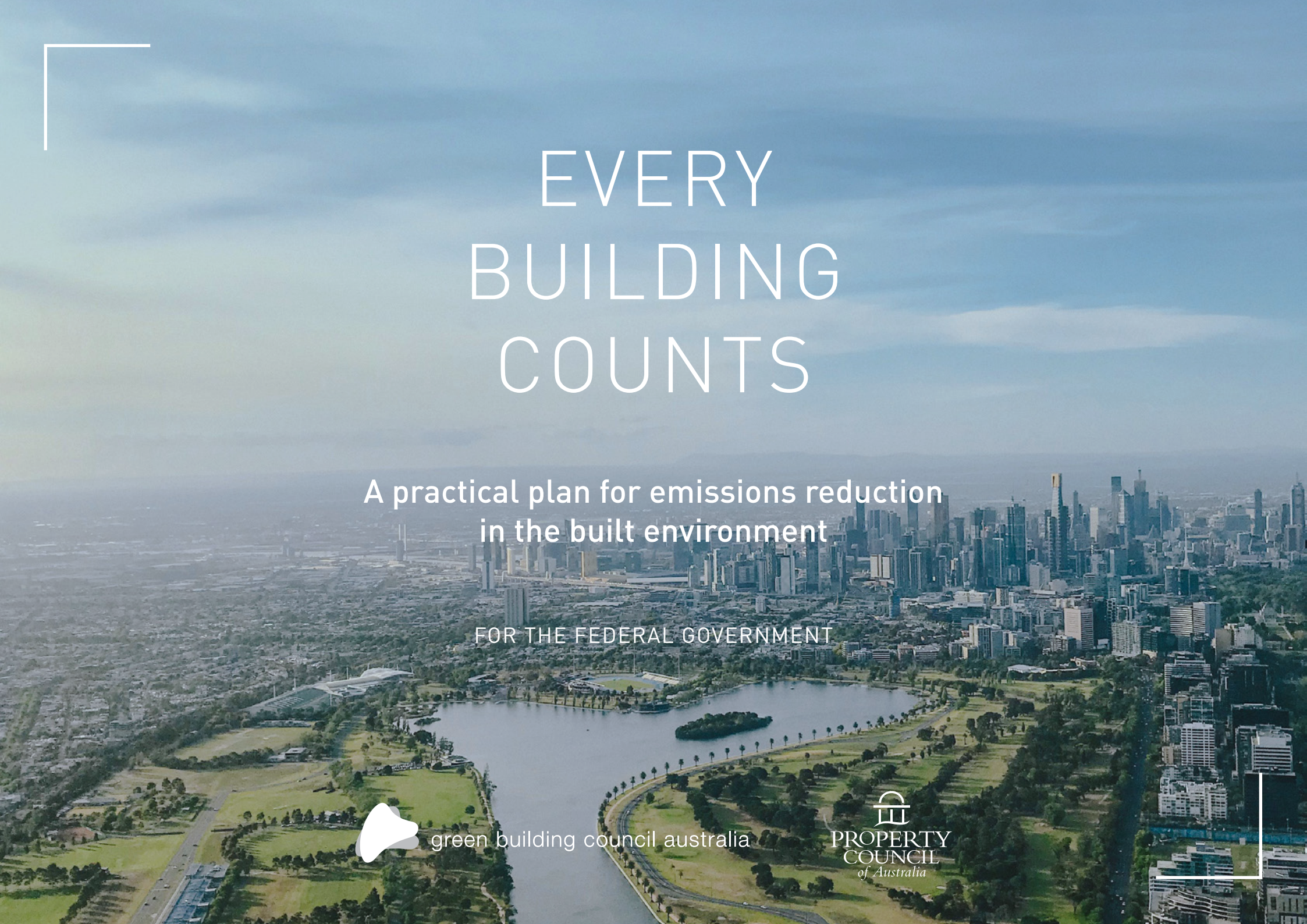


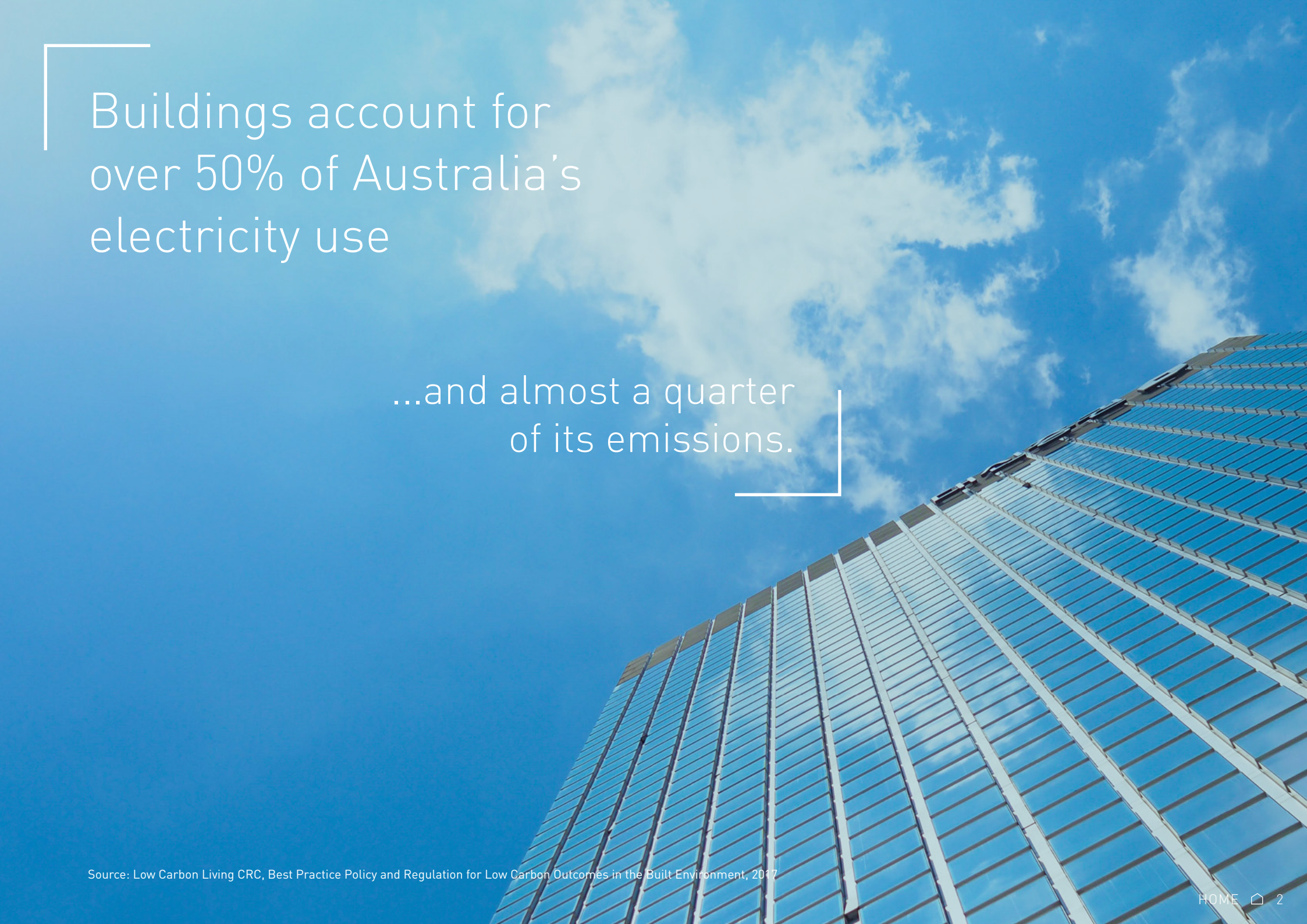
# EVERY BUILDING COUNTS

## A practical plan for emissions reduction in the built environment

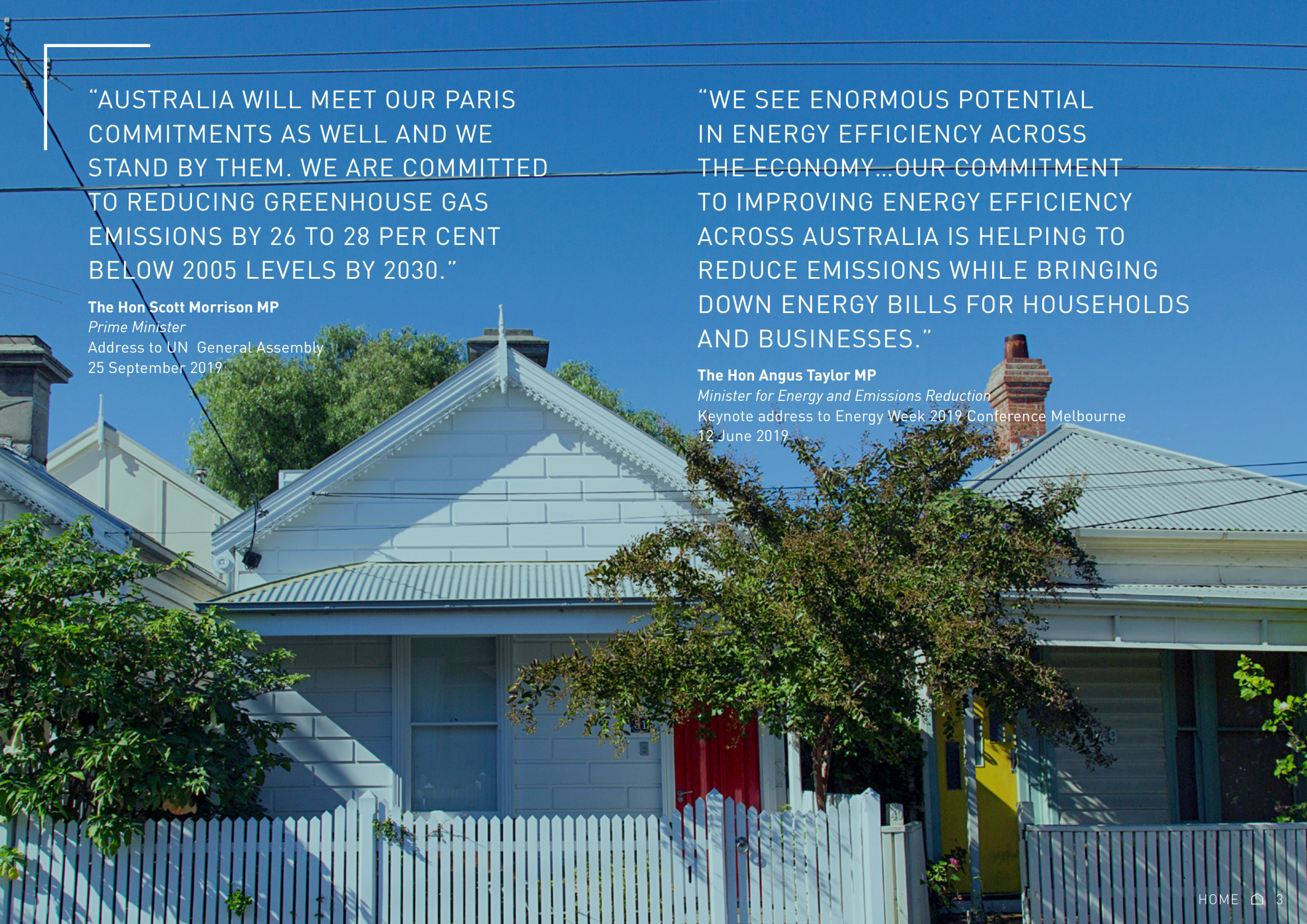
FOR THE FEDERAL GOVERNMENT

green building council australia

PROPERTY COUNCIL of Australia




Source: Low Carbon Living CRC, Best Practice Policy and Regulation for Low Carbon Outcomes in the Built Environment, 2017



"AUSTRALIA WILL MEET OUR PARIS COMMITMENTS AS WELL AND WE STAND BY THEM. WE ARE COMMITTED TO REDUCING GREENHOUSE GAS EMISSIONS BY 26 TO 28 PER CENT BELOW 2005 LEVELS BY 2030."

**The Hon Scott Morrison MP**
*Prime Minister*
Address to UN General Assembly
25 September 2019

"WE SEE ENORMOUS POTENTIAL IN ENERGY EFFICIENCY ACROSS THE ECONOMY...OUR COMMITMENT TO IMPROVING ENERGY EFFICIENCY ACROSS AUSTRALIA IS HELPING TO REDUCE EMISSIONS WHILE BRINGING DOWN ENERGY BILLS FOR HOUSEHOLDS AND BUSINESSES."

**The Hon Angus Taylor MP**
*Minister for Energy and Emissions Reduction*
Keynote address to Energy Week 2019 Conference Melbourne
12 June 2019

