshine, there was a mix of gas, wind, solar and small solar. In Adelaide’s climate zone 59, energy use increases and subsequently in winter, is not supplied by 100% renewables, particularly in Mount Barker where there are requirements for connection to gas infrastructure.

The Passivhaus requirements for *“thermal comfort must be met for all living areas during winter as well as in summer, with not more than 10 % of the hours in a given year over 25 °C<sup>10</sup>”* indicate a benchmark for houses which would also suit Adelaide’s NatHERs climate zone 59, Adelaide Hills, and would be supported as an alternative pathway to compliance in South Australia.

*Below: Live Supply and Demand Widget, Sponsored by RenewEconomy 7.7.2023<sup>11</sup>*



<sup>10</sup> Passive House Institute (2023) Passive House Requirements.

[https://passiv.de/en/02\\_informations/02\\_passive-house-requirements/02\\_passive-house-requirements.htm](https://passiv.de/en/02_informations/02_passive-house-requirements/02_passive-house-requirements.htm)

<sup>11</sup> [Live Supply & Demand Widget, sponsored by RenewEconomy | \(nem-watch.info\)](https://www.nem-watch.info/widgets/reneweconomy/) <https://www.nem-watch.info/widgets/reneweconomy/>

2023 science and health based targets in south Australia’s residential sector

## Support new construction material research for better resistance to weather and increased insulation.

### With the following criteria:

- Local supply and potential for skill growth.
- Better resistance to outside extreme temperatures that can handle both winter and summer. Closed cell petrochemical-based products can be of assistance in winter however fall down in conditions of extreme heat. Incremental delay should be used as an indicator of performance and opportunities exist for both investment in agriculture and construction materials for natural renewable cradle to cradle products. Similar investments in the UK have seen a larger adoption of those materials due to their natural resistance against condensation and mould.
- Lifespan and durability in exposure to UV during construction.
- Ability to form part of the cradle-to-cradle methodology and reduction in use of key finite resources.
- Embodied Carbon research through mandatory disclosure would aid in the identification of key areas of manufacturing that need to change, are not suitable for the extreme climate and likely are related to their high embodied carbon. Instead, government should start funding the transition of these skills into other markets such as building with hempcrete, strawbale and wood fibre.

## Though credentials unverified for accuracy in their statements nor endorse work, there are several Adelaide builders\* already listing their sustainability credentials on google such as:

\*the following list is provided for example only and does not constitute an endorsement.

### a. Builders:

- i. Enduro Builders – Passivhaus homes and consulting for hygrothermal assessments.
- ii. Aaron Martin Construction
- iii. Dellatore Construction
- iv. Balance Homes
- v. Gallery Living
- vi. Beechwood Homes
- vii. Lumea Building Co
- viii. ModnPods
- ix. Eco Homes

### b. With skills noting:

- i. Greensmart Builder
- ii. Energy efficiency
- iii. capable of attaining 8 stars energy rating.
- iv. Sustainable Homes & Green Design