

Sustainable Indigenous Housing

Meeting the housing needs of Aboriginal and Torres Strait Islander households

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Modelling Sustainable Regional and Remote Indigenous Housing and Maintenance

Partnered with

- Nganampa Health Council
- Housing SA
- Gunida Gunyah Housing Corporation
- Healthabitat



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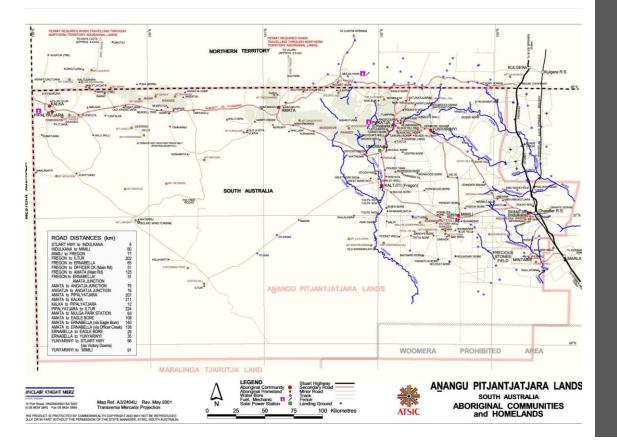


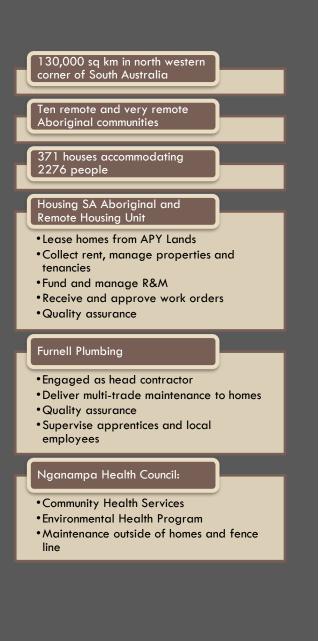
Sustainability from multiple angles

- > How is the word 'sustainability' deployed?
 - > Literature synthesis: policy and research
- > Best funding model for sustained housing supply and maintenance?
 - > Life-cycle costing (LCC) framework
- > Requirements for sustaining existing housing stock in good repair
 - Case study Anangu Pitjantjatjara Yankunytjatjara (APY) Lands: SA Housing and Nganampa Health Council
- > Best ways to sustain local employment?
 - > Case study NSW: Gunida Gunyah Aboriginal Corporation
- > Readiness for climate change?
 - > Simulations
 - > NATO, BOM, other data synthesis

Lea, T., Grealy, L., Moskos, M., Brambilla, A., King, S., Habibis, D., Benedict, R., Phibbs, P., Sun, C. and Torzillo, P. (2021) Sustainable Indigenous housing in regional and remote Australia, AHURI Final Report No. 368, Australian Housing and Urban Research Institute Limited, Melbourne, https://www.ahuri.edu.au/research/final-reports/368, doi: 10.18408/ahuri7323701.

SA Case Study: Anangu Pitjantjatjara Yankunytjatjara (APY) Lands







SA Case Study: Repair and Maintenance

Planned and preventative maintenance:

- Urgent responsive repairs
- Majority of budget on planned and preventative (59%)
- Ten visits per year to each home
- Reduced travel time and costs (11%)
- More maintenance for the dollar
- Maintain higher level of function

Local employment:

- Apprentices:
- Buddy program
- Training and support
- Labourers:
- Permanent and casual
- Training and support

Health and well being

- Holistic view of healthy hardware inside and outside the house
- Cross agency collaboration
- Supports safety and health outcomes



But is this enough?

