AUSTRALIAN
HEMP MASONRY


# Why the paddock needs to be closer to the plate - And why the plate needs to be smaller (Working in the Safe Operating Space)

Australian Reduction Roadmap V1.3

“What happens in the next 10 years will likely determine the state of the planet we hand over for future generations.”
Johan Rockström, 2022, Professor in Earth System Science, University of Potsdam

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In the latest update of the **planetary boundaries** work by Stockholm Resilience Centre, it is evident that we have now exceeded six out of the nine boundaries. With each update, it becomes increasingly clear that humanity’s pressure on Earth’s systems is pushing our planet closer to irreversible climate change.

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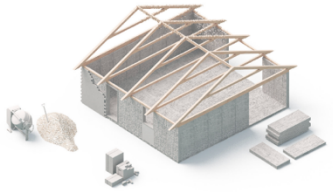
Australians have the largest per capita housing footprint globally. The average floor area of a new dwelling is 186m2 —though the most common Australian type, the detached house, averages 232m2, the largest in the world.



461.8
$kgCO_2e/(m^2 \cdot a)$



## Current housing emissions

The annual greenhouse gas emissions per square metre of housing in Australia is calculated as such: initial embodied greenhouse gas emissions + annualised recurrent embodied greenhouse gas emissions (for replacing materials over 50 years) + annualised heating and cooling greenhouse gas emissions (over 50 years) for the average size of a new dwelling: 186m² (noting that Australia's predominant dwelling type, the detached house, is 232m² on average).

Initial embodied greenhouse gas emissions are sourced from Schmidt et al, 2020. Recurrent embodied greenhouse gas emissions are based on figures from Dixit, 2017. Heating and cooling greenhouse gas emissions are based on data from NatHERS.

All greenhouse gas emissions are reduced by relevant factors over a 50 year period, to reflect the decarbonisation of the energy mix and improving technology.

6.63
$kgCO_2e/(m^2 \cdot a)$

## Housing emissions limit per m²

In order to operate within planetary boundaries, the estimated greenhouse gas emissions intensity of 461.8 $kgCO_2e/(m^2 \cdot a)$ needs to be reduced by **98.57%**, resulting in a limit of **6.63 $kgCO_2e/(m^2 \cdot a)$** for new housing.

“Australia’s targets for new housing, if delivered ‘business as-usual’, would consume around 200% of our national emissions budget for everything. “

At the same time most Australians can’t afford a new home.

**What options are identified within the reduction roadmap?**

1. Reducing the average size of homes back to the average size of homes in 1970 i.e. 120m2 (We have much smaller households now than in 1970.)
2. Reducing the number of homes built
3. Reducing the size as well as the number of new homes and making better use of the existing housing space. (This will give us more available carbon budget.)

**Where are the opportunities for hemp construction in response?**

- Current Australian housing targets vary by state/territory, but the total **goal per state approximates to 200,000 new housing units being built annually.**
- Roughly 80% of Australia's 10 million homes still have poor thermal performance (rated at 2 stars or less). Retrofitting of older homes is an effective strategy to achieve the net zero target by 2050.
- Substantial carbon storage whether in new builds, adaptive reuse or retrofitting projects.

Challenges: Without significant marketing of the co-products of hurd production for construction materials, hurd producers/processors will continue to struggle to produce hurd at a cost low enough to supply low-cost/affordable housing material options.

We have abundant hurd available for the current rate of hemp construction – not all hurd that's being produced is building grade hurd.

**Measures that could shift this balance:**

Continue work on **standards** for hurd for construction

**Establish a trading platform** to quantify production and record uptake of materials. This could also potentially inform industries outside the hemp industry about availability of feedstocks and **trigger substitution**.

Specifications for any hurd products where they are known should be collated and shared by the primary hemp organisations to any of their members, so that they can **give clearer advice to farmers about potential markets and the risks, so that risks can be managed.**

Industry organisations **market hemp feedstocks to potential larger buyers for substitution.**

**Imports of subsidised hurd are discouraged** and those not actually involved in construction, cease public commentary about all Australian hurd being sub-standard. Existing processors who are producing building grade hurd based on European criteria need support not unnecessary competition.

**What is building grade hurd?**

It's been **retted** so that the process of microbial and fungal breakdown is sufficient that the bast separating from the hurd is well established (**and not over-retted - full of mould**). It's particle size is variable and workable without being too small.

The particle size should not negatively impact on the finish, is workable and the amount of retained bast does not causing tangling in the mixer.

**What does the available science tell us about retting and why it matters to the long-term durability of hempcrete?**

The coating on the hurd inhibits Binders when some of it dissolves when the hurd gets wet in the mixer.

The undissolved lignins and organic sugars coat the hurd keeping bast attached (which can separate at a later stage in the wall) impacting long-term durability.