# ENERGY EFFICIENCY MEASURES IN BUILDINGS COULD DELIVER:

**$20 BILLION**

in energy bill savings for businesses and households

**OVER 50%**

of the Australian Government's 2030 energy productivity target

**OVER 25%**

of Australia's 2030 emissions reduction target

**WE ARE COMMITTED TO ACHIEVING DECARBONISATION BY MID-CENTURY IN ACCORDANCE WITH AUSTRALIA'S RESPONSIBILITIES UNDER THE PARIS AGREEMENT.**

While Australia's leading property companies continue to top international sustainability benchmarks, the challenge remains to extend this progress across the sector more broadly.

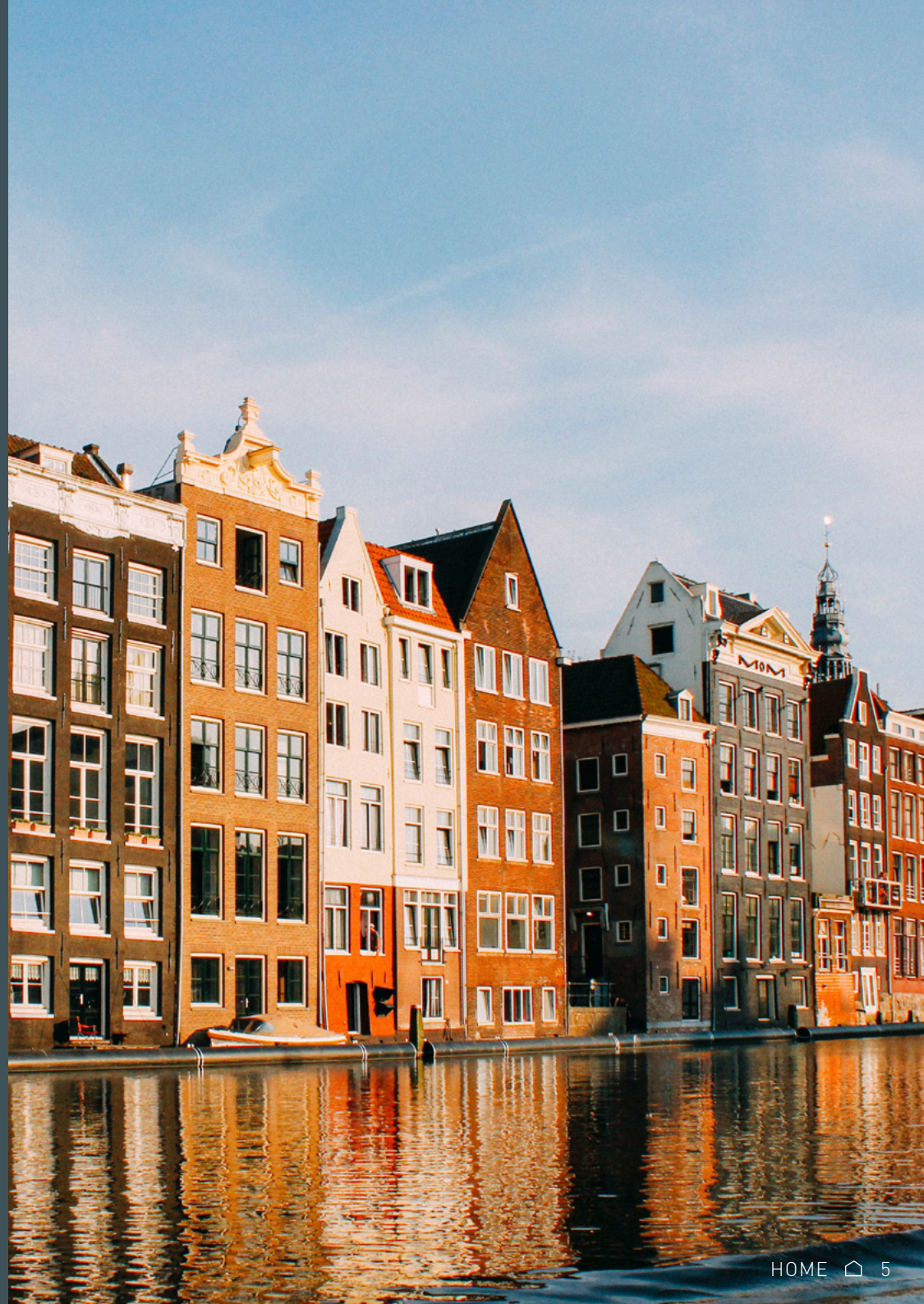
The right policy settings can help our buildings achieve their full potential with consistency and efficacy. Targeted policies are needed for the sector as well as national consistency of processes and programs where possible.

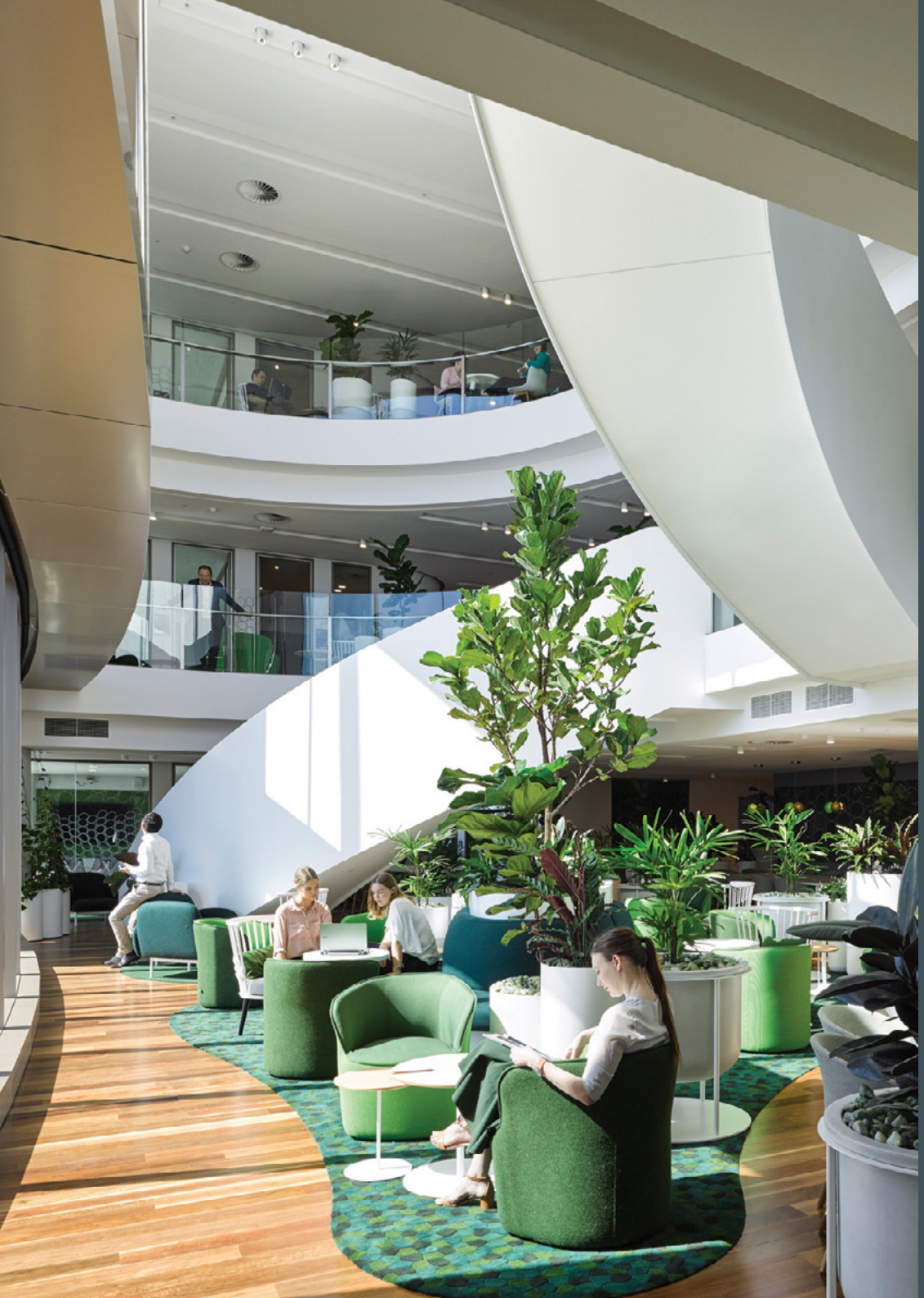
Source: ASBEC Low Carbon, High Performance 2016

## WE HAVE COMPLETED A COMPREHENSIVE REVIEW OF GLOBAL AND LOCAL POLICIES WITH A PROVEN RECORD OF EMISSIONS REDUCTION TO INFORM RECOMMENDATIONS WITH THE BEST VALUE FOR GOVERNMENTS AND INDUSTRY.

