

# Future proofing our homes for a hotter climate

## COUNCIL NAME

Western Sydney  
Regional  
Organisation of  
Councils, supported  
by Blacktown,  
Hawkesbury and  
Liverpool City  
Councils

## WEB ADDRESS

[wsroc.com.au](http://wsroc.com.au)

## SIZE

8,872 square  
kilometres

## POPULATION

2,175,000+

## FUNDING PROGRAM

Increasing  
Resilience to  
Climate Change

## Overview

Western Sydney's average temperature has increased by 1°C over the last 50 years and is predicted to rise by another 2°C by 2070. Heatwaves will be more prominent, with an additional 20 days of 35°C or more over the course of a year.

The homes we are building today will be standing for decades to come. What happens if those homes can't keep their occupants safe in a hotter climate?

This was one of the many questions that the Western Sydney Regional Organisation of Councils, in partnership with WSP and the University of NSW, set out to answer in a ground-breaking climate modelling project.

## Background

"Western Sydney is already hotter than the climate data we use to assess energy efficiency and heat resilience. The homes we are building today were designed for a climate that no longer exists, says Judith Bruinsma, WSROC's Project Coordinator.

Australia relies on a range of tools to assess the energy efficiency and thermal resilience of our residential buildings. Two of the most common are NatHERS, the Nationwide House Energy Rating Scheme, and BASIX, the NSW Government's Building Sustainability Index.

The latest upgrade to the National Construction Code, which comes into effect in October 2023, relies on updated climate data, or 'files', from NatHERS. The Code has also raised the standard of thermal comfort required for new dwellings to a 7-star rating. The NSW Government has also increased the thermal comfort standard in BASIX to align with the Code update.

WSROC's study looked at whether these regulations would be adequate to deliver efficient, resilient and adaptable homes as Western Sydney's climate changes. It furthered the work of Waverley Council's Future Proofing Residential Development to Climate Change study

## Implementation

This study modelled the performance of a range of real-world buildings, including single and double storey homes, low and high-rise apartments.

The performance of each building type in Western Sydney (climate zone 28) was assessed against five climate scenarios using a NatHERS accredited tool. The research team evaluated each building type against:

- The current NatHERS climate file
- National Construction Code (NCC) 2022 NatHERS climate file
- The climate conditions in 2020
- The future climate of 2030

- The future climate of 2050.

The study evaluated how each building type would perform during extreme heat events. It also modelled the performance of dwellings without air-conditioning to understand what the conditions will be like in situations where power fails or when residents cannot afford to run air conditioning.

A broad range of design strategies were investigated for future climate using the current NatHERS climate file and the NCC 2022 NatHERS climate file. This was done to determine what design elements are needed to ensure thermal comfort of occupants and if the NatHERS and BASIX tools allowed for these.

## Outcomes

The research discovered that building assessment tools NatHERS and BASIX are relying on outdated climate data. NatHERS currently uses climate data from 1967 to 2004. The recent update will adjust the climate files to include data from 1990 to 2015. However, even this updated data does not reflect today's 2020s climate, let alone the climates of 2030 or 2050.

“We are currently designing houses that are consistent with a 1980s climate. The update will take us to around a 2010s climate. This means the new 7-star requirement is already out of step with our changing climate. Rather than relying on data from the past, we need to look at future climate modelling and build in adaptation right from the start,” Judith says.

Buildings that comply with NatHERS and BASIX are also optimised for cooler conditions than what we experience today, let alone what we can expect in 2050. In fact, the research has found NatHERS' climate files significantly underestimate the hours that a home will operate under warmer conditions and overestimates the hours with cooler conditions.

Some modifications to make homes more resilient in the future do not currently comply with NatHERS because the tool prioritises heating in cold months, Judith adds. “We need to address the heating and cooling imbalance because our future will be much hotter.”

## Key Learnings

The research also underscored the importance of designing for “thermal safety” - a step beyond thermal comfort that guarantees a home has at least some space where a thermally safe indoor environment can be maintained during extreme weather events, even without mechanical heating and cooling.

“Our building codes consider thermal comfort, but this is not the same as thermal safety. If we experience extreme conditions and the power fails, or if people are reluctant to turn on the air conditioning because they can't afford their electricity bill, then they need a safe space in their home. We need to set minimum standards to ensure homes are thermally safe to be in.”

Australian buildings are not currently required to demonstrate thermal safety. Other parts of the world, notably the United States and United Kingdom, have established

thermal safety standards. Overseas case studies can guide policy, “but we need specific standards for Australia’s climate,” Judith adds.

“This research is the first climate analysis to consider current building codes and adaptive capacity of our residential dwellings to extreme heat in Western Sydney, with and without access to air conditioning. We hope the findings and our recommendations will attract interest from governments, so our homes are future-proofed as our climate changes.”

### More information

Download Western Sydney Regional Organisation of Councils’ [Urban Heat Planning Toolkit](#) or the [Cool Suburbs tool](#). Or check out WSROC’s [Turn Down the Heat Strategy](#) and [Heat Smart Resilience Framework and community resources](#).

### Contact

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