No



Simulating housing performance

Three climate zones: Zone 1 Zone 3 Zone 4

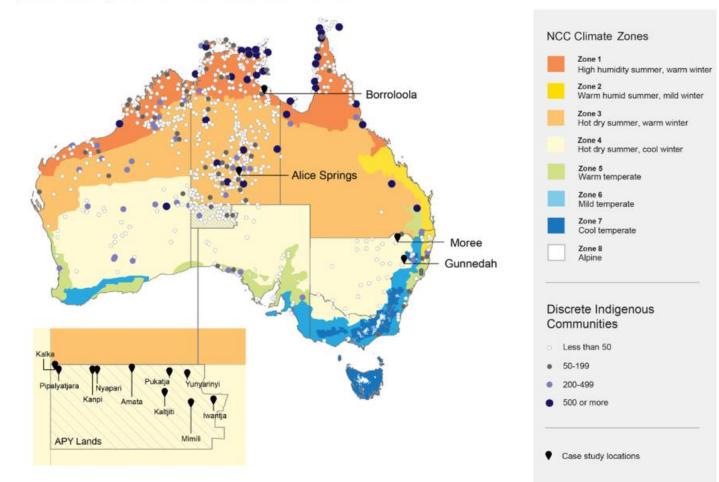
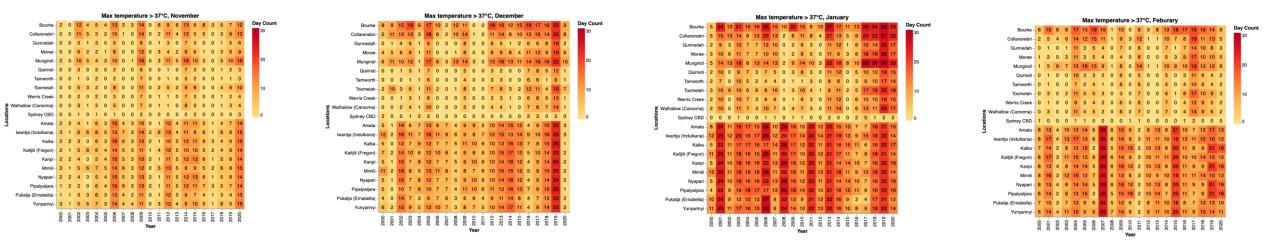


Figure 4: Project case studies by National Construction Code (NCC) climate zones



It is hot and getting hotter

The existing housing stock struggles to provide affordable thermal comfort



Three bedroom house, multiple variables

Type one 'standard' construction; type two 'improved' to meet NCC/NatHERS standards

- Occupancy: 4, 7, 11, 16 people
- Ventilation: can open and close windows fully, partially, not at all
- > Air conditioning presence, absence, placement, heating and cooling impacts
- > Energy consumption
- > Climate zone
- > Temperature range: across the year current, with 1.5°C global warming



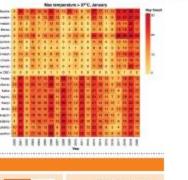
We put these things into combination. 366 simulations later....

https://www.hfhincubator.org/heat-modelling-data-set/



Non-temperature > 87°C, January The climate is warming, with higher maximum temperatures sustained for longer periods. Summers -----are beginning earlier and lasting longer, with higher night-time minimums. maria Canada - 1 Remote Indigenous communities are Raises (197) disproportionately impacted by climate change. Indigenous housing in regional and remote Australia is of mixed quality and age. 1000 And Street Crowding remains a major issue. ******************* 71% The majority of Indigenous adults in The main reasons for health Projections suggest 51% hardware dysfunction are: that for Australia, hot remote areas rent 74% a lack of routine maintenance The proportion of indigenous dave will become from a social housing adults living in overcrow the trequent and provider (2018-19) households in very remote 19% poor initial construction hother (very high confidence) areas (2018-19) https://www.indigeroutlpf.gov.au/manume/2-61-huming-http://webhaldat.com/103m//wewcoru-au/w/inexent/jine/commental-impacts/climate-change/climate-change-information Bovernment funding for cyclical and HEIC Davids Come ----preventative maintenance is severely Part and and and and some limited. This matters because most and the second second Indigenous households are in some Date of the local division of the local divi form of tenancy arrangement. - 041 a faith and E 221-----OUR AIM: 100 We sought to test how well Indigenous houses perform across the three different Australian ---climate zones (1. tropical, 3. arid, and 4. hpt/ 4 10.00 38.00 mild) where the majority of discrete Indigenous communities are located, as defined by the Australian Building Codes Board. Instantion

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SUSTAINABLE INDIGENOUS HOUSING IN REGIONAL AND REMOTE AUSTRALIA

AHURI House Temperature Simulation Dashboard



Chao Sun (Sydney Informatics Hub Project Scheme)

IMPROVED HOUSE DESIGN

Thee shading



Our modelling showed that, in this scenario, the house sustained high indoor temperatures throughout the

We created a simple housing typology: a 'standard' three bedroom house of the kind one might find across remote Australia,

and an 'improved' three bedroom house,

that has been modified to meet National

Construction Code guidelines for the climate

zone in question. Using simulation software we modelled for crowding, cooling systems,

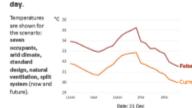
energy consumption, and ventilation for

both standard and improved housing designs.

For example, a house with seven residents, a split system air conditioner in the living room,

and natural ventilation in the arid climate

zone.



with current construction recommendations for the climate zones-at best offers limited gains for indoor temperature.

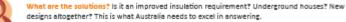
The average indoor temperatures remain high. For what lies ahead, people will need more from effective retrofitting and improved designs.

> Question: Will retrofitting the houses offer a big enough impact? Answer: no

The improved house design-built in accordance

Using conservative climate change projections, our modelling showed that 'improved' house designs built to current. recommendations will not cope with an (optimistic) increase of 1.5°C.

MORE RADICAL DESIGN SOLUTIONS ARE NEEDED



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