The coating negatively affects thermal and acoustic performance.

# What are proactive responses from an industry that believes it offers some of the best solutions to the emerging low carbon construction industry?

- Industry organisations need to **understand and communicate the overall ecological impact as well as the carbon footprint of importing** – relying on science rather than commercial platforms for information.
- **Collectively lobby federal and state governments to utilise the appropriate mechanisms to address this trade imbalance.** French farmers are subsidized which is largely why the French are the world's primary exporters of hemp. **Keep the industry Australian**.
- **Engage with science** / proof / (the NCC will become more prescriptive not less so / EPDs / LCAs)
- **Meet the design challenges for smaller, smarter design / for adaptive reuse and who will respond to the need for retrofitting** with hemp solutions Seek out pro-active designers.
- Improve affordability and accessibility through **prefab building solutions and improve performance** of prefab solutions. (Compared to cast in place, prefab and block solutions often include multiple high embodied energy and some include components and products that affect indoor air quality.)
- **Minimise the footprint of Binders, Adhesives, Polyester webbing etc**
- **Design for reuse.** Develop clever retrofitting solutions.
- **Manufacture closer to site**
- **Every hectare planted that is not useful has a footprint.**Organisations should discourage farming where there are no clear markets and clearly outline the risks. **Where people are interested in growing hemp for building materials they should be referred to those standards that do exist internationally.**
- Where organisations or Australian social media platforms are representing the Australian hemp building industry, their primary focus should be to **support Australian farmers, Australian processors and Australian manufacturers** and they should be **supporting existing Australian businesses where they experience anti-competitive behaviour from importers (which is rife).**
- **Maintain excellence.** Never lose sight of the need for excellence in construction projects. Any new product introduced to the construction industry is vulnerable. (If we celebrate poor quality builds we are shooting ourselves in the foot. Consumers and certifiers who are new to the materials are also misled.)
- **Lobby education organisations** in the tertiary and VET sectors to integrate knowledge about hemp and hemp construction into curricula. **Prepare a white paper.**
- **Encourage product testing.** Understand the requirements of the NCC with regard to the need for products to be sufficiently tested e.g. the UTAS fire tests demonstrate that hempcrete can meet commercial standards, but they do not mean that all hempcrete products automatically meet the necessary standards.

# Australian Hemp Masonry Pty Ltd

MANUFACTURER AND SUPPLIER OF NATA TESTED LIME BINDER AND HEMP LIME RENDERS FOR CONSTRUCTION.

RATED FOR BAL 12.5 TO BAL FZ LOCATIONS

GROUP 1 FIRE RATED FOR INTERNAL USE IN COMMERCIAL SETTINGS

PARTNERING WITH REGIONAL PROCESSORS IN NSW, VIC, TAS AND WA

DEVELOPING PREFAB SOLUTIONS

R & D

THERMAL AND ACOUSTIC DATA AND DATA ON INDOOR AIR QUALITY

COMPARATIVE ANALYSIS OF CAST IN PLACE, HEMP PANELS, HEMP PANELS COMBINED WITH GREEN INFRASTRUCTURE

DEVELOPMENT OF ALTERNATIVE LOW CARBON BINDERS

(UTS 2021-2024)

COMPARATIVE ANALYSIS WITH EUROPEAN HEMPCRETE BUILDING MATERIALS

(UNSW 2019-20)

EDUCATION AND TRAINING

THEORY AND PRACTICAL TRAINING FOR BUILDERS AND OWNER BUILDERS

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TAILORED WORKSHOPS AND WEBINARS FOR ARCHITECTS AND DESIGN PRACTICES AND OTHER BUILDING PROFESSIONALS. E.G. WORK WITH PUBLIC REALM LAB AND WOODS BAGOT

PROJECT CONSULTANCY

WE WORK WITH ALL STAKEHOLDERS TO ENSURE HIGH QUALITY SUCCESSFUL PROJECTS

QUALITY & STANDARDS

MEMBER OF STANDARDS WORKING GROUPS IN AUSTRALIA. ALSO WORKING (BY INVITATION) WITH ASTM WORKING GROUPS IN USA

CURRENTLY IMPLEMENTING EUROPEAN STANDARDS AND AUDITABLE MEASURES WITH THOSE PROCESSORS WHO SUPPLY TO AHM PROJECTS

INDUSTRY INVOLVEMENT

MEMBER OF IHEMP NSW, AIHA, TASMANIAN HEMP ASSOCIATION, NSW HEMP INDUSTRY TASKFORCE.

ACTIVELY INVOLVED IN LCA WORK THROUGH MECLA.

ACTIVELY INVOLVED IN SUPPORTING DEVELOPMENT OF AN AUSTRALIAN TRADING PLATFORM FOR HEMP AND THE CARBON ASSOCIATED WITH CONSTRUCTION