This work has resulted in a set of recommendations covering residential, commercial and public buildings that are ready for implementation by the Federal Government.

This report is companion to two others tailored for state and territory, as well as local governments respectively and is the latest in a series of flagship publications showing how government and industry can work together to unlock a low carbon built environment.





## AUSTRALIA'S TRANSITION TO A LOW EMISSIONS ECONOMY WILL BE SMOOTHER IF GOVERNMENTS SET A CLEAR AND STEADY TRAJECTORY FOR EMISSIONS REDUCTIONS IN KEY ECONOMIC SECTORS, AND A SUITE OF POLICIES THAT PROVIDE INDUSTRY CERTAINTY.

With the right policy frameworks in place, we can minimise the costs of transition, create economic opportunities across all parts of industry, from sole traders and homeowners to large businesses.

An ambitious strategy to improve the energy performance of Australia's buildings could create more than 80,000 job-years of employment.*

*Source: Energy Efficiency Council, Energy Efficiency Employment in Australia 2019

# THIS REPORT WAS PRODUCED BY

PROJECT PARTNERS

green building council australia

PROPERTY COUNCIL of Australia

SPONSOR

LOW CARBON LIVING CRC

Curtin University

STEERING GROUP PARTNERS

asbec AUSTRALIAN SUSTAINABLE BUILT ENVIRONMENT COUNCIL

energy efficiency COUNCIL

# METHODOLOGY

We have completed a comprehensive review of global and local policies.

National

International

We have identified solutions for different building types across the built environment.

All buildings

Government

Commercial

Residential

We have identified the building lifecycle stage to which each recommendation can be applied.

All stages

Design

Construction

Commissioning

Sale/lease

Retrofit

Occupation

We assessed each policy according to the key criteria.

Impact

Emissions reduction opportunity

Ease of implementation

Lack of barriers or challenges for adoption

Cost effectiveness

Industry return on investment

# POLICY THEMES

**THEME 1**

NET ZERO BUILDINGS PLAN

**THEME 2**

INCENTIVISE HIGH PERFORMANCE

**THEME 3**

MINIMUM STANDARDS

**THEME 4**

ENERGY MARKET REFORM

**THEME 5**

GOVERNMENT LEADERSHIP

**THEME 6**

ROBUST RATING TOOLS FOR DIFFERENT BUILDING TYPES

**THEME 7**

TRANSFORM MARKETS FOR MATERIALS AND PRODUCTS

THIS IS AN INTERACTIVE PDF. CLICK THE BOXES TO GO TO EACH THEME.

# KEY RECOMMENDATIONS

1

Set out a long term vision for net zero buildings and extend the *Trajectory for Low Energy Buildings* to 2050

THEME 1

2

Ensure the Climate Solutions Fund drives low cost abatement and provide targeted financial incentives

THEME 2

3

Deliver a Zero Carbon Ready building code and improve enforcement and compliance

THEME 3

4

Expand the mandate of the Energy Security Board to drive energy productivity across the economy

THEME 4

5

Deliver City Deals that drive cost effective emissions reductions

THEME 5

6

Empower owners, buyers and renters with a single national rating scheme for home energy performance

THEME 6

7

Make Australia a global leader in high performance building products

THEME 7

# RECOMMENDATIONS SUMMARY

**THEME 1**
## NET ZERO BUILDINGS PLAN

**1.1 Set out a long term vision for net zero buildings and extend the *Trajectory for Low Energy Buildings* to 2050**

**THEME 2**
## INCENTIVISE HIGH PERFORMANCE

**2.1 Accelerate the shift to high performance buildings with targeted financial incentives**

**2.2 Ensure the Climate Solutions Fund drives low cost abatement in buildings**

2.3 Support green loans and innovative finance products to drive high performing homes and retrofits

2.4 Expand the Commercial Building Disclosure program

2.5 Introduce and harmonise energy efficiency obligation schemes across jurisdictions

2.6 Provide support for distinct market segments through sectoral leadership strategies

**THEME 3**
## MINIMUM STANDARDS

**3.1 Deliver a Zero Carbon Ready building code**

**3.2 Improve compliance, monitoring and enforcement of the National Construction Code**

3.3 Strengthen minimum standards for appliances

3.4 Support renters with minimum energy efficiency standards for rental properties

3.5 Investigate energy performance improvements for existing buildings

**THEME 4**
## ENERGY MARKET REFORM

**4.1 Expand the mandate of the Energy Security Board to drive energy productivity across the economy**

4.2 Invest in the best mix of demand-side and supply-side measures

4.3 Ensure energy users are paid for the services they deliver to the grid

4.4 Ensure that networks engage with consumers and generators on fair terms

4.5 Unlock the potential of distributed energy

# RECOMMENDATIONS SUMMARY (CONTINUED)

## THEME 5
## GOVERNMENT LEADERSHIP

**5.1 Deliver City Deals that drive cost effective emissions reductions**

**5.2 Lead through government owned and leased buildings**

5.3 Drive the broader application of trusted, robust and credible building rating systems such as Green Star and NABERS in government projects

5.4 Establish a national built environment energy efficiency and emissions education and training agenda

5.5 Establish a national built environment energy efficiency and emissions research and innovation agenda

5.6 Inform consumers on residential energy efficiency

5.7 Support targeted retrofits for worst performing and highest risk housing stock

5.8 Support vulnerable consumers with targeted assistance and tools

## THEME 6
## ROBUST RATING TOOLS FOR DIFFERENT BUILDING TYPES

**6.1 Empower owners, buyers and renters with a single national rating for home energy performance**

**6.2 Implement mandatory performance disclosure for homes at the point of sale or lease**

6.3 Expand robust benchmarks for operational energy performance for commercial buildings

## THEME 7
## TRANSFORM MARKETS FOR MATERIALS AND PRODUCTS

**7.1 Make Australia a global leader in high performance building products**

7.2 Develop a nationally coordinated strategy to achieve net zero embodied carbon

7.3 Grow the availability of cost-effective low emissions building materials

# THEME 1
# NET ZERO BUILDINGS PLAN

# NET ZERO BUILDINGS PLAN

## 1.1 Set out a long term vision for net zero buildings and extend the *Trajectory for Low Energy Buildings* to 2050

**RECOMMENDATION 1.1**

# A NATIONAL NET ZERO EMISSIONS PLAN

**Set out a long term vision for net zero buildings and extend the *Trajectory for Low Energy Buildings* to 2050**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Australia's support for the Paris Agreement means that we are committed to transitioning toward a low emissions economy. To fulfil our obligation, Australia must reach net zero emissions by 2050. Buildings present some of the lowest cost emissions reduction opportunities, and the technology already exists today to achieve zero carbon buildings. A national plan which includes sector targets and policies for emissions reduction out to 2050 would leverage opportunities in the sector and expand the progress shown by market leaders in recent years.

## PATHWAY

The Federal Government should establish a comprehensive national plan, in conjunction with state and territory governments towards net zero emissions buildings. The plan should encompass a range of measures that accelerate decarbonisation in the built environment and include interim science based targets aligned with Australia's obligations under the Paris Agreement. It should be underpinned by frameworks to coordinate action across different levels of government, departments, agencies and policy processes. To support this plan, Government should extend the Trajectory for Low Energy Buildings, which identifies opportunities for low and zero energy (and carbon) ready building, out to 2050.

NATIONAL

### LOW ENERGY BUILDINGS TRAJECTORY

In February 2019 Australian Energy Ministers committed to developing a national plan that sets a trajectory towards zero energy (and carbon-ready) buildings for Australia. Work is currently underway to assess cost-effective increases to energy provisions in the National Construction Code, and to consider options for improving existing commercial and residential buildings. A number of building measures are also facilitated through the National Energy Productivity Plan 2015-2030.

INTERNATIONAL

### DENMARK'S ZERO ENERGY BUILDINGS PLAN

A front-runner in global energy efficiency and climate policies, Denmark has a strategy for reducing energy consumption that covers both new and existing buildings. In mid-2019, the Danish Government unveiled plans to reduce its GHG emissions by 70 per cent by 2030 to meet the goals of the Paris Agreement. The Government has signalled to the construction industry that a 'nearly zero energy buildings' target will be mandatory by 2020, which will reduce the energy consumption of new buildings by 75% compared to 2006. Policies for achieving zero energy buildings in Denmark include a balanced mix of both top-down and bottom up strategies, including targets and building codes, building certification, economic instruments, information tools, demonstration projects, education and training and R&D.

# THEME 2
# INCENTIVISE HIGH PERFORMANCE

# INCENTIVISE HIGH PERFORMANCE

**2.1 Accelerate the shift to high performance buildings with targeted financial incentives**

**2.2 Ensure the Climate Solutions Fund drives low cost abatement in buildings**

2.3 Support green loans and innovative finance products to drive high performing homes and retrofits

2.4 Expand the Commercial Building Disclosure program

2.5 Introduce and harmonise energy efficiency obligation schemes across jurisdictions

2.6 Provide support for distinct market segments through sectoral leadership strategies

**RECOMMENDATION 2.1**

# FINANCIAL INCENTIVES

**Accelerate the shift to high performance buildings with targeted financial incentives**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

Design

Construction

Retrofit

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Notwithstanding the progress made by market leaders, energy efficiency investment for most stakeholders in the built environment remains a low priority. This is due to barriers such as the perceived difficulty of energy upgrades, high upfront costs and long payback periods. Financial incentives can drive accelerated uptake of energy efficiency and distributed technologies in new and existing buildings, by helping to reduce the gap between energy efficiency outlays and returns, and motivating action by building owners and tenants.

## PATHWAY

The Federal Government should work with state and territory, as well as local governments to deliver financial incentives that encourage the built environment towards better sustainability practice and reduced emissions. Priority should be placed on:

- Modernising the 10 per cent green building withholding tax regime by:
  - expanding the regime to all buildings held for rental purposes (regime is currently limited to offices, hotels and shopping centres)
  - applying the rate to buildings that have been refurbished to achieve the necessary Green Star ratings (regime is currently limited to newly constructed buildings)
  - applying the test on an asset by asset basis (regime currently requires all of the MIT's assets to satisfy the Green Star rating requirements)
- Extending the instant asset write-off scheme to include energy efficiency upgrades of buildings up to $100k.
- Green depreciation, which would see the deferment of taxable income in early years in exchange for bringing forward investment in large upgrades that exceed the instant asset write-off threshold.
- Rates and charges relief for buildings that satisfy a performance standard, for instance stamp duty and land tax concessions for high performing buildings.

NATIONAL

### CITY OF ADELAIDE SUSTAINABILITY INCENTIVES SCHEME

The City of Adelaide's Sustainability Incentives Schemes provides a range of rebates to support community investment in sustainable technologies, such as solar PV systems, energy storage systems and electric vehicle charging systems. Rebates are also available for Carbon Neutral Certification and for the achievement of voluntary performance ratings under Green Star and NABERS.

INTERNATIONAL

### US ENERGY POLICY ACT 2005

The US Energy Policy Act 2005 established a number of tax incentives to drive energy efficiency improvements for both commercial and residential buildings, including tax credits to builders of residential buildings who build to a high benchmark under the Energy Star rating system, and tax credits for homeowners who upgrade their building envelope through purchase and installation of insulation, window and roofing materials.

**RECOMMENDATION 2.2**

# DRIVE LOW COST ABATEMENT IN BUILDINGS

**Ensure the Climate Solutions Fund drives low cost abatement in buildings**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT: ☑ ☑ ☑

EASE: ☑ ☑ ☑

COST EFFECTIVENESS: ☑ ☑ ☑

## CURRENTLY

Since 2014, the Emissions Reduction Fund (ERF) has been the Federal Government's flagship program for delivering cost effective emissions abatement. While the ERF has been successful in driving significant emissions reductions in some sectors, structural barriers have prevented uptake in buildings, where many of the lowest cost opportunities exist. These barriers – which include minimum bid sizes, high transaction costs and the requirement for multi-year contracts – have left significant abatement opportunities on the table.

## PATHWAY

At the start of 2019 the Federal Government announced the Climate Solutions Fund, which included an allocation of an additional $2 billion for purchasing low cost abatement.

The ERF's reverse auction structure is well suited to some sectors of the economy, such as agriculture. However, continuing to rely solely on reverse auctions to allocate these additional funds will leave buildings on the sidelines. There are particular opportunities and barriers in the buildings sector, which means a tailored approach is needed to drive low cost abatement. Given that buildings account for around a quarter of Australia's emissions, the Federal Government should use $500 million of the allocated $2 billion for targeted programs that drive low cost abatement in commercial and residential buildings. The Government should work with peak industry bodies, consumer groups and other experts to design a suite of measures that target key sub-sectors of the built environment that leverage existing programs like Green Star and NABERS and target key sub-sectors of the built environment.

INTERNATIONAL

## TOKYO'S CAP-AND-TRADE PROGRAM

Launched in 2010, Tokyo's cap-and-trade program requires around 1,000 large offices and 200 factories to reduce their emissions over several compliance periods, with a target of 25-27% emissions reduction on 2000 levels by 2025. A Tokyo-wide emissions cap is aggregated from baselines set at the individual building level based on the average emissions of three consecutive years between 2000-2007. By 2016, program had achieved a 26% reduction in emissions compared to base-year emissions, with progress made despite an increase in overall floor space, demonstrating a decrease in emissions intensity across the sector.

INTERNATIONAL

## GERMANY'S SECTOR-FOCUSED EMISSIONS REDUCTION STRATEGY

Germany is both a global economic powerhouse and a leader in driving energy and emissions reductions. As well as setting economy wide targets for emissions, Germany has set 'target corridors' for reducing emissions in key economic sectors, such as buildings and industry. In the built environment, this framework has resulted in tailored policies and programs for both new and existing buildings, developed in partnership with industry. This tailored, sectoral approach led the retrofitting existing buildings, with big results: between 1990 and 2018 Germany achieved a massive 44 per cent reduction in emissions from its building sector, more than any other sector (including energy).

**RECOMMENDATION 2.3**

# INNOVATIVE FINANCE MECHANISMS

**Support green loans and innovative finance products to drive high performing homes and retrofits**

BUILDING TYPE:

Residential

LIFECYCLE STAGE:

Design

Construction

Retrofit

Sale/lease

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Cost is one of the biggest barriers to building or renovating sustainably. For instance, the perception that the value of retrofit is less than its cost can make it extremely difficult to induce a homeowner to take action. Green finance mechanisms, such as green mortgages offer a way to overcome these cost barriers by providing incentives in the form of a lower interest rate or increased loan amount, whilst elevating the consideration of sustainability in consumer decision making. There is a growing market for green finance mechanisms in Australia, but government support can drive broader engagement.

## PATHWAY

The Federal Government should work with state and territory governments, as well as the property and finance sectors, to accelerate the expansion of financing mechanisms incentivising sustainable buildings and upgrades. Measures could involve funding the development of green home finance products, such as green mortgages, equity loans and home improvement loans, or incentivising industry to develop innovative ways of reducing the cost of retrofitting housing stock.

NATIONAL

## BENDIGO BANKS'S GREEN HOME LOANS

Since 2002, Bendigo Bank has offered Green Home Loans, which reward owner-occupiers for building or renovating their home in a sustainable way. The loan provides discounts on interest rates for projects that fulfill certain sustainability criteria, such as minimum environmental standards or installing standards or installing a number of features and technologies designed to make the home more energy or water efficient.

INTERNATIONAL

## GERMANY'S KFW BANK

Germany's KfW, founded in 1948 is a publicly owned bank which operates one of the country's most effective and far-reaching energy efficiency refurbishment loan programs. KfW extends low cost credit lines to local banks for retrofit projects in private housing. Retail banks in turn finance homeowners, by providing each housing unit up to €75,000 for a pre-defined investment package that relates to a different level of the KfW-Efficiency House, a standard that has been developed by KfW to define different levels of energy efficiency.

**RECOMMENDATION 2.4**

# COMMERCIAL BUILDING DISCLOSURE

**Expand the Commercial Building Disclosure program**

BUILDING TYPE:

Commercial

LIFECYCLE STAGE:

Sale/lease

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Australia's Commercial Building Disclosure (CBD) Program is widely regarded as a successful national policy for driving improvements in improvements in the office sector, having delivered over $72 million in savings and over $168 million in improved occupant productivity. Noting this success to date, there is a strong case to expand the program to new sectors, in particular to office tenancies. Tenants have a critical role to play in driving demand for better performing buildings, particularly since the energy used by office tenancies account for around half of the energy consumed in an office building.

## PATHWAY

The Federal Government should expand the CBD Program to new commercial building sectors including but not limited to office tenants. Further consideration should also be given to incorporating sectors that currently qualify for NABERS Energy ratings or present a significant opportunity to deliver increased efficiency, for example apartments, hotels, data centres and shopping centres. With awareness of opportunities increased through the possible expansion of the program the Federal Government should also work with other governments to provide targeted support for owners, by leveraging programs which incentivise building upgrades.

NATIONAL

## COMMERCIAL BUILDING DISCLOSURE PROGRAM

The Commercial Building Disclosure (CBD) Program is a regulatory program that requires energy efficiency information to be provided in most cases when commercial office space of 1000 square metres or more is offered for sale or lease. The aim is to improve the energy efficiency of Australia's large office buildings and to ensure prospective buyers and tenants are informed. Under the program, most sellers and lessors of office space of 1000 square metres or more are required to obtain a Building Energy Efficiency Certificate (BEEC) before the building goes on the market for sale, lease or sublease. BEECs are valid for up to 12 months and include the building's NABERS Energy star rating and a tenancy lighting assessment of the relevant area of the building.

INTERNATIONAL

## EU ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE

Denmark was the first country in the world to implement a comprehensive mandatory building label program. Since 1997, all Danish homes and commercial buildings have been required by law to obtain and disclose an energy performance rating upon sale or lease. Based in part on the initial successes of this and similar programs, the EU's Energy Performance of Buildings Directive now mandates that each member state require Energy Performance Certificates in all building property transactions. In 2010, the revised Directive also required that an energy performance indicator be included in rental or sale advertisements, not just in the final transaction document.

**RECOMMENDATION 2.5**

# HARMONISED ENERGY OBLIGATION SCHEMES

**Introduce and harmonise energy efficiency obligation schemes across jurisdictions**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

Commissioning

Retrofit

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

To achieve maximum emissions reductions at least cost, actions across all sectors and jurisdictions should be consistent with each other so that the most efficient and effective measures can be actively implemented. While energy efficiency obligation (EEO) schemes exist in New South Wales, Victoria, South Australia and the ACT, each is different and requires bespoke applications to access incentives. To improve program design and administration, and reduce costs for delivering energy efficiency upgrades, these schemes should be harmonised and integrated.

## PATHWAY

The Federal Government should adopt the objective of a single national EEO scheme, whilst supporting state and territory action to introduce schemes where they do not already exist and align them with existing, harmonised schemes in the interim. Best practice elements of harmonised EEOs will include consistent application and rules as well as wide coverage of sectors. State and territory-based schemes should be developed to support the long-term goal of a single national scheme to maximise their impact and effectiveness.

NATIONAL

## NATIONAL ENERGY PRODUCTIVITY PLAN MEASURE 2.1

Under the National Energy Productivity Plan Measure 2.1, COAG Energy Council has been conducting work to harmonise schemes across state and territory jurisdictions, such as consideration of eligible measures, products and methodologies. According to COAG, there is currently an analysis of national and international energy efficiency obligation schemes underway and based on the findings, further activities could be undertaken.

INTERNATIONAL

## US ENERGY EFFICIENCY SCHEME HARMONISATION

Regulators in the US have made efforts to harmonise the details of energy efficiency schemes between and within states, through regulators sharing experiences and adopting similar regulatory requirements. Harmonisation in the US has in some cases Been facilitated through a single government, private organisation or non-profit (such as in the cases of the Wisconsin Energy Conservation Corporation, the Energy Trust of Oregon and the Vermont Energy Investment Corporation) to carry out administrative duties such as product registration, and potentially some aspects of program design.

**RECOMMENDATION 2.6**

# SECTOR LEADERSHIP

**Provide support for distinct market segments through sectoral leadership strategies**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

The breadth and diversity of the built environment is a major challenge for policy development. Targeted approaches for particular market segments can be a way to overcome this challenge, and the Federal Government should explore collaborative approaches in particular sectors to build on successes and consolidate learnings. Industrial, health and retail are among the sectors where a body of leading organisations with substantial market presence exists, and the Government can lead or support industry-led groups to accelerate action in these sectors.

## PATHWAY

The Federal Government should support the creation of leadership groups in priority sectors, such as industrial, health and retail sectors to support innovation, demonstrate opportunities, connect stakeholders, proliferate learnings about best practice and develop industry skills and capability.

NATIONAL

### BETTER BUILDINGS PARTNERSHIP

The Better Buildings Partnership is a leading collaboration of property owners, managers and key influencers that play a pivotal role in improving the performance and sustainability of existing buildings in the City of Sydney area and across Australia. Much of the BBP's work aims to streamline and enable conversations between tenants and landlords, whether by driving demand for high performing buildings, creating clauses for best practices leases, or developing resources. The BBP has collaborated with a number of industry bodies and programs to expand its reach, such as the CitySwitch program to engage and educate tenants on the business case for choosing high performing buildings.

INTERNATIONAL

### US CARBON LEADERSHIP FORUM

The Carbon Leadership Forum is an industry-academic collaboration hosted at the University of Washington. Supporters include product manufacturers, building owners, general contractors, architects, engineers and policy makers. Members of the Forum work together to understand and reduce embedded carbon – leading by testing methods, developing standards, sharing results and motivating each other to improve. Examples of the Forum's work include leading research projects, promoting education and awareness and implementing strategies into practice.

# THEME 3
# MINIMUM STANDARDS

# MINIMUM STANDARDS

**3.1 Deliver a Zero Carbon Ready building code**

**3.2 Improve compliance, monitoring and enforcement of the National Construction Code**

3.3 Strengthen minimum standards for appliances

3.4 Support renters with minimum energy efficiency standards for rental properties

3.5 Investigate energy performance improvements for existing buildings

**RECOMMENDATION 3.1**

# A TRAJECTORY TOWARDS ZERO ENERGY (& CARBON) READY BUILDINGS

**Deliver a Zero Carbon Ready building code**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

Design

Construction

Retrofit

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Progress in improving energy efficiency across the building sector has been slow, with overall energy intensity improving between two to five per cent over the decade from 2005 to 2015. This is despite market leaders driving world-class innovation in low-energy buildings, suggesting a widening gap between industry leaders and the rest of the market. Minimum energy requirements for new buildings and fitouts, with a forward trajectory for strengthened requirements over time, can play a role in closing this gap. A forward trajectory for energy performance targets in existing buildings will also provide a regulatory signal to consumers and industry, thereby encouraging innovation and investment in new technology, design and construction practices.

## PATHWAY

Working with its state and territory counterparts through the COAG Energy Council and the Building Ministers Forum, the Federal Government should lead the development of a national trajectory for future upgrades to minimum energy performance requirements in the National Construction Code (NCC), starting with a step change for residential buildings in 2022. The ABCB has commenced work to develop a case for these performance changes.

The trajectory should have broad industry support, and be aligned with the long-term goal of a net zero emissions economy by 2050.

NATIONAL

### LOW ENERGY BUILDINGS TRAJECTORY

In 2019 Australian Energy Ministers through the COAG Energy Council requested that the Building Ministers Forum (BMF) consider opportunities to strengthen energy efficiency within the NCC. The BMF have subsequently tasked the Australian Building Codes Board (ABCB) with this action which is now being progressed. The ABCB is exploring cost-effective increases to the residential and commercial codes for the next update of the NCC in 2022, and in each subsequent update of the NCC until 2030.

INTERNATIONAL

### US MODEL ENERGY CODES

The US updates its model energy codes on a three-yearly cycle, and states have two years to revise the energy efficiency provisions of their codes to meet or exceed the model codes. The Federal Department of Energy has set a target for all new commercial buildings to be net zero emissions by 2030, and all commercial buildings to be net zero emissions by 2050. The Department provides technical assistance to state and local governments to help facilitate adoption, implementation and compliance processes. This support includes tracking state adoption status, coordinating activities among stakeholders, technical analysis and the development of materials and tools, including those to document and verify compliance with the energy codes.

**RECOMMENDATION 3.2**

# IMPROVED CODE COMPLIANCE

**Improve compliance, monitoring and enforcement of the National Construction Code**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

Design

Construction

Retrofit

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Non-compliance with the National Construction Code (NCC) is an ongoing issue that is not only unlawful but also undermines the rights of building purchasers and occupants who are not receiving what they are legally entitled to and provides an unfair advantage to operators who cut corners. Whilst non-compliance impacts a number of different areas, there is a need for a specific focus on energy efficiency compliance if the NCC is to support the transition of new buildings to a low carbon economy.

## PATHWAY

The Federal Government should support a coordinated approach with state and territory governments to address issues relating to compliance and enforcement highlighted through the Shergold Weir Building Confidence report. Whilst focused primarily on safety issues, many of the recommendations from the review have relevance to energy efficiency. The Government should ensure an explicit focus is incorporated into the Australian Building Codes Board's program of work developing model regulation and nationally consistent implementation of the report's recommendations which have relevance to energy efficiency. These include but are not limited to registration and training of building practitioners, publication of state and territory government audit strategies and identification of defects, consistent requirements for documentation of performance solutions involving complex energy modelling, and on-site inspections timed to ensure compliance with energy efficiency provisions can be verified.

NATIONAL

## BUILDING CONFIDENCE REPORT IMPLEMENTATION PLAN

In July 2019, Australian building ministers committed to developing a national framework to address the issues identified in the Building Confidence report by Prof. Peter Shergold and Ms Bronwyn Weir, which assessed compliance and enforcement problems impacting the efficacy of the NCC. Adoption of the framework and ultimate implementation of the report recommendations will remain the responsibility of the state and territory governments.

INTERNATIONAL

## US BUILDING ENERGY CODES PROGRAM

To support the compliance process for model building codes in the US, the Department of Energy worked with researchers from the Pacific Northwest National Laboratory (PNNL) on the Building Energy Codes Program. PNNL provided technical assistance to states and localities working to improve energy code compliance by analysing compliance data, and developing educational materials and other resources to support compliance and enforcement efforts. In addition, PNNL developed the REScheck and COMcheck™ software, which is used by designers, builders, and building officials across the U.S to verify and document energy code compliance.

**RECOMMENDATION 3.3**

# STRONGER APPLIANCE STANDARDS

**Strengthen minimum standards for appliances**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Equipment and appliances are important components of the overall energy use for buildings. Strong minimum standards can drive improvements in a building's energy performance by ensuring that equipment and appliances on the market are consistent with Australia's emissions reduction targets. Australia's standards are lagging behind other countries and the pace of development of new technologies. Furthermore, the process for introducing new or updating existing standards is relatively slow and ad hoc compared to those overseas.

## PATHWAY

To deliver the long-term certainty needed to support industry planning and investment, the Federal Government should progressively enhance the Greenhouse and Energy Minimum Standards (GEMS) Act. Focus should be given to formalising and streamlining the process for introducing and raising standards for products. Best practices involve developing predictable, clear, transparent and rules-based processes, with clear policy objectives and limited discretion. Where Australian standards lag behind those of our major trading partners (such as US, EU and China), attention should be given to increased harmonisation.

NATIONAL

## GREENHOUSE AND ENERGY MINIMUM STANDARDS ACT

The Greenhouse and Energy Minimum Standards Act 2012 (GEMS Act) is Australia's national legislation to regulate energy efficiency and labelling standards for appliances and other products. The legislation enables the Australian Government to set mandatory minimum energy efficiency requirements for products to drive greater energy efficiency, and to set nationally consistent labelling requirements. The GEMS program saves the average household between $140 and $220 each year on their electricity bill, or up to 15 per cent of the average annual bill.

INTERNATIONAL

## JAPAN'S TOP RUNNER PROGRAM

Japan's Top Runner program for appliances sets a clear process for regularly updating appliance standards. Under the program, companies compete to produce the most efficient product in a class, which are then labelled 'Top Runner'. This label helps consumers identify leading appliances and provides marketing benefits to the winning company. The performance of the winning product is then used to set the minimum standard for that class of product over the next five to ten years. The program has delivered rapid improvements in product efficiency, for instance driving down the energy consumption of air conditioners in Japan by 33 per cent between 2001 and 2011.

**RECOMMENDATION 3.4**

# ENERGY EFFICIENT RENTAL STANDARDS

**Support renters with minimum energy efficiency standards for rental properties**

BUILDING TYPE:

Residential

LIFECYCLE STAGE:

Sale/lease

Retrofit

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Australia does not have minimum energy efficiency standards for rental properties, which are typically less energy efficient and have less distributed energy than owner occupied residences. This means that renters only have limited ability to make changes to the properties they live in, whilst landlords have little incentive to invest in upgrades. Introducing minimum energy performance standards for rental properties would help to overcome the landlord-tenant split incentive, and ensure that all households have an acceptable level of energy efficiency. This would also benefit low income and disadvantaged households, who are more likely to live in inefficient homes and have less efficient appliances.

## PATHWAY

The Federal Government should coordinate and fund a nationally consistent approach to deploying minimum energy efficiency standards for existing rental properties by state and territory governments. These standards could include requirements for basic, cost effective measures, such as insulation, draught sealing and low-flow shower heads. Alongside these standards, state and territory governments should review mechanisms for tenants to initiate upgrades to rental properties, and investigate incentives that encourage landlords to upgrade rental properties, as well as safeguards to avoid any unintended consequences around housing affordability, such as significant rent increases.

NATIONAL

## VICTORIAN RESIDENTIAL TENANCIES ACT

South Australia, Tasmania and Victoria currently have legislation covering minimum standards for rental properties. However, these standards do not specifically cover energy efficiency standards. The Victorian Government's recent review of the Residential Tenancies Act saw the introduction of provisions that enable minimum energy performance standards going forward.

INTERNATIONAL

## NEW ZEALAND'S HEALTHY HOMES GUARANTEE ACT

In 2017, the New Zealand Government introduced the Healthy Homes Guarantee Act, which requires rental properties to meet minimum standards for heating, insulation, ventilation and drainage. Landlords were given several years to bring their properties up to the standard with ceiling and underfloor insulation to become compulsory from 1 July 2019. Once the standards become compulsory, landlords that fail to comply with the standards will be liable for penalties of up to NZ $4,000.

**RECOMMENDATION 3.5**

# BETTER EXISTING BUILDINGS

**Investigate energy performance improvements for existing buildings**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

Commissioning

Retrofit

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

While Australia's National Construction Code (NCC) is vital to ensuring that new buildings perform to a minimum standard, it only affects existing buildings when they are substantially upgraded or rebuilt. Recently, the International Energy Agency's review of Australia's energy policies stated that energy efficiency in existing buildings deserves more attention at both national and state levels because of the long lifetime of buildings.

## PATHWAY

The Federal Government should investigate the need, options, benefits and costs of improving minimum energy performance for existing buildings. Possible considerations include strengthening the requirements of the NCC to apply to a greater number of major renovations in existing homes, as well as optimisation practices such as commissioning and ongoing tuning.

NATIONAL

## NATIONAL CONSTRUCTION CODE

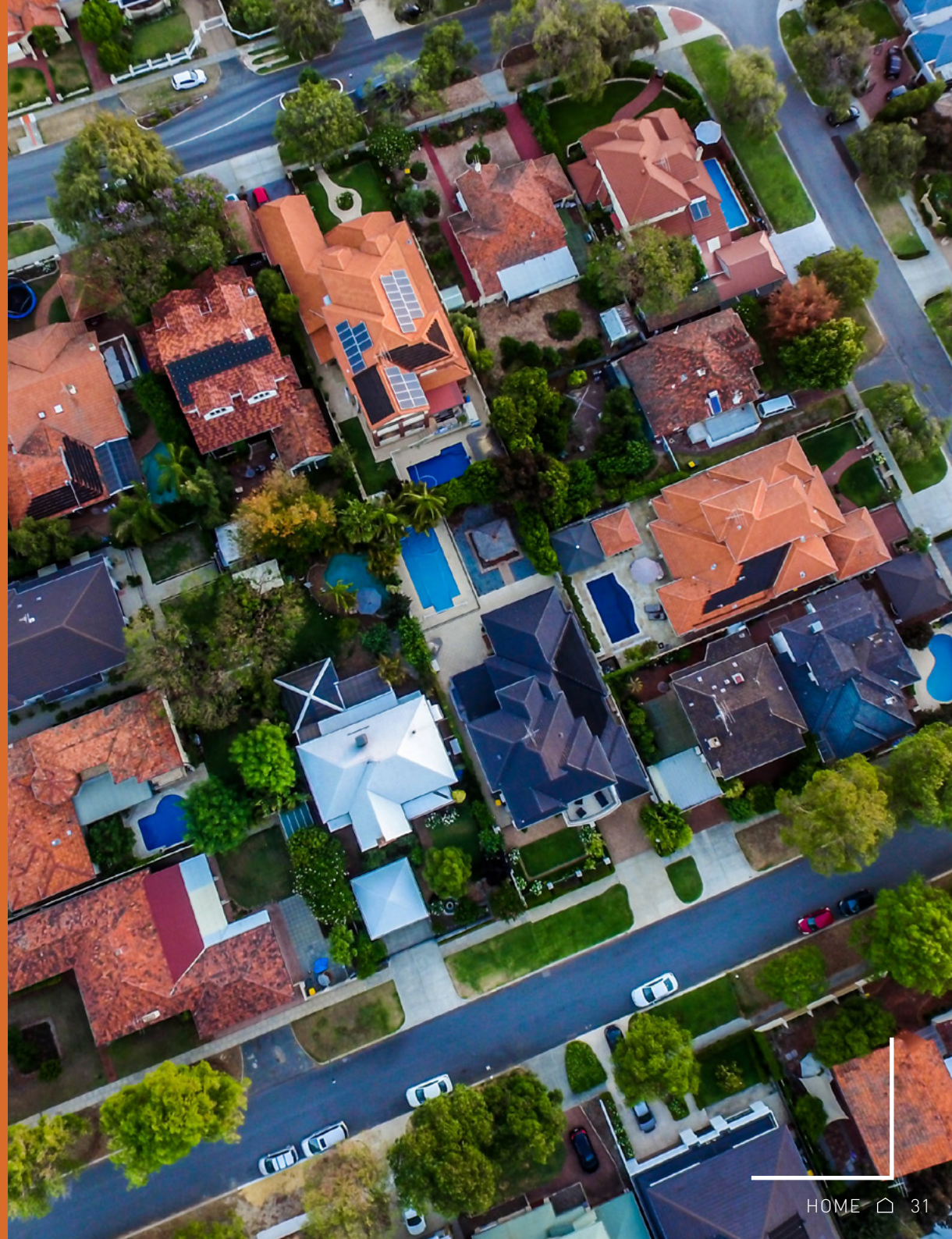
The NCC covers existing buildings undergoing major renovations which includes refurbishments but excludes alterations and additions that are exempted from seeking formal building approval. The line that distinguishes between refurbishments and minor additions and alterations is determined by the provision of each state and territory's individual building regulations, and the applicability of the NCC to renovations differs significantly between jurisdictions.

INTERNATIONAL

## SINGAPORE'S GREEN MARK STANDARDS FOR EXISTING BUILDINGS

Singapore, which is widely considered a world leader in setting minimum standards for existing buildings, requires all commercial buildings with gross floor area of at least 15,000 square metres to meet minimum Green Mark certified standards at the point of installation or replacement of cooling and ventilation systems. In addition to this, these buildings are required to undertake three yearly energy audits of their cooling system, ensuring the system continues to operate efficiently and comply with the standards.

# THEME 4
# ENERGY MARKET REFORM



# ENERGY MARKET REFORM

**4.1 Expand the mandate of the Energy Security Board to drive energy productivity across the economy**

4.2 Invest in the best mix of demand-side and supply-side measures

4.3 Ensure energy users are paid for the services they deliver to the grid

4.4 Ensure that networks engage with consumers and generators on fair terms

4.5 Unlock the potential of distributed energy

**RECOMMENDATION 4.1**

# INDEPENDENT AUTHORITY TO ADDRESS ENERGY MARKET BARRIERS

**Expand the mandate of the Energy Security Board to drive energy productivity across the economy**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

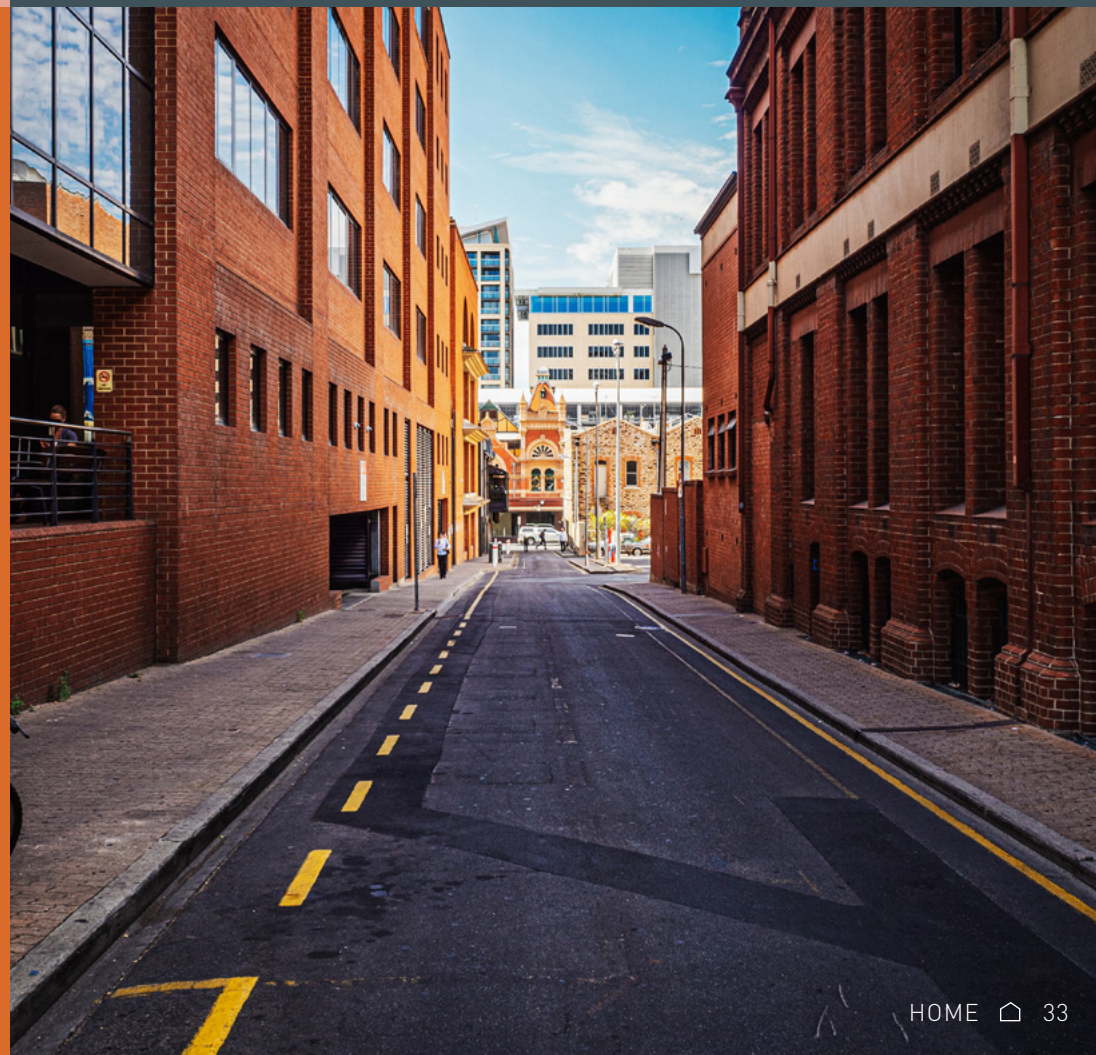
COST EFFECTIVENESS:

## CURRENTLY

Australia's energy market rules and regulations have a strong impact on the ability of built environment stakeholders to implement energy efficiency and distributed energy in buildings. However, the processes by which these rules and regulations are set are extremely complex, limiting the ability of non-technical experts in the built environment to participate. The establishment of an independent authority to investigate and address issues experienced by distributed energy, energy efficiency and built environment stakeholders over time would help ensure that these processes support and do not disincentivise cost-effective uptake of energy efficiency and distributed energy.

## PATHWAY

The Federal Government should establish an independent authority to investigate and recommend solutions to address energy market barriers experienced by distributed energy, energy efficiency and built environment stakeholders over time, and voice their concerns in the context of energy market processes and reforms. This authority should participate on the Energy Security Board in the same capacity as existing energy market authorities.



**RECOMMENDATION 4.2**

# ENERGY EFFICIENCY FIRST

**Invest in the best mix of demand-side and supply-side measures**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Australia's energy market has invested heavily in supply-side infrastructure, but less action has been taken to balance this investment with smarter energy use that reduces demand. To address this supply-side bias, many overseas governments have committed to invest in the most cost-effective mix of supply and demand-side measures, and some have adopted the principle of 'Energy Efficiency First' to address biases against demand-side investment.

## PATHWAY

The Federal Government, working with state and territory energy ministers on the COAG Energy Council, should undertake an independent review to determine what actions are required to adopt the Energy Efficiency First principle in Australia, to ensure that demand-side measures are considered first before planning for investments. The review could examine changes that can be made at multiple levels, including governance, strategy and policy, and system planning and investment.

NATIONAL

## DEMAND-SIDE BLIND SPOT

In Australia, the distortion between demand-side and supply-side measures has led to under-investment in the former and over-investment in the latter. This has contributed to recent increases in electricity prices, with the average residential electricity bill increasing by 35 per cent between 2007-08 and 2017-18 in areas covered by the National Electricity Market (NEM).

INTERNATIONAL

## US INTEGRATED RESOURCE PLANNING

In the US, utilities in 38 states are required to undertake integrated resource planning which involves forecasting future demand for energy, identifying potential supply and demand-side options and determining the mix of measures that will meet consumer demands at lowest cost.

**RECOMMENDATION 4.3**

# INCENTIVISE DEMAND MANAGEMENT

**Ensure energy users are paid for the services they deliver to the grid**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Households and businesses can reduce their energy demand through better energy management and shifting demand away from peak periods. Whilst these measures can deliver considerable network savings, consumers are currently not properly incentivised to provide these services.
A number of reviews in recent years have recommended the development of a system that can support and incentivise consumers to adjust the energy use demand in response to prices in the wholesale electricity market. Not only would this increase the stability and affordability of the energy market, it would also reduce the volume of emergency capacity that is required.

## PATHWAY

The Federal Government, working with state and territory energy ministers on the COAG Energy Council, should ensure the Australian Energy Market Commission implements its draft determination for a wholesale demand response mechanism. The mechanism should enable residential customers and businesses to sell to sell demand response capacity into the wholesale electricity market on an equal basis with generation when it formally commences.

NATIONAL

### WHOLESALE DEMAND RESPONSE MECHANISM (AEMC)

Over the last decade, the need for a wholesale demand response mechanism has been identified in a number of federal reviews. In mid-2019, the AEMC released a new draft rule for public consultation on the creation of a wholesale demand response mechanism. The new rule would allow non-retailers to offer demand response directly into the wholesale market for the first time.

INTERNATIONAL

### PENNSYLVANIA NEW JERSEY MARYLAND ENERGY MARKET

In the US, the Pennsylvania New Jersey Maryland energy market extends over 13 states and services around 65 million people. The PJM pays generators for the amount of energy that they dispatch into the market, but also operates a forward capacity market which pays generators and demand response providers to be available for dispatch during periods when demand exceeds normal supply.

**RECOMMENDATION 4.4**

# FAIR TERMS FOR CONSUMERS

**Ensure that networks engage with consumers and generators on fair terms**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

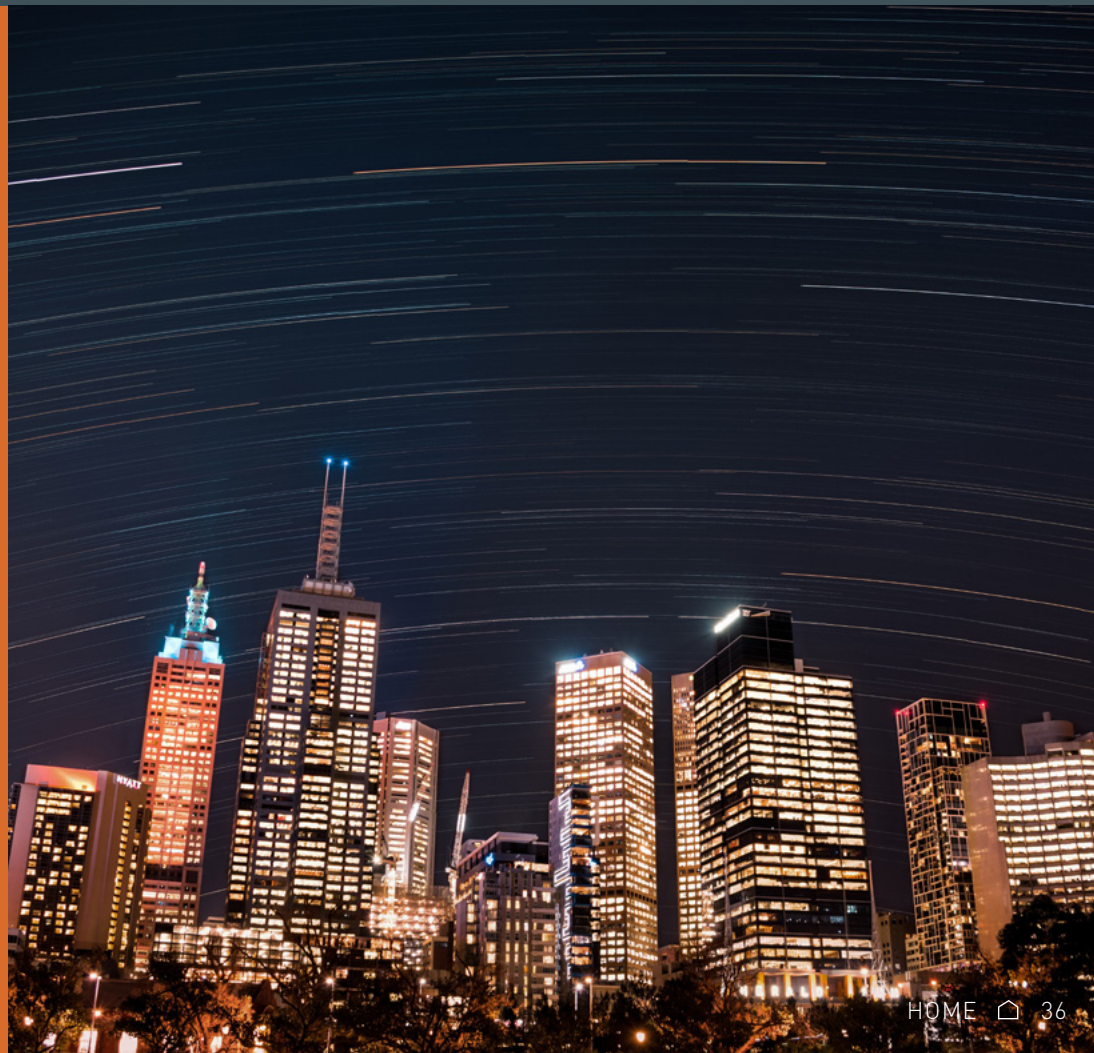
COST EFFECTIVENESS:

## CURRENTLY

Network Service Providers (NSP) are monopolies, but individual consumers, generators and demand-side providers are expected to negotiate with NSPs on the costs for connecting to the network or payments for projects that reduce the need for network expenditure. Independent oversight of NSP interactions with consumers would ensure that the transition to renewables, storage and energy management occurs in a way that is cost-effective, fair and benefits consumers.

## PATHWAY

The Federal Government should appoint an individual (potentially within an existing market body) to provide active oversight of the interactions between NSPs and third parties. This would include gathering and reviewing information on the speed of NSP negotiations on matters such as connection, and the charges or payments resulting from negotiations.



**RECOMMENDATION 4.5**

# REDUCED BARRIERS FOR EMERGING ENERGY STRUCTURES

**Unlock the potential of distributed energy**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

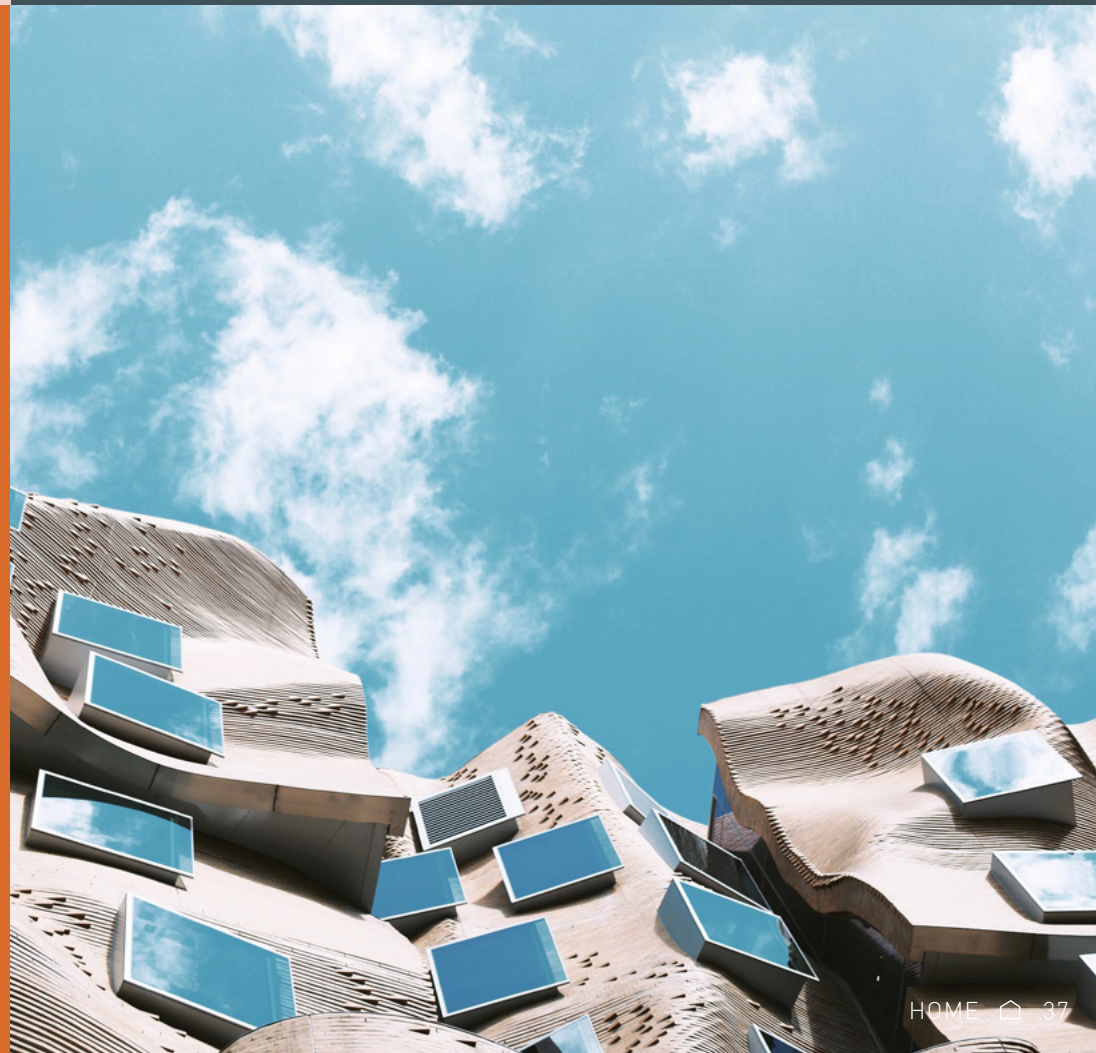
EASE:

## CURRENTLY

It is widely acknowledged that Australia's regulatory environment imposes barriers to innovation and alternative utility infrastructure and supply. For instance, Australian companies that wish to deploy district-based utilities face many 'first mover' costs, including overcoming regulatory complexities, substantial delays, ad hoc processes and costs for connecting to the grid. This has created many barriers to the uptake of distributed generation, embedded networks and demand response in Australia.

## PATHWAY

Reforms that address barriers to the connection of distributed energy, embedded networks and demand response should be adopted, including a nation-wide consistent approach on how standards for connection are set, governed and applied. The Federal Government should implement recommendations from the Property Council and Clean Energy Finance Corporation's joint report, *Distributed Energy in the Property Sector: Unlocking the Potential*, which identifies barriers to distributed energy in property, and proposes solutions to address them.



# THEME 5
# GOVERNMENT LEADERSHIP

# GOVERNMENT LEADERSHIP

**5.1 Deliver City Deals that drive cost effective emissions reductions**

**5.2 Lead through government owned and leased buildings**

5.3 Drive the broader application of trusted, robust and credible building rating systems such as Green Star and NABERS in government projects

5.4 Establish a national built environment energy efficiency and emissions education and training agenda

5.5 Establish a national built environment energy efficiency and emissions research and innovation agenda

5.6 Inform consumers on residential energy efficiency

5.7 Support targeted retrofits for worst performing and highest risk housing stock

5.8 Support vulnerable consumers with targeted assistance and tools

**RECOMMENDATION 5.1**

# BEST PRACTICE PROCUREMENT

**Deliver City Deals that drive cost effective emissions reductions**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Government investment in infrastructure is an opportunity to maximise resilience and climate change outcomes for the community. Through the City Deals program, Australia has a platform for integrated strategic planning and coordination which can enable government leadership on issues such as sustainability and resilience planning. The Federal Government is uniquely positioned to drive better outcomes through its investments in infrastructure projects that underpin these deals, and opportunities should not be lost to use City Deals to negotiate ambitious objectives and outcomes around emissions reduction and sustainability more broadly.

## PATHWAY

The Federal Government should embed sustainability in City Deals by associating investment in projects with clear requirements around emissions reduction and climate adaptation in our buildings, cities and communities. Measures and data sets required to evidence and communicate progress should be developed with state and territory, as well as local government input and focus should be given to consistent approaches for benchmarking and data gathering. The establishment of statutorily independent development cooperations, tasked with guiding development, managing procurement, engaging with the community and industry is also important to guide what are likely to be major, complex infrastructure and urban renewal projects.

NATIONAL

## CITY DEALS

A key part of the Australian Government's Smart City policy framework, City Deals involve shared vision across the three levels of government centred on unlocking potential in a city. Governments must work together to customise their approach to the unique opportunities of the city, drawing on innovative financing and funding arrangements to provide transformative investment. Institutional reforms and investments may also be needed to create the whole-of-city capacity and governance arrangements necessary to sustain and build on the improvements under the City Deal.

**RECOMMENDATION 5.2**

# HIGH PERFORMING GOVERNMENT BUILDINGS

**Lead through government owned and leased buildings**

BUILDING TYPE:

Government

LIFECYCLE STAGE:

Design

Construction

Commissioning

Retrofit

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

The Federal Government can use its strong market presence to drive improvements in building energy performance. This would not only deliver significant financial savings for the public sector and taxpayers, but also contribute to emissions reduction and build skills and capability in the market. A commitment to net zero emissions by 2030 for all new buildings and fitouts would place the Federal Government in a leadership position and in doing so, encourage similar commitments from subnational governments and Australian property companies.

## PATHWAY

The Federal Government should commit to a trajectory of performance improvements for government owned and leased properties over time, with the aim of achieving net zero emissions for new buildings by 2030, and existing buildings by 2050. Measures could include strong minimum standards for new buildings and fitouts, targets for onsite energy efficiency and requirements around renewable energy, offsite renewable energy and offsets. The benefits of NABERS energy ratings should be augmented with a holistic building rating through Green Star, and mechanisms to improve compliance and implementation should be introduced or enhanced.

NATIONAL

## ENERGY EFFICIENCY IN GOVERNMENT OPERATIONS

The Energy Efficiency in Government Operations (EEGO) policy requires Australian Government operations to comply with energy intensity targets and minimum energy performance standards. The policy sets minimum energy performance standards for office buildings that are new, have undergone major refurbishment or are leased for more than two years. Energy efficiency improvements in government office buildings are committed to by both building owners and government tenants through the use of Green Lease Schedules.

INTERNATIONAL

## SINGAPORE'S GREEN MARK STANDARDS FOR PUBLIC BUILDINGS

Singapore's Green Mark building sustainability rating tool is a central pillar of the Government's economy-wide emissions reduction goals. To meet the national target of greening at least 80 per cent of the country's buildings by 2030, all new public buildings must achieve a Platinum rating, and all existing buildings with a minimum air conditioned floor area must achieve Gold Plus rating by 2020.

**RECOMMENDATION 5.3**

# SUSTAINABLE BUILDING RATING SYSTEMS

**Drive the broader application of trusted, robust and credible building rating systems such as Green Star and NABERS in government projects**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Voluntary rating and benchmarking systems such as Green Star and NABERS have long been embraced by the private sector to establish design parameters for and verify performance of high-quality buildings. However, their adoption in the public sector has been uneven. By leveraging these tools through procurement processes, governments can integrate requirements that will help lower emissions in public projects, drive broader transformation across the supply chain and improve community facilities.

## PATHWAY

The Federal Government should promote the adoption of building sustainability rating systems such as Green Star and NABERS to drive sustainable outcomes in public projects. These rating systems should be adopted by the Federal Government through its owned and leased buildings including and beyond office buildings (to include assets such as defence housing). Government should also support industry adoption of these rating systems to drive greater transformation across the sector.

NATIONAL

## BUILDING UP AND MOVING OUT

In 2017, the Federal House of Representatives Standing Committee on Infrastructure, Transport, and Cities undertook a inquiry into the role of Australian Governments in the development of cities. The findings were tabled in a report released in 2018, titled *Building Up and Moving Out*. Among the findings, the Committee noted that a successful transition to best practice urban development will create vibrant, sustainable and prosperous Australian cities, and recommended that the Australian Government support the broader application of rating systems, such as Green Star, to urban regeneration.

INTERNATIONAL

## FRANCE'S E+C- VOLUNTARY LABELLING SYSