RACE for 2030

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PROGRESS REPORT

Identifying, modelling and realising retrofit opportunities for apartment buildings – June 2026



Progress report

Identifying, modelling and realising retrofit opportunities for apartment buildings

June 2026

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Acknowledgement of Country

The authors of this report would like to respectfully acknowledge the Traditional Owners of the ancestral lands throughout Australia and their connection to land, sea and community. We recognise their continuing connection to the land, waters, and culture and pay our respects to them, their cultures and to their Elders past, present, and emerging.

What is RACE for 2030?

RACE for 2030 is a 10-year cooperative research centre (CRC) with $350 million of resources to fund and support research towards a reliable, affordable, and clean energy future.

Disclaimer

The authors have used all due care and skill to ensure the material is accurate as at the date of this report. The authors do not accept any responsibility for any loss that may arise by anyone relying upon its contents.

Executive Summary

The Race for Homes project, HT3.R.0680 Identifying, modelling and realising retrofit opportunities for apartment buildings, officially commenced on 18 June 2025.

Staffing has remained the same since the last progress report in December 2025, with the exception that Dr Xingji Yu left the project in December 2025, following his departure from UNSW Sydney. The research team is currently recruiting a suitable replacement for WP2 modelling.

Ethics approval from the UNSW Human Research Ethics Committee, covering all components of this project, was received on 2 October 2025.

Following initial meetings with project partners and Industry Reference Group (IRG) members, three working groups aligned with specific work package components (Topology development, Regulatory review and Case Studies) were formed with partners and IRG members invited to self-nominate.

WP1a (typology development). The explanatory report is currently being finalised. The research team used a combination of open-access and commercial-in-confidence datasets to develop an apartment building typology framework. The methodology has been refined through cross-validation of multiple datasets, and expert consultation including interviews with building construction and NatHERS assessment professionals, whose insights helped address data gaps and inform key typology parameters. Existing datasets provide varying levels of coverage and update frequency, requiring the research team to apply informed assumptions and estimations, which are documented in the supplementary explanatory report. The resulting framework defines eight apartment typologies based on height, age, size (number of units), construction materials, window performance, and shared services.

WP1b (regulatory review). The final report is currently being finalised. The report includes: i) a plain English explanation of strata title ownership, jurisdictional terminology differences, and key barriers and considerations affecting sustainability upgrades; ii) a summary of legislation and regulation affecting sustainability retrofits spanning five categories—strata management, renting, planning, building, and electricity and gas—across New South Wales, Victoria, Queensland, and the Australian Capital Territory; and iii) a comparative analysis of retrofit-enabling legislative interventions across those four jurisdictions. Analysis of complaints data made available by the NSW Energy and Water Ombudsman revealed few useful insights, leading the team to discontinue further analysis across other jurisdictions.

Following working group input, the scope of the regulatory review was expanded to add worked examples across three categories: common property solar installations, internal retrofits to single units, and whole-building electrification. These worked examples will be informed by the case studies and will be published as separate documents over the remainder of the project timeframe.

WP2 (modelling) will commence in July 2026.

WP3 (case studies). Recruitment of the four case studies has been completed: a single unit in Sydney's Inner West LGA, a high-rise building in Melbourne LGA, a multi-building complex in Sydney's Botany Bay LGA, and a brick walk-up block in Sydney's Randwick LGA. The first case study is nearing completion, with retrofit works finalised in mid-2025, interviews completed in March 2026, and energy use and thermal comfort monitoring scheduled to conclude in July 2026. Initial meetings have also been conducted with strata committees for the remaining three case studies, and participant recruitment for energy and thermal comfort monitoring completed in June 2026.

The research team has received extensive supporting documentation, including strata committee records, retrofit proposals, consultation reports, and energy usage data, and is attending meetings and monitoring communications between strata committees and retrofit providers to capture decision-making processes.

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Project progress

The Race for Homes project, R4H0680 Identifying, modelling and realising retrofit opportunities for apartment buildings, officially commenced on 18 June 2025. It aims to:

1. Assist property owners to make a case for retrofit by providing examples of successful retrofit projects and an indication of the likely costs and benefits.
2. Provide information and resources to support behaviour change (e.g. encourage residents to change their energy usage behaviour).
3. Help inform government decisions on programs, grants and incentives to encourage sustainable retrofits in apartment buildings.
4. Provide information to support regulatory reform (e.g. amendments to strata scheme management acts, support the case for mandatory disclosure of building performance).

It comprises three related work packages, each with interrelated components:

- WP1 – Identifying Retrofit Opportunities and Regulatory Barriers, including:
  – WP1a Establishing apartment typologies and associated retrofit opportunities via a desk-based review.
  – WP1b Reviewing and comparing relevant legislation and regulations across four jurisdictions (New South Wales, Victoria, Queensland, and the Australian Capital Territory) that enable or hinder energy retrofits in apartment buildings.
- WP2 – Modelling Retrofit Opportunities, which will extend the findings of WP1a by modelling the impacts on energy usage, bills, payback periods, and network connections of different retrofitting opportunities identified by different typologies.
- WP3 – Realising Retrofit Opportunities, which follows the experiences and outcomes of case study apartment buildings undertaking energy efficiency related retrofit.

Update on research activities

Research activities continue to progress as per the proposed project timeline.

	2025		2026				2027				2028	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
WP1												
WP2												
WP3												

WP1 – Identifying retrofit opportunities and regulatory barriers

WP1	2025						2026					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Ethics approval												
Typology												
Regulatory review												

WP1a Apartment building typology development

The typology development uses open access and commercial-in-confidence data available to the research team to inform the development of apartment typologies. The typology takes into account building height, size (by number of lots), age (from year of strata registration), external wall materials, window performance, and other building characteristics.

The typology framework and methodology are explained in an accompanying explanatory report. Areas where data consistency or availability was limited were supplemented through interviews from the building construction industry and NatHERS assessors, as well as working group member feedback.

After discussion in the typologies working group in June 2026, we agreed to delay the publication of the typologies information sheets to 2027 so that they can incorporate results from the modelling exercise in WP2, as this will further strengthen the case they make in support of retrofits where found to be appropriate. The working group however proposed that the typologies explanatory report could be published ahead of the working sheets (in Q3 2026)

WP1b Review of legislation and regulations relevant to retrofitting apartment buildings

A regulatory review report is currently being finalised (to be published in Q3 2026), which contains the following sections:

- Understanding the legal structure of strata homes
- Legislation impacting upon sustainability retrofits
- Comparison of interventions to enable sustainability retrofits
- Other data and resources, including a note on energy ombudsman data and worked examples of sustainability retrofits.

Changes to WP1 scope

Three changes to the original scope of WP1 have been made over the past 12 months:

1. The original scope included a review of consumer complaints to the energy ombudsman to identify bottlenecks that require additional regulatory oversights. Publicly available data does not distinguish between complaints relating to apartments and other dwellings. The research team approached the NSW and VIC energy ombudsman to request non-public data.

   The NSW Energy & Water Ombudsman (EWON) were kind enough to assist us. EWON records complaints data with respect to the complaints as brought by the customer (e.g. “bill too high”) and the property address, but this data is not classified by building type (e.g. apartment/house) or by the age of the building (it would be helpful if it was). The research team cross-referenced complaints data provided at address level by EWON against existing datasets held by the research team to identify apartment properties. The data provided included the date of the complaint lodgement and complaint type (in this case, either ‘smart meter’ or ‘feed in tariff’). While we can assume that complaints about smart meters or feed in tariffs have a high

probability of being associated with solar installations, without knowing the nature of the complaints (i.e. what exactly the problem with the smart meter or tariff was), it is difficult to identify recommendations for regulatory amendments. It is also not possibly to identify from the data whether the complaint relates to a single unit or a whole apartment building. For these reasons, an analysis of complaints to the energy ombudsman have not been included in the regulatory review for this project.

2. The scope of the regulatory review has been expanded to include worked examples of sustainability retrofits and the regulatory considerations at each state, at the suggestion of the working group.

3. The original scope included conducting interviews with industry experts and apartment residents that have completed retrofit upgrades to inform findings of the WP1 components. This was replaced with interviews with building experts and NATHERS assessors to inform the typology development. This change was necessary to enable gaps in information regarding building materials to be filled to complete the apartment typology development.

WP2 – Modelling retrofit opportunities

WP2 will commence in Year 2 following the completion of WP1a.

WP2	2026						2027					
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Data collection												
Data cleaning												
Modelling												
Analysis												

WP3 – Case studies

Recruitment of apartment buildings for WP3 case studies is complete. The four case studies are:

1. A single unit in the Inner West LGA of Sydney, NSW
2. A high-rise apartment building within the Melbourne LGA of Victoria
3. A multi-building complex in the Botany Bay LGA of Sydney, NSW
4. A brick walk-up block in the Randwick LGA of Sydney, NSW

The fieldwork for case study 1 is almost complete. The retrofit works was completed by mid-2025, and the research team interviewed the owner-builder in March 2026. The energy use and thermal comfort monitoring will conclude in July 2026. This first case study report will be published in Q3 2026.

The research team has also conducted initial meetings with the strata committees of case studies 2, 3 and 4. Recruitment of energy use and thermal comfort monitoring participants across the different case studies was completed in June 2026.

Preliminary findings

WP1a – Apartment building typology development

A number of existing datasets contain variables that can inform the development of an apartment building typology. These include:

- Building height (Australian Bureau of Statistics' Australian Census of Population and Housing)
- Building size by number of lots and age (land title registration)
- External wall materials (Australian housing data provided by CSIRO)
- Number of units within buildings (Geoscape Buildings – NSW only)
- Building age by approval dates (Australian Bureau of Statistics)

Each dataset presents varying degrees of coverage and limitations and are updated at different frequencies. This requires various assumptions and estimations to be made in the development of the typology, which are recorded in a supplementary explanatory report. These datasets have been supplemented by additional information collected through interviews with building experts.

The available data have been analysed to clarify the influence of key parameters on building energy performance and to define apartment typologies. The report provides definitions for eight apartment types, considering building height, age, size (by number of units), wall and floor/ceiling construction, window performance, and shared services. These are summarised in Table 1.

Table 1: Apartment Building Typology – Summary Overview (Draft)

Type	Height / Age	Building Construction	Window Performance	Building Systems
1	Older Low-Rise (1–3 storeys, pre-2000)	Concrete structure with double brick / cavity brick walls; pitched tiled roof	Single glazing; aluminium frames; low airtightness	Natural ventilation; individual electric hot water
2	Newer Low-Rise (1–3 storeys, post-2000)	Concrete structure with steel-framed infill walls; flat concrete roof	Single glazing; aluminium frames; moderate airtightness	Natural ventilation or individual split systems; individual electric hot water
3	Older Mid-Rise (4–8 storeys, pre-2000)	Reinforced concrete structure with cavity brick infill walls; flat concrete roof	Single glazing; aluminium frames; low airtightness	Natural ventilation; individual electric hot water
4	Newer Mid-Rise (4–8 storeys, post-2000)	Reinforced concrete structure with AAC wall panels; flat roof	Double glazing increasingly common;	Individual split systems; central gas hot water common

			aluminium frames; moderate airtightness	
5	**Older High-Rise** (9–19 storeys, pre-2000)	Reinforced concrete structure with precast concrete panels; flat concrete roof	Single glazing; aluminium frames; low airtightness	Individual split systems; central gas hot water common
6	**Newer High-Rise** (9–19 storeys, post-2000)	Reinforced concrete structure with lightweight insulated façade; flat roof	Double glazing with aluminium frames; high airtightness	Central HVAC; central gas hot water common
7	**Residential Tower** (20+ storeys, post-2000)	Concrete structure with lightweight façade systems; flat roof	Mix of single and double glazing; aluminium frames; high airtightness	Central HVAC systems; central gas hot water common
8	**Residential Tower** (20+ storeys, post-2000)	Concrete structure with curtain wall / highly glazed façade; flat roof	Mix of single and double glazing; aluminium frames; high airtightness	Central HVAC systems; central gas hot water common

Issues and difficulties encountered, if any, during the course of the research activities
Few existing datasets have 100% coverage of all strata units and/or apartment buildings in Australia. The exception is building height (by broad categories) through the five-yearly Australian Census of Population and Housing conducted by the Australian Bureau of Statistics. For other datasets with varying degrees of coverage, the research team has had to make best, educated assumptions of applicability, and supplement these with interviews with building experts.

Actions proposed or undertaken to overcome the issues and difficulties
Following IRG and working group advice, the research team has made adjustments to the initial categorisations of apartment typologies. These adjustments primarily concern differentiation by the number of lots and storeys in each scheme, and the introduction of a super high-rise (of 20 storeys or more) category.

Additional factors suggested by IRG and Working Group members for consideration include: gas and electricity connections, availability of external spaces and regulations and standards. The research team has checked that no comprehensive dataset on these factors exist, and these thus cannot be appropriately incorporated in our typology development.

The assumptions made to inform the typology development were tested across multiple datasets. For example, building age classifications were cross-checked using both apartment approval data and strata registration date data across different periods. Similarly, building size, based on the number of units, was validated against Geoscape data for NSW. The interviews also helped clarify gaps in the available data regarding construction materials and retrofit opportunities, providing valuable practical insights into building thermal performance challenges and potential retrofit measures.

WP1b – Review of legislation and regulations relevant to retrofitting apartment buildings

The regulatory landscape is complex. We have organised the legislation impacting upon sustainability retrofits into five categories:

1. Strata management
2. Renting
3. Planning
4. Building
5. Electricity and gas

The comparative table compares the legislative and regulatory interventions currently in place to enable sustainability retrofits in apartments across New South Wales, Victoria, Queensland, and the Australian Capital Territory. Due to the large volume of regulatory detail, we have created a simplified scorecard assessment to accompany the more detailed table.

Following working group advice, we have included worked examples of different types of sustainability retrofits and the legislation and regulation that applies at each stage of the retrofit process. The worked examples will be:

- installing solar to common property
- internal building retrofits to a single lot
- whole building electrification

Issues and difficulties encountered, if any, during the course of the research activities

This WP has involved analysing and organising complex and detailed regulations. We are still finalising how to present each of the outputs in a way which is engaging and accessible, without losing relevant detail.

The analysis of complaints data received by the NSW Energy and Water Ombudsman found limited useful data. As a result, we have not reported on this in detail.

Actions proposed or undertaken to overcome the issues and difficulties

Where possible, we are including visualisations and summaries, alongside more detailed tables with hyperlinks to relevant legislation.

We have included a plain English overview of the key features of strata title, differences in terminology across jurisdictions, and key considerations that will impact on the realisation of sustainability upgrades. Feedback from the regulatory working group regarding this additional information resource has been very positive.

WP2 – Case studies

WP2 commences in Year 2 of this project. Its findings will be discussed in a future report.

WP3 – Case studies

One case study (single unit) is near completion, while the remaining three case studies are in the preliminary stages. The research team has been provided with relevant documentation, including details of strata committee meetings, proposed retrofit works, consultation reports, and existing energy usage data. The research team is also copied into strata committees' communications with retrofit service providers to ensure the nature and details of those queries are recorded.

A report on the single unit case study has been drafted, while recruitment for monitoring participants for the other case studies was completed in early June 2026.

Issues and difficulties encountered, if any, during the course of the research activities

The recruitment of energy use and thermal comfort monitoring participants have been slower than anticipated. An online survey was designed and distributed among all residents of the case study for interested parties to sign up for the monitoring exercise, and to provide relevant information to contextualise any collected data, but sign up remained low. The strata committees and strata managers have assisted the research team by sending out reminders and redesigned recruitment flyers without notable improvements.

Actions proposed or undertaken to overcome the issues and difficulties

The research team has commenced the energy use and thermal comfort monitoring with a smaller number of participants than anticipated. In addition to the redesigned and redistributed recruitment flyers, participants were asked to encourage other residents in their apartment buildings to sign up.

Outcomes of IRG and Working Group meetings

One IRG meeting has been conducted since our last progress report: 23 March 2026. A meeting with project partners was also conducted immediately following the IRG meeting. Subsequent IRG and project partner meetings will take place twice yearly, nominally in late March and in late September for the remainder of the project's timeline.

The March 2026 meeting included the introduction of Scott Barnes as the new RACE for 2030 representative and two new IRG members, representing:

- Common Equity Housing Limited (CEHL)
- Passivenous Consulting Pty Ltd

The IRG meeting updated all stakeholders on research activity progress to date, including outcomes of the three working groups (see Table 2), focussing on the two components of WP1 (developing apartment building typologies, and regulatory review) and management of the case studies (WP3). The meetings also noted that an additional work group—on WP2 modelling—will be established from Q3 2026 to aid the team as works of this work package commence.

Table 2: Working Group representation

	Typologies	**Regulatory review**	**Case studies**
Project partners	7	6	6
IRG members	5	9	6
Research team members	7	5	4

Two meetings of the Regulatory Review Working Group were held online in February and May 2026, and similarly for the Typologies Working Group in February and June 2026 (see Table 3). These meetings provided additional directions for the research team to update work packages approaches, potential new data sources, and fine-tuning planned research processes.

An update on the progress of case study recruitment was provided to the case study working group in February 2026. A completed draft of the single unit case study report will be circulated to the working group for comments in Q3 2026.

Table 3: Timing of working group meetings and attendance

	Regulatory review		**Typologies**	
	Feb 2026	May 2026	Feb 2026	June 2026
Project partners	6	4	3	3
IRG members	2	3	5	3
Research team members	6	6	6	6

Note: No meeting was held in February 2026 for the case studies working group. An email update was instead provided.

Appendix

Table 4: List of IRG members (in alphabetical order by organisation)

Organisation
ANU Centre for Energy Systems
Ausgrid
Australian Sustainable Built Environment Council (ASBEC)
Common Equity Housing Limited
City of Adelaide
City of Sydney
City of Yarra
Energy Consumers Australia (ECA)
Energy Efficiency Council (EEC)
Facility Managers Association of Australia (FMA)
Green Building Council of Australia (GBCA)
Justice and Equity Centre (JEC)
Let Me Be Frank
Milli Studio
Moonee Valley Council
Passivenous Consulting Pty Ltd
Sustainability Now
Victorian Department of Energy, Environment and Climate Action (DEECA)
Wattblock

Table 5: List of current working group members

Typology development	Regulatory review
ACT Government	City of Melbourne
City of Melbourne	City of Sydney
City of Randwick	EEC
City of Sydney	GBCA
EEC	Let Me Be Frank
JEC	National Australian Built Environment Rating System (NABERS)
Owners Corporation Network (OCN)	OCN
Sustainability Now	DEECA
CEHL	CEHL
Australian Glass and Window Association (AGWA)	Passivenous
	AGWA
	Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW)

Case study	Modelling
ACT Government	AGWA
City of Randwick	NSW DCCEEW
City of Sydney	
ECA	
Let Me Be Frank	
Milli Studio	
OCN	
Sydney Water	
AGWA	
NSW DCCEEW	

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