PROPERTY COUNCIL of Australia

Green Building Council Australia

Climateworks CENTRE

Built Environment Ambition

How does the Built Environment Sector Plan measure up? We review recent policy updates against a 1.5°C pathway.

Victorian DFFH Program Tarakan Street, VIC, Homes Victoria, Targeting 5 Green Star Design & As Built v1.3.

Sept 2025

The Green Building Council of Australia (GBCA) was established in 2002 to lead the sustainable transformation of the built environment. Our vision is for healthy, resilient and positive places for people.

GBCA represents more than 550 individual companies with a combined annual turnover of more than $46 billion. Members include major developers, professional services firms, banks, superannuation funds, product manufacturers, retailers, utilities and suppliers – and together they represent 50,000 people. We also work with 32 local government members, representing 26% of Australia's population, 24 state government departments and land organisations, and 21 universities.

The Property Council of Australia is the leading advocate for Australia's largest industry – property. Our industry represents 13% of Australia's GDP, employs 1.4 million Australians (more than mining and manufacturing combined) and generates $72 billion in tax revenues annually. Property Council members invest in, design, build and manage places that matter to Australians across all major built environment asset classes.

Climateworks Centre bridges the gap between research and climate action. We are climate transition specialists, working in Australia, Southeast Asia and the Pacific with decision-makers who have the power to reduce emissions at scale. Climateworks develops evidence-based solutions to accelerate emissions reduction in line with the global 1.5°C temperature goal and shared climate safety.

Co-founded by philanthropy and Monash University, Climateworks is an independent not-for-profit working within the Monash Sustainable Development Institute.

Supported by

Note on data and analysis

This report is a collaboration between Property Council of Australia, Green Building Council of Australia and Climateworks Centre. PCA and GBCA have undertaking the measuring of federal government policy and the scorecard review. Climateworks has provided the sector modelling and buildings data.

The data and analysis provided by Climateworks Centre uses two sources – AusTIMES and Renovation Pathways. AusTIMES is a detailed whole-of-economy model of Australia, developed in partnership with CSIRO. AusTIMES is based on globally recognised frameworks from the International Energy Agency. Renovation Pathways includes a residential housing stock model and 'per home' analysis developed in partnership with CSIRO, drawing from the Australian Housing Data Portal.

Executive summary

The built environment presents a unique, no-regrets opportunity to decarbonise the sector rapidly and meet Australia's net zero targets.

Australia's path to achieving its net zero commitments requires coordinated action across all sectors, and the faster we reduce emissions, the more cumulative benefits we'll gain. Enabling rapid and deep emissions reductions in the built environment will be key to achieving the recently announced 2035 target to reduce emissions by 62-70 per cent from 2005 levels.

This report highlights:

- Rapid decarbonisation of the built environment, accompanied by electricity sector decarbonisation, can see annual emissions reduced by 66 $MtCO_2e$ by 2035 compared to 2025 levels. This could contribute around a quarter of the emissions reductions needed from energy-using sectors to achieve the 70 per cent target.
- By 2035, this pathway achieves a 93 per cent reduction in annual operating emissions from residential buildings and a 90 per cent reduction from commercial buildings, compared to 2025 levels.
- Reducing emissions quickly is critical to meeting targets – swift emissions reductions in the built environment provides critical time for 'late-to-abate' sectors to ramp up their decarbonisation efforts.

Our analysis confirms that buildings offer a fast and cost-effective way to reduce emissions further and contribute to our energy system's decarbonisation. While Australia's energy system is shifting to renewable sources, immediate, practical action to improve energy efficiency and electrify commercial and residential buildings will be key to unlocking decarbonisation opportunities from building operations.

Implementing policies and initiatives aligned with achieving a 1.5°C trajectory can reduce operational emissions in residential buildings by 93 per cent by 2035 compared to 2025. Abatement achieved through electrification and improving energy performance also offers significant additional whole-of-economy benefits through better health and productivity outcomes, lower energy bills, and avoided energy system costs.

Gas use in commercial buildings needs to decline rapidly in favour of electricity to achieve the modelled 90 per cent emissions reduction by 2035 compared to 2025. This decline will be achieved by electrification of large systems used for space heating, ventilation and air-conditioning (HVAC). Within commercial buildings, Victoria and New South Wales have the highest gas use. Timely reduction of emissions from gas in these two states will be critical.

The Australian Government has recently released the Built Environment Sector Plan (BESP) – one of six sector plans under Australia's Net Zero Plan. The BESP highlights the role of the built environment sector in contributing to national decarbonisation goals and keeping Australia on track to do its fair share for a 1.5°C future.

Importantly, the BESP commits funding to expand the Nationwide Home Energy Rating System (NatHERS), National Australian Built Environment Rating System (NABERS) and the Commercial Building Disclosure (CBD) Program – initiatives with proven success in improving energy performance and reducing emissions. The main action areas identified in the BESP are:

- Electrify, where possible
- Increase energy efficiency
- Improve design and decarbonise materials
- Harness low emissions technology
- Phase out hydrofluorocarbons (HFCs)

The BESP details important initiatives already underway, including the National Energy Performance Strategy, Cheaper Home Batteries Program and the Sustainable Finance Strategy.

The next steps we take to address the challenges and opportunities identified in the BESP will be critical. Some of the lowest-cost and most immediate emissions reduction opportunities remain poised for decisive government action – there is no time to lose in ramping up electrification and energy efficiency improvements for existing homes and buildings at speed and scale.

This report outlines a set of high-impact, actionable priorities for government, aligned with the first two action areas of the BESP – electrify, where possible, and increase energy efficiency. A government commitment to delivering action on these four priorities will drive emissions reductions across the built environment between now and 2035:

1. **Prioritise investment to fast-track energy efficiency and electrification upgrades in Australia's homes and buildings**
2. **Collaborate with industry to develop a comprehensive BESP implementation plan**
3. **Make new buildings zero-carbon-ready and ready for a warming climate in the National Construction Code (NCC) starting with 2025**
4. **Sustain and expand investment in proven programs.**

A snapshot of how the BESP addresses these priorities – and the opportunities still on the table – are outlined here:

Traffic light key	
🟢	BESP and priorities are well-aligned with progress underway. Opportunities for action are available but not urgent.
🟠	BESP and priorities have some alignment, some progress has been made. Opportunities for action should be prioritised.
🔴	BESP and priorities are not yet well-aligned. Opportunities for action are significant and action is urgently needed.

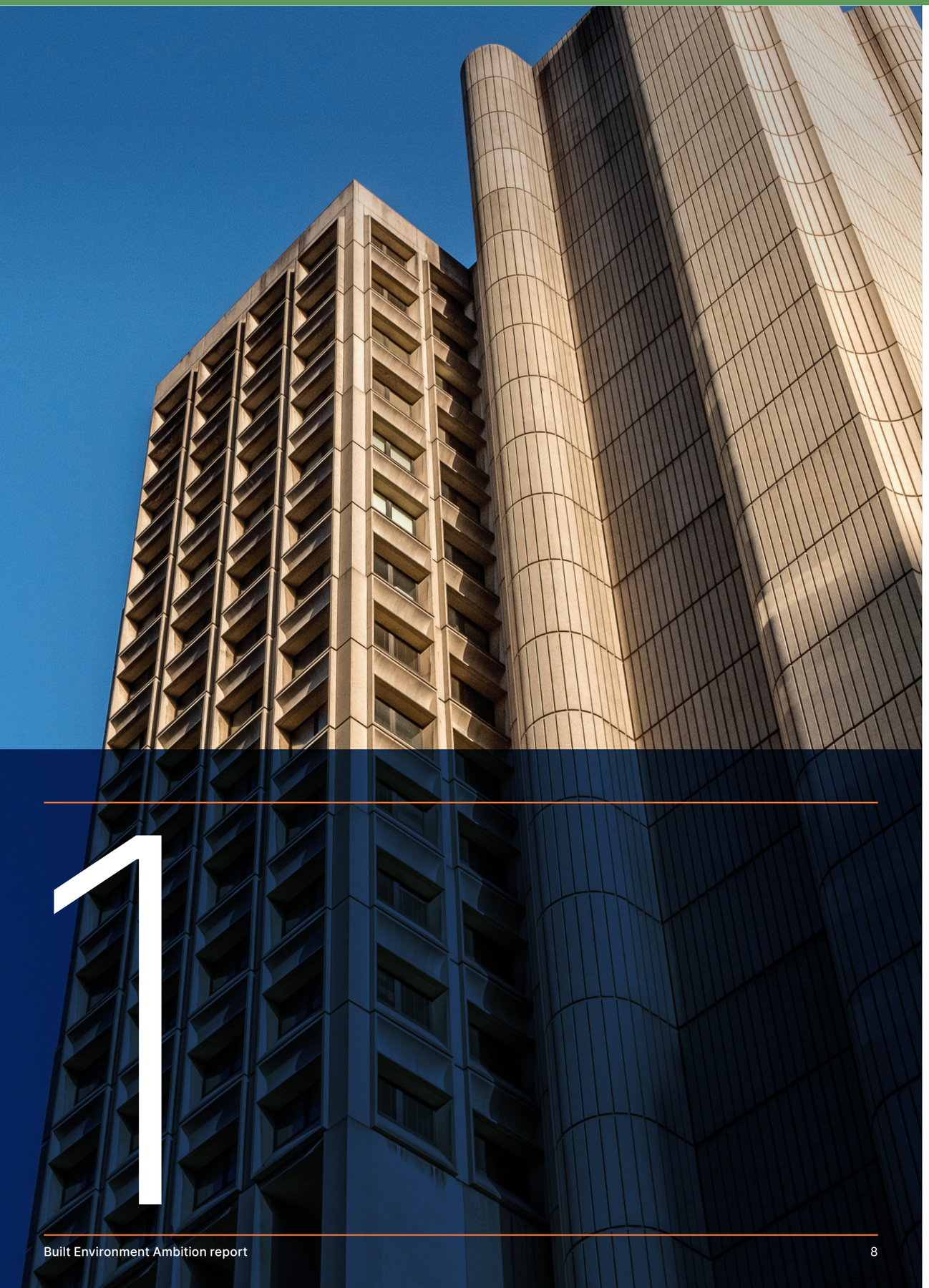
1. Prioritise investment to fast-track energy efficiency and electrification upgrades in Australia's homes and buildings	
🟠 **Alignment and progress**	The BESP identifies electrification as a key action area and the importance of an orderly transition away from natural gas. However, clear signals for when and how we will phase out gas use in homes and buildings are not included in the BESP.
🔴 **Opportunities for action**	One of Australia's biggest opportunities to reduce emissions by 2035 is investing in electrifying existing homes and buildings. A range of additional, targeted incentives, including expanded support for more vulnerable households, will be needed to drive this transition at speed and scale.
🟢 **Alignment and progress**	The BESP acknowledges energy efficiency as a key area for action. Funding to expand existing programs is an important step to improve energy performance with new disclosure opportunities to be introduced through the CBD Program and NatHERS.
🟠 **Opportunities for action**	One of Australia's biggest opportunities to reduce emissions by 2035 is investing in improving the energy efficiency of existing homes and buildings. A range of additional, targeted incentives, including expanded support for more vulnerable households, will be needed to drive this transition at speed and scale.

2. Collaborate with industry to develop a comprehensive BESP implementation plan	
🟢 **Alignment and progress**	The BESP delivers a clear set of priorities and opportunities to decarbonise the built environment. The next steps for taking action are critical.
🟠 **Opportunities for action**	Collaborate with industry to develop and implement a comprehensive and structured plan to ensure measurable progress on the priorities and opportunities highlighted in the BESP. This should align with the updated Trajectory for Low Energy Buildings, National Adaptation Plan and other key policies.

3. Make new buildings zero-carbon-ready and ready for a warming climate in the NCC starting with 2025	
🟢 **Alignment and progress**	The BESP identifies electrification and energy efficiency as two key action areas and acknowledges the role of NCC in improving energy efficiency in Australia's homes and buildings. Proposed changes in NCC 2025 will require non-residential buildings to be zero-carbon-ready.
🟠 **Opportunities for action**	Work with all jurisdictions to agree on a clear, national plan for future NCC updates for homes and buildings which align with emissions reduction commitments and action areas identified in the BESP. Adequately fund the Australian Building Codes Board (ABCB) to maintain strong standards and processes.
🟠 **Alignment and progress**	The BESP highlights the importance of creating a built environment that is fit for purpose, liveable, provides thermal comfort and is resilient to a changing climate. While the BESP acknowledges the role of NCC in resilience in homes and buildings, at this point, the NCC does not address resilience explicitly.
🔴 **Opportunities for action**	Building Ministers agreed to include climate resilience as a specific objective of the ABCB. The ABCB must be resourced to respond to this priority.

4. Sustain and expand investment in proven programs	
🟢 **Alignment and progress**	Funding to expand NABERS, CBD Program, GEMS and NatHERS for existing homes is a welcome and vital step.
🟢 **Opportunities for action**	Publish the CBD Program Roadmap, explore options for additional funding and partner with industry to prepare those in the commercial building sector not currently covered by the CBD Program. Commit to long-term funding and support for NABERS and NatHERS.

Review based on GBCA/PCA policy insights



1

Introduction

Australia has enshrined in law its commitment to reach net zero emissions by 2050, with a near-term goal of cutting emissions 43 per cent by 2030 under its Paris Agreement obligations. Building on this trajectory, the Australian Government has announced a 2035 target to cut emissions by 62–70 per cent below 2005 levels – a clear signal that we must accelerate abatement efforts. Cost-effective decarbonisation in line with Australia's commitments under the Paris Agreement will require action across all sectors of the economy – electricity and energy, transport, industry, agriculture and land, and the built environment. Each sector will decarbonise at a different pace between now and 2050 for a variety of reasons, such as technologies that are available and the policies in place.

Emissions added each year to the stock of greenhouse gases contribute to atmospheric concentrations that put Australia further away from avoiding unacceptable warming scenarios. Warming outcomes are incredibly sensitive to the level of action taken in next decade because eventual heating depends on the accumulated stock of greenhouse gases in the atmosphere. While it is imperative that all sectors of Australia's economy are supported to decarbonise, the climate science is clear: **prioritising the delivery of immediately accessible opportunities to reduce emissions is essential to limiting future warming.**

The built environment presents a unique, no-regrets opportunity to decarbonise the sector rapidly and meet Australia's net zero targets. Technologies have been ready and available to deliver energy-efficient, all-electric ready buildings through energy performance upgrades and electrification for several years, and their use can be scaled up quickly with the right supports in place. Climateworks' analysis shows rapid decarbonisation of the built environment, accompanied by electricity sector decarbonisation, can reduce annual emissions by 66 MtCO2e by 2035 compared to 2025 levels. This could contribute 26 per cent of the emissions reductions from end-use sectors over the next 10 years required to achieve the 70 per cent target.

Rapid decarbonisation can help Australia stay in line with its emissions reduction targets while also buying time for other 'late-to-abate' sectors, such as industry and agriculture, to reduce emissions. Prioritising the built environment can also deliver co-benefits to households in the form of lower energy bills, improved health and wellbeing, and better resilience.

Reducing operating emissions from the built environment will be key between now and 2035

Emissions from the built environment are predictable and can be categorised as operational or embodied emissions. Most operational building emissions link directly to energy grid decarbonisation. As the energy system decarbonises through renewable energy sources such as large-scale solar and wind, operational emissions from the built environment sector will naturally see a reduction. This is already occurring – the share of

renewable sources in Australia's main energy grids increased from 16 per cent in 2015 to 40 per cent in 2023 (Clean Energy Council 2024). To take full advantage of this shift, new buildings must be all-electric. The built environment's abatement potential is also realised through energy-efficient building retrofits to the thermal shell and other demand-side measures such as more efficient appliances and consumer energy resources. Importantly, this can reduce energy consumption at peak demand times. This lowers household and business energy bills, reduces pressure for costly investment in network upgrades and new energy infrastructure, and reduces reliance on fossil fuels during times of high system stress.

Constructing new and transforming existing buildings to be zero-carbon-ready and low-emissions is a critical action to support a rapid and least-cost transition to a renewable energy grid. Zero-carbon-ready buildings:

- cut emissions
- lower household and business operational energy costs
- reduce grid peak demand
- result in lower costs for the augmentation of the energy grid – avoided energy costs.

Operations in existing buildings are responsible for 18 per cent of Australia's carbon emissions (Department of Climate Change, Energy, the Environment and Water 2024), with nearly a quarter of national emissions attributable to operational and embodied carbon.

It is worth noting that refrigerants used to heat and cool buildings have high global warming potential and emissions from refrigerants are considered operating emissions. The transition to low-emissions refrigerants is an important issue for the built environment, and identified in the BESP, but outside the scope of this report.

Embodied emissions will become more important as operating emissions are reduced

While the focus in this report is on operating emissions to 2035, embodied emissions reduction becomes essential during the period to 2050 and beyond. Actions to reduce 'upfront embodied carbon' can help shift the sector to construct new buildings using low-carbon materials and encourage reuse and renovation of the buildings Australia already has. Embodied emissions present further abatement opportunities, and are also highlighted in the BESP, but are outside the scope of this report.

Switching buildings from gas to efficient, all-electric equipment will result in additional benefits beyond decarbonisation

Inefficient and gas-powered buildings also have a significant social and economic cost. They lead to higher energy bills, lower productivity (especially in extreme weather) and increased health costs. The 2013/14 heatwaves alone cost the Australian economy $8 billion in productivity loss through absenteeism and a reduction in work productivity (Climate Council 2017). Zero-carbon-ready homes have improved indoor air quality, prevent heat stress and cold-related illness, and reduce energy poverty and social inequality. With the right policy settings, buildings are a cost-effective opportunity in national cost-of-living and productivity reforms.

Swift action can occur across all levels of government and can reduce the cost of delays

Federal, state and local governments have direct levers in the built environment sector that can effect swift change. These include:

- stronger building regulations
- planning schemes with effective enforcement mechanisms
- sustainable finance support
- public procurement
- social and affordable housing investment
- energy performance disclosure supported by NatHERS and NABERS.

Government must prioritise and adequately resource these levers without delay. Inaction is leading to mounting costs and lost potential for swift abatement. Australia's millions of home and building owners are the ultimate decision-makers for emissions reduction. However, more government leadership and support is needed to catalyse action and ensure these owners have agency to make informed decisions.

If action in the built environment sector is delayed, the need for retrofits later will add additional cost burdens to households, businesses and governments and will pull labour away from the construction of the new homes that will be needed in 10–15 years.

What does a 1.5°C scenario mean for action on buildings and energy?

In Climateworks' modelling for a 1.5°C scenario (Climateworks Centre 2023a), different sectors move at different rates on a least-cost pathway. Rapid decarbonisation of the electricity sector will underpin actions in other sectors – especially buildings, industry and transport.

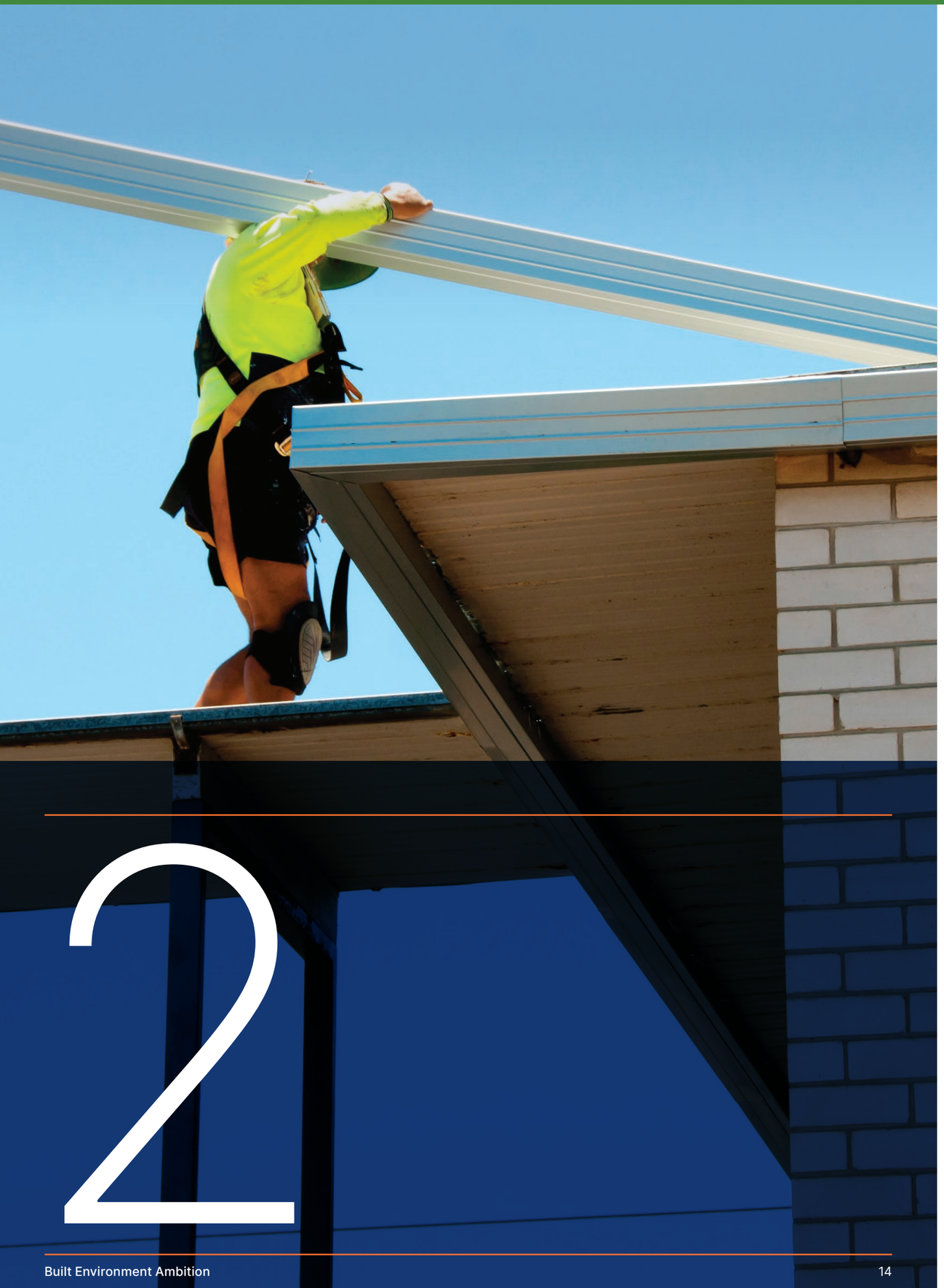
Electricity and buildings emissions decrease rapidly in a 1.5°C scenario, showing that strong policy action in these sectors is critical for Australia to decarbonise in line with the Paris Agreement.

Key factors in the 1.5°C scenario for energy

- Coal-powered electricity generation disappears before 2035 in Climateworks' 1.5°C scenario.
- Around the same time period, gas-powered electricity generation is greatly reduced.
- Renewable electricity generation grows to 83–90 per cent share of generation by 2030. This increases to nearly 100 per cent by 2050.
- Demand management practices could reduce the grid's reliance on gas even more than shown by this modelling.

Key factors in the 1.5°C scenario for buildings

- Rapid emissions reductions in the building sector come from electrification and improvements in energy performance.
- Gas use phases out of buildings in the 2030s.
- Commercial and residential buildings are decarbonised through upgrades such as replacing all gas appliances with efficient all-electric technologies, including space conditioning (heating and cooling), hot water heating, and cooktops, as well as improvements to appliance efficiency and building thermal shell improvements.



2

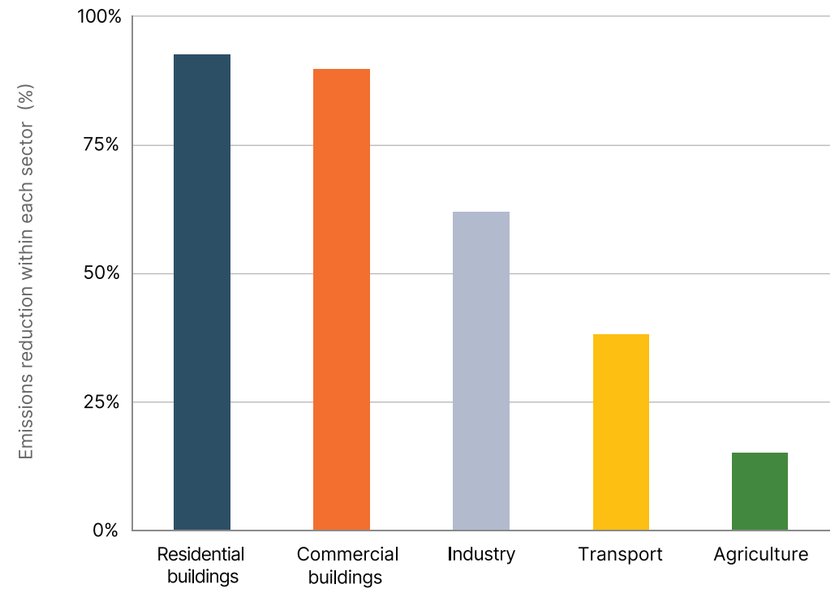
Built environment connection to ‘late-to-abate’ sectors: Land and agriculture, industry and transport

The built environment presents an opportunity for immediate action that can drive decarbonisation across the broader economy, including late-to-abate sectors, even though it contributes a relatively small share of overall emissions.

The percentage of emissions from the built environment reduces drastically by 2035 in a 1.5°C aligned trajectory

Climateworks’ decarbonisation scenarios modelling (Climateworks Centre 2023a) demonstrates that, under a pathway aligned with Australia reducing emissions on a 1.5°C trajectory, most emissions from the built environment are reduced in the time period to 2035. This is particularly noticeable in comparison to other sectors’ rates of decarbonisation across the same time period. Figures 1 and 2 show the emissions reduction percentage and emissions trajectories respectively between 2025 and 2035 for the residential building, commercial building, industry, transport, and agriculture sectors. By 2035, sector emissions reduce by 93 per cent for residential buildings (40 $MtCO_2e$) and 90 per cent for commercial buildings (26 $MtCO_2e$) when compared to 2025. This is significantly faster than the agriculture sector, which has a 15 per cent reduction by 2035 (14 $MtCO_2e$), and transport, which has a 38 per cent reduction (39 $MtCO_2e$). Industry also sees some earlier decarbonisation with a 62 per cent reduction by 2035 (112 $MtCO_2e$), but not as early as buildings.

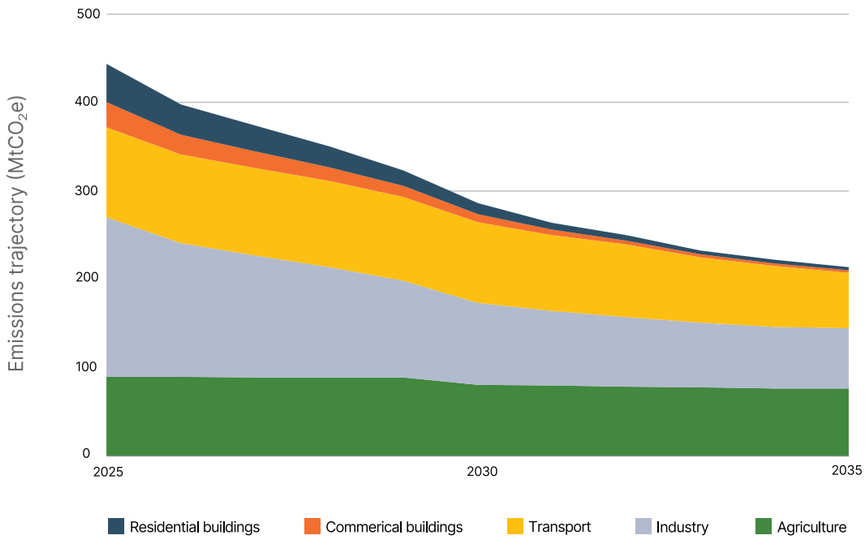
Figure 1: Emissions reduction percentage within each sector by 2035 compared to 2025 levels in a 1.5ºC scenario



Decarbonising the built environment quickly can buy time for other sectors

Figure 2 shows the emissions trajectory in different sectors between 2025 and 2035. Residential and commercial buildings decarbonise rapidly under a 1.5°C scenario.

Figure 2: 2025–2035 Comparison of sector emissions trajectories ($MtCO_2e$) in a 1.5°C scenario



While built environment emissions account for nearly a quarter of Australia's total emissions – and 18 per cent of total emissions are from operating existing buildings - most emissions reductions will occur by 2035 in a 1.5°C scenario. The industry, transport, and agriculture sectors reduce emissions between now and 2035 but will still require deep decarbonisation beyond 2035.

Agricultural emissions, mostly methane from livestock and nitrous oxide from fertilisers, continue to be substantial as emissions intensity improves, but production increases.

The industry sector is considered late-to-abate as addressing emissions within industrial supply chains poses more technological and commercial challenges than other economic sectors (Climateworks Centre and Climate-KIC Australia 2023).

In the transport sector, the initial higher assumed demand for transport cancels out the emissions benefits of shifting to electric vehicles (EV). The demand for EVs and EV charging is a key consideration for the activation of consumer energy resources in the built environment sector. If done well, EVs can take energy when supply is plentiful, either onsite or in the grid. They can also be used as energy sources during peak demand times.

While these 'late-to-abate' sectors will need time to decarbonise, action to reduce emissions from the built environment should not delay action across other sectors. Instead, decarbonising the built environment should be prioritised – particularly between now and 2035 – to ensure that Australia's emissions are reduced in line with net zero commitments while action in other sectors continues within their respective trajectories.

Decarbonising the built environment also catalyses other sectors. Decarbonising boosts demand for clean energy, including large-scale and community energy infrastructure, supporting an accelerated transformation of the energy sector. Increasing signals or requirements to reduce 'upfront emissions' in new buildings creates demand for the industrial sector to decarbonise and will help to stimulate industrial innovation, such as low-carbon cement and steel, and scale up ready industries such as insulation and window technologies. This makes the built environment sector a driver for change upstream (industry) and downstream (energy – demand energy resources and consumer energy resources).

If Australia delays action on zero-carbon-ready buildings, it will lock in inefficient, gas-reliant assets for decades, and lose the opportunities to seize upstream and downstream productivity benefits.

3

Decarbonising the built environment in line with 1.5°C trajectory

Significant early abatement in buildings can be achieved through several ways. These include:

1. **electrifying buildings to reduce direct emissions. This means eliminating gas from all new developments and progressively phasing it out of existing buildings. Gas-fuelled space conditioning (heating and cooling) should be replaced with electric systems, gas cooktops swapped for efficient induction alternatives, and gas-fuelled hot water units transitioned to electric hot water technologies.**

2. **improving the energy performance of appliances by installing efficient electric appliances or services such as HVAC and lighting.**

3. **improving the energy efficiency of buildings' external envelope or the 'thermal shell' through upgrades to external walls, roofs and ground floors.**

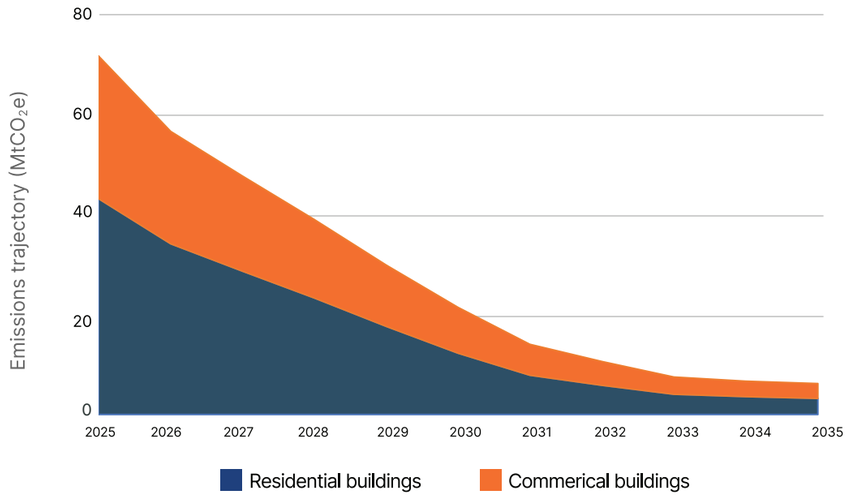
In addition, the following effective ways to abate should be noted, but lie outside of the scope of this report. These include: on-site generation and storage of renewable energy such as rooftop solar and batteries, demand management, reducing embodied carbon, and reducing refrigerants with high global warming potential.

Phasing out gas in buildings will inevitably switch energy demands to electricity. However, prioritising energy efficiency thermal shell improvements and efficient appliances, as well as on-site renewable energy generation and consumption and consumer energy resources, are key opportunities to ensure a least-cost transition to a renewable energy sector.

Using Climateworks' modelling, the following graphs demonstrate the reduction in emissions that would occur in the built environment in a 1.5°C scenario and the relative share of reductions that can be attributed to energy efficiency and electrification measures. The analysis and results are based on economy-wide modelling, where the choices between potential options for emissions reduction in all sectors are based on optimised least-cost modelling (Climateworks Centre 2023a). For all buildings, Figures 3 to 6 include upgrades such as switching to LED lighting, replacing all gas appliances with efficient all-electric technologies such as space conditioning (heating and cooling), hot water heating, and cooktops, as well as improvements to appliance efficiency and building thermal shell improvements. It is worth noting here, under Climateworks' (2023a) 1.5°C-aligned decarbonisation scenario, it is assumed that gas-powered generation for the National Energy Market falls 61 per cent by 2030 relative to 2024 levels. Whole-of-economy gas use falls by 47 per cent by 2030. Industry gas use in 2030 falls by 34 per cent. The move away from gas in residential buildings is rapid under a 1.5°C scenario, declining by half by 2030 (Climateworks Centre 2024b).

Figure 3 demonstrates the emissions reductions trajectory for residential buildings and commercial buildings in a 1.5°C scenario to 2035.

Figure 3: 2025–2035 Built Environment emissions trajectory ($MtCO_2e$) – all buildings in a 1.5°C scenario

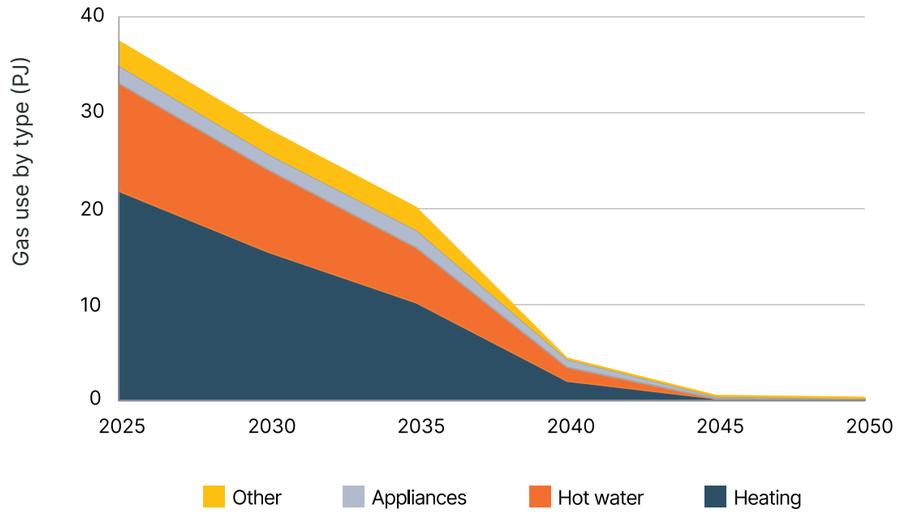


This graph shows a rapid decline in emissions of 50 $MtCO_2e$ between 2025 and 2030, as electrification is taken up and appliance and building efficiency are improved in the built environment sector. The rate of decline slows between 2030 and 2035 after the most cost-effective decarbonisation options have been taken up. Gas use declines in buildings in the 2030s, and gas use in new and existing buildings approaches 5 per cent by 2040 and almost 0 per cent by 2045 (Climateworks Centre 2023a).

Electrification of commercial buildings

Electrification offers the greatest potential for emissions reduction in commercial buildings.

Figure 4: 2025–2050 Gas use in commercial buildings by type: Hot water, heating and appliances (PJ) in a 1.5°C scenario



This graph shows how the gas use in commercial buildings reduces over time in a 1.5°C-aligned scenario. Gas for heating and hot water is largely replaced by electricity use, with reasonably consistent declines through to 2040. Victoria and New South Wales have the highest gas use in commercial buildings, each being larger than the sum of the other states. Timely reduction of emissions from gas in these two states will be critical in the commercial building sector.

Electrification and energy efficiency measures play an important role in emissions reductions across residential and commercial buildings

Figure 5: 2025–2050 Avoided emissions from demand-side measures: energy efficiency and electrification ($MtCO_2e$) in a 1.5°C scenario

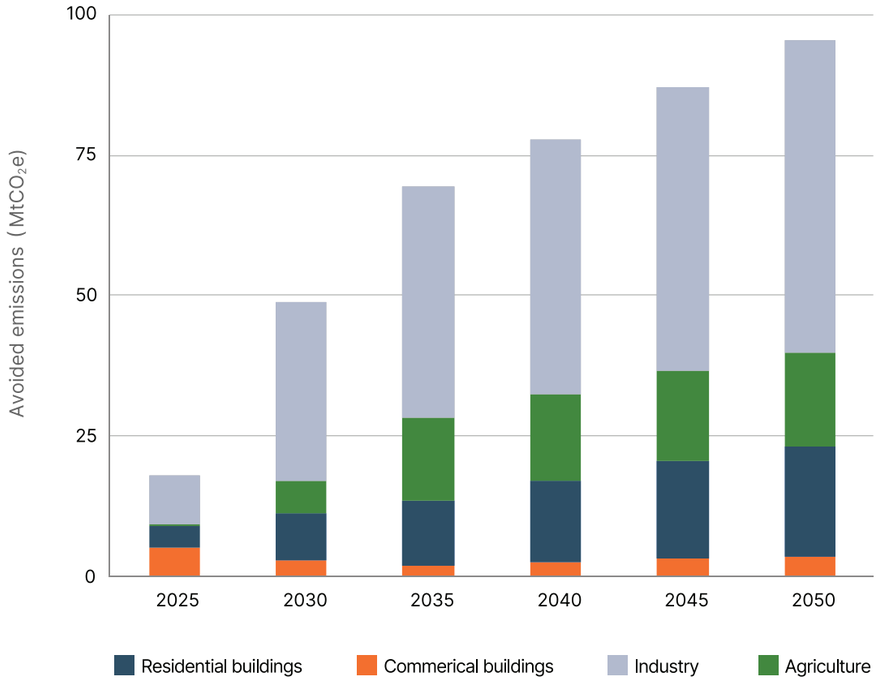


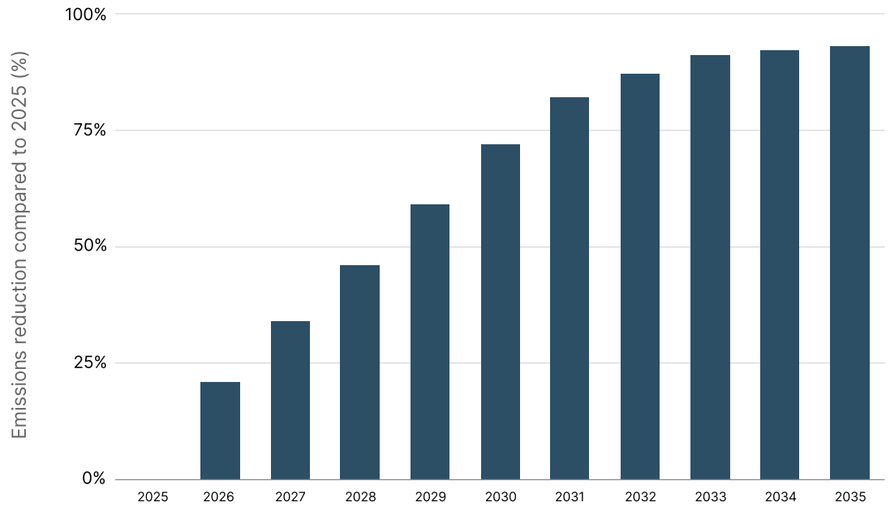
Figure 5 shows the emissions avoided in the residential buildings, commercial buildings, industry, and agriculture sectors in a 1.5°C trajectory between 2025 and 2050. Despite the comparatively small size of the built environment sector, the potential for reducing overall emissions is still sizable – particularly in the short term. Emissions are reduced in residential buildings and commercial buildings through a combination of grid decarbonisation, switching gas appliances for efficient electric alternatives, and improvements in energy efficiency.

In the residential building sector, emissions avoided through electrification and energy efficiency are predicated on improvements to each buildings' thermal shell over time. For existing homes, this would take the form of energy performance upgrades such as adding insulation and improving air tightness at the same time as replacing gas heating, cooking, and hot water

with electric alternatives. In new homes, this would mean ensuring they are built to energy efficiency standards to which they are designed, i.e., 7 star NatHERS. These actions also support the recently released National Adaptation Plan and its objective for ensuring more resilient, future-proofed and liveable homes.

Figure 6, below, demonstrates how rapidly emissions are reduced in the residential sector, with a 93 per cent reduction in annual emissions in 2035 when compared to 2025.

Figure 6: 2025–2035 Built Environment percentage reduction of emissions – residential buildings in a 1.5°C scenario



Reducing emissions from Australia's existing residential building stock will be paramount for decarbonising the built environment

Electrification and thermal upgrades to residential buildings are some of the most cost-effective emissions reductions available in the economy in terms of direct emission reduction.

The opportunities to avoid emissions are even higher for detached houses and homes in colder climates such as in the ACT, Tasmania, South Australia and Victoria, when homes are upgraded to energy performance levels aligned with their respective climate zones (Climateworks Centre 2024a). Energy performance upgrades can also increase resilience, in line with the National Adaptation Plan, and improve productivity outcomes for households facing energy hardship – for example, by reducing time lost at work due to poor health linked with gas cooktops (Asthma Australia 2023) or unsafe indoor temperatures (Janssen et al. 2023). There is a clear role for government in ensuring these changes occur in a timely and equitable manner. This is of particular importance when considering the potential risks of low-income and vulnerable households, who are at risk of missing out on cost savings and the benefits of more comfortable housing due to structural barriers such as the inability to afford upgrades due to upfront costs or the lack of agency to undertake modifications to the building structure.

4

Case studies

Residential buildings

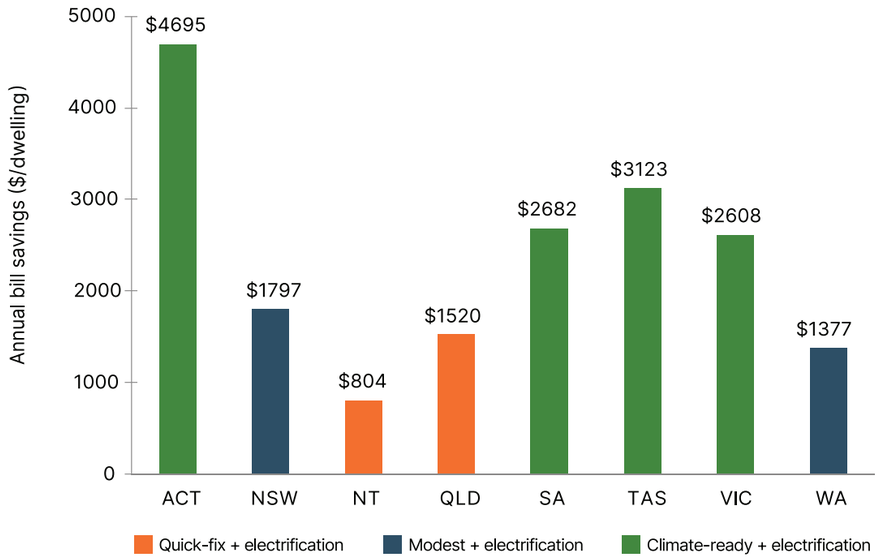
Currently, around 70 per cent of homes are estimated to be below NatHERS 3 stars, and many are connected to gas. There are approximately 5.5 million homes connected to gas in need of electrification and 7.7 million needing thermal upgrades to be climate-resilient (Department of Industry, Science and Resources 2024).

To be 1.5°C-aligned nationally, Climateworks' latest modelling of the housing stock (Climateworks Centre 2023b) estimates the number of home renovations needed in each state and territory. The number of homes and the size of the opportunity varies per state. By 2035, nearly 823,000 low-performing existing dwellings in Victoria need to couple climate-ready upgrades and electrification, and around 556,000 existing low-performing dwellings in Queensland need to couple quick-fix upgrades and electrification.

The three upgrade packages applied on a household basis used for Figures 7 and 8 are defined as:

- **'Quick-fix': Ceiling insulation, draught sealing, heavy drapes and roller shutters combined with an efficient electric heat pump.**
- 'Modest': 'Quick-fix' plus floor insulation and an additional layer of glass or film on windows.
- 'Climate-ready': 'Quick-fix' plus floor and wall insulation, high levels of draught sealing, double-glazed windows and a heat recovery

Figure 7: Annual bill savings after thermal upgrades and electrification per home



This graph shows the average annual energy bill savings per home after recommended thermal upgrades and electrification of cooktops and hot water per dwelling for detached houses (Class 1a) by state and territory.

On average, Australian households would save on energy bills from thermal shell upgrades and full electrification of appliances. With 'quick-fix' and 'climate-ready' thermal upgrades and full electrification of appliances, households could save a national average of between $1,690 and $2,002 each year, based on 2023 gas and electricity prices (Climateworks Centre 2023b). Annual bill savings increase for those undertaking 'climate-ready' upgrades, especially for detached houses in the coldest climates, as shown in Figure 7.

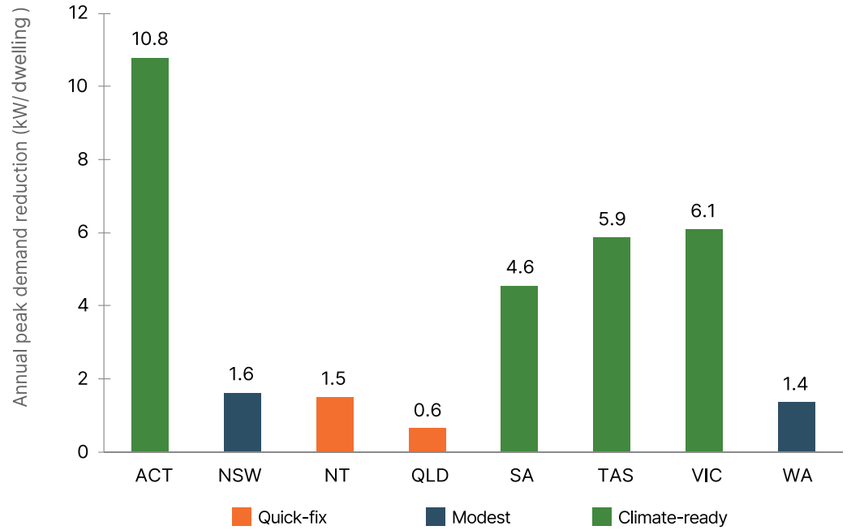
Several times a year, the energy demand from residential buildings is considered to be 'peak'. The highest energy demand by residential buildings is in peaks of summer heatwaves and cold winters. Although these occur for only short periods per year, the energy grid infrastructure is sized for these peak demands. Reduction in peak demand, therefore, can attract big cost savings through avoided network augmentation, referred to as 'avoided network costs'.

Coupling electrification with thermal upgrades reduces peak demand as this coupling ensures homes are optimised to consume more of their

own on-site rooftop solar and have lower heating and cooling demands due to smaller amounts of heated and cooled air escaping through gaps and uninsulated walls and roofs. Upgrading homes to 5–6 stars NatHERS means appliances for space conditioning achieve their expected potential reduction and savings, and consumer energy resources, such as solar and battery storage, are right-sized.

Thermal upgrades ensure that the potential abatement from improving energy performance of new all-electric space conditioning appliances is achieved. Heat pumps are efficient when homes are relatively air-tight and insulated to be a minimum of 5–6 stars (NatHERS).

Figure 8: Annual peak demand reduction after recommended thermal upgrades per home



This graph shows the average annual peak demand reduction after recommended thermal upgrades per home for detached houses by state and territory.

Peak energy demand has implications for the overall cost of the energy grid infrastructure across Australia.

Policy Recommendations

In September 2025, the Australian Government announced a new target to achieve emissions reductions of 62–70 per cent below 2005 levels by 2035. Along with the target, the government also released the BESP, one of six sector plans under Australia's Net Zero Plan. The BESP highlights the critical role of the built environment in achieving national decarbonisation goals and especially the 2035 target.

This section responds to the release of the BESP and sets out key priorities for decisive government action to unlock abatement potential in the built environment and deliver meaningful progress on the abatement curve in the short to medium-term. The key priorities are to:

1. **Prioritise investment to fast-track energy efficiency and electrification upgrades in Australia's homes and buildings**
2. **Collaborate with industry to develop a comprehensive BESP implementation plan**
3. **Make new buildings zero-carbon-ready and ready for a warming climate in the NCC starting with 2025**
4. **Sustain and expand investment in proven programs.**

These priorities:

- align with the policy settings needed to achieve the emissions reductions modelled in a 1.5°C scenario
- reflect key recommendations from Every Building Counts (GBCA and Property Council of Australia, 2023) and the Renovation Pathways Program (Climateworks Centre, 2023; 2024; 2025)
- respond to challenges and opportunities identified in the BESP
- recognise the importance of expanding proven initiatives such as NABERS, CBD Program, NatHERS and Greenhouse and Energy Minimum Standards (GEMS), committed to in the BESP.

The BESP identifies key areas for action to decarbonise the built environment. Below, the challenges and opportunities identified in the BESP are compared with the priorities for action identified in this report.

Traffic light key	
🟢	BESP and priorities are well-aligned with progress underway. Opportunities for action are available but not urgent.
🟠	BESP and priorities have some alignment, some progress has been made. Opportunities for action should be prioritised.
🔴	BESP and priorities are not yet well-aligned. Opportunities for action are significant and action is urgently needed.

1. Prioritise investment to fast-track energy efficiency and electrification upgrades in Australia's homes and buildings	
🟠 **Alignment and progress**	The BESP identifies electrification as a key action area and the importance of an orderly transition away from natural gas. However, clear signals for when and how we will phase out gas use in homes and buildings are not included in the BESP.
🔴 **Opportunities for action**	One of Australia's biggest opportunities to reduce emissions by 2035 is investing in electrifying existing homes and buildings. A range of additional, targeted incentives, including expanded support for more vulnerable households, will be needed to drive this transition at speed and scale.
🟢 **Alignment and progress**	The BESP acknowledges energy efficiency as a key area for action. Funding to expand existing programs is an important step to improve energy performance with new disclosure opportunities to be introduced through the CBD Program and NatHERS.
🟠 **Opportunities for action**	One of Australia's biggest opportunities to reduce emissions by 2035 is investing in improving the energy efficiency of existing homes and buildings. A range of additional, targeted incentives, including expanded support for more vulnerable households, will be needed to drive this transition at speed and scale.

2. Collaborate with industry to develop a comprehensive BESP implementation plan	
Alignment and progress	The BESP delivers a clear set of priorities and opportunities to decarbonise the built environment. The next steps for taking action are critical.
Opportunities for action	Collaborate with industry to develop and implement a comprehensive and structured plan to ensure measurable progress on the priorities and opportunities highlighted in the BESP. This should align with the updated Trajectory for Low Energy Buildings, National Adaptation Plan and other key policies.
3. Make new buildings zero-carbon-ready and ready for a warming climate in the NCC starting with 2025	
Alignment and progress	The BESP identifies electrification and energy efficiency as two key action areas and acknowledges the role of NCC in improving energy efficiency in Australia's homes and buildings. Proposed changes in NCC 2025 will require non-residential buildings to be zero-carbon-ready.
Opportunities for action	Work with all jurisdictions to agree on a clear, national plan for future NCC updates for homes and buildings which align with emissions reduction commitments and action areas identified in the BESP. Adequately fund the Australian Building Codes Board (ABCB) to maintain strong standards and processes.
Alignment and progress	The BESP highlights the importance of creating a built environment that is fit for purpose, liveable, provides thermal comfort and is resilient to a changing climate. While the BESP acknowledges the role of NCC in resilience in homes and buildings, at this point, the NCC does not address resilience explicitly.
Opportunities for action	Building Ministers agreed to include climate resilience as a specific objective of the ABCB. The ABCB must be resourced to respond to this priority.
4. Sustain and expand investment in proven programs	
Alignment and progress	Funding to expand NABERS, CBD Program, GEMS and NatHERS for existing homes is a welcome and vital step.
Opportunities for action	Publish the CBD Program Roadmap, explore options for additional funding and partner with industry to prepare those in the commercial building sector not currently covered by the CBD Program. Commit to long-term funding and support for NABERS and NatHERS.

Review based on GBCA/PCA policy insights

Powering productivity through building upgrades

Cutting emissions from the built environment isn't just good for the climate – it boosts productivity and delivers wide-ranging benefits. Energy efficiency upgrades and electrification of homes can upskill the workforce, spark innovation, and drive down costs.

For example, rapid uptake in rooftop solar in Australia has driven innovation and pushed down costs. More efficient homes mean lower energy bills – and fewer hours worked to pay for essential utilities. Healthier living conditions mean fewer days lost to illness and fewer medical costs incurred. Victoria's Healthy Homes study (Sustainability Victoria, 2022) found energy upgrades saved $887 per person in healthcare costs over a single winter. Investing in building performance supports Australia's climate targets and strengthens the economy in the process.

Burwood Brickworks Retail, VIC, Frasers Property Australia, Green Star – 6 Star Design & As Built v1.3.

1. Prioritise investment to fast-track energy efficiency and electrification upgrades in Australia's homes and buildings

This report shows that rapid decarbonisation of the built environment can save 66 $MtCO_2e$ by 2035. That's 93 per cent of residential building operating emissions and 90 per cent of commercial building emissions by 2035.

But these achievements will rely on driving the uptake of building electrification and energy efficiency upgrades at speed and scale.

Some progress has been made to incentivise and support the upgrade and retrofit of existing homes and buildings, but more government leadership and support is needed to catalyse action in millions of households and buildings across Australia.

Recommendation:

- Accelerate the shift to high-performance buildings with targeted incentives. These could include:
    - Funding for electrification pilots in hard-to-electrify buildings
    - Funding for electrification and energy efficiency upgrades (appliances and thermal shell) for households, prioritising low-income and vulnerable households
    - Incentivise NABERS & Green Star ratings for buildings not yet covered by the CBD Program
    - Continue to review and expand the Clean Building Managed Investment Trust withholding tax concession to additional building types.
- Work with states and territories to ensure energy efficiency and electrification obligation schemes are introduced where none currently exist. Encourage harmonisation and incorporate best practice from across jurisdictions.
- Catalyse sustainable investment and green financial products in the market for both the residential and commercial buildings sectors
- Coordinate with states and territories to set mandatory minimum standards for rental homes.
- Optimise existing initiatives, such as the Household Energy Upgrades Fund, to ensure that this funding is reaching more people, faster.

2. Collaborate with industry to develop a comprehensive BESP implementation plan

The BESP provides a clear picture of the work to be done across the built environment sector to achieve a net zero transition by 2050. The main opportunities identified in the BESP are:

- Electrify, where possible
- Increase energy efficiency
- Improve design and decarbonise materials
- Harness low emissions technology
- Phase out hydrofluorocarbons (HFCs)

The critical next step is to map a clear plan for implementing actions in these areas.

Recommendation:

- Government should commit to working with industry to develop a comprehensive implementation plan within 12 months of the BESP's release. The plan should outline clear actions, timelines, and responsibilities to deliver zero-carbon-ready, climate-resilient homes and buildings, and a clear decarbonisation pathway to net zero.
- Ensure that the BESP includes and aligns with other key policies already delivered or announced. Complementary policies include:
    - National Adaptation Plan
    - The other sector plans under Australia's Net Zero Plan, particularly the Electricity and Energy Sector Plan, Transport and Infrastructure Sector Plan, and the Industry Sector Plan
    - The updated Trajectory for Low Energy Buildings
    - The National Construction Code (NCC) – one of the most powerful levers for driving improvements in energy performance, electrification and improved resilience
    - National Energy Performance Strategy
    - Agreements with states and territories to support energy-efficiency upgrades in social housing
    - Commercial Building Disclosure (CBD) Program Roadmap – to be released in 2025.

Recommendation (cont.):

- Work with jurisdictions and industry to develop a detailed implementation plan to underpin the updated Trajectory for Low Energy Buildings out to 2050. This should align with the BESP and include timelines, actions and responsibilities.

The BESP also has significant opportunities to align with, and contribute to, the aims of other key policy priorities, such as the National Energy Workforce Strategy (under development by Department of Climate Change, Energy, Environment and Water), to boost the energy-efficiency workforce and supply chains (Climateworks Centre 2024a). The Treasury's Measuring What Matters framework could include a range of measurements to track the built environment's contribution to wellbeing and productivity (Climateworks Centre 2023c). This could include indicators for the proportion of people living within each NatHERS star band, in zero-carbon-ready homes and with access to affordable essential energy services.

Hassell Brisbane Fitout, QLD. Hassell 5 Star Green Star – Interiors v1.3

3. Make new buildings zero-carbon-ready and ready for a warming climate in the NCC starting with 2025

Every new building equipped with gas is one more building that will need to be retrofitted in the future for Australia to achieve its net zero emissions commitments.

New homes and buildings can be designed to be all electric, but gas connections are still growing at a rate of around 100,000 new connections annually. This is inconsistent with a net zero future and sustains unnecessary competition for limited gas supplies.

At the same time, millions of Australian homes are facing escalating risks from natural hazards, including flood, bushfire and extreme temperatures, which are growing more intense due to climate change.

The NCC is a key instrument to deliver new buildings that are zero-carbon-ready, and ready for a warming climate.

Recommendation:

- Implement NCC 2025 changes which require commercial buildings to be zero-carbon-ready.
- Make new residential buildings zero-carbon-ready in the next update to the NCC.
- Work with all jurisdictions to set a clear national plan for future NCC updates which are aligned with emissions reduction commitments, climate resilience objectives and community safety expectations
- Commit adequate funding to the ABCB to maintain strong standards and processes and to respond to additional priorities advised by the Building Ministers' Meeting.

4. Sustain and expand investment in proven programs

As part of the BESP, the Australian Government announced it will expand several existing programs proven to deliver emissions reductions and energy performance improvements. This is a welcome and vital commitment that will deliver measurable emissions reductions as well as a range of benefits for households and businesses. It includes funding for:

- Implementing NatHERS for existing homes
- Expanding the CBD Program
- Expanding NABERS
- Modernising GEMS

Recommendation:

- Publish the CBD Program Roadmap
- Provide additional funding and identify opportunities for government and industry to work together to support new participants in accessing NABERS ratings and improving building performance in anticipation of the CBD Program expanding to additional building types.

1 William Street, QLD, Cbus Property, Green Star – 6 Star Office As Built v3

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Appendix

Appendix:
Technical details – Decarbonisation Scenarios data and analysis

- AusTIMES models how the whole of the Australian economy could decarbonise in a way that reflects the lowest overall cost between now and 2050. Climateworks and CSIRO have been developing the model since 2018, based on the globally-recognised TIMES model from the International Energy Agency (IEA) Energy Technology Systems Analysis Program (ETSAP). Decarbonisation scenarios produced by AusTIMES include:
    - Emissions reduction pathways based on minimising overall long-term costs, which can inform long-term target-setting and policy decisions.
    - Interactions and trade-offs between different sectors of the economy, under a national decarbonisation objective.
    - The approach offers guidance on potential uptake and phase-out of particular technologies, including timings.
- The model covers all states and territories: ACT, NSW, NT, QLD, SA, TAS, VIC and WA, it models the economy in increments from 2021 to 2050 (every two years in Climateworks Centre decarbonisation scenarios 2023), represents annual operations of the supply-side of the electricity sector, includes all major fuel types and energy feedstocks across end-use sectors, including coal, diesel, biomethane, renewable energy and hydrogen, and segments Australia's economy into five end-use sectors:
    - agriculture (7 subsectors)
    - industry (43 subsectors across mining, manufacturing and 'other')
    - buildings (14 building types across residential and non-residential)
    - road transport (10 vehicle types)
    - non-road transport (rail, sea and aviation).

Appendix:
Technical details – Renovation Pathways data and analysis

- Renovation Pathways is a program of research, developed in collaboration with CSIRO, Strategy Policy Research (SPR), and representatives from industry and finance organisations. The program has won recognition from Energy Efficiency Council (2024) and is embedded in policy literature and guidance by DCCEEW, Climate Council Authority (CCA) and Clean Energy Finance Corporation (CEFC). The program includes:
  - a residential housing stock model developed in partnership with CSIRO, drawing from the Australian Homes dataset and Race for Homes project with RMIT.
  - economic analysis, including the household bill savings and avoided network costs, was undertaken by SPR.
- All data presented from Renovation Pathways is on a per home basis.
- All data is based on upgrading homes from a base ('low-performing') scenario (as detailed in the Renovation Pathways Technical Report).
- Data presented is weighted averages for detached houses in each state and territory.
- Details of dwelling type definition and scenario assumptions can be found in Renovation Pathways technical report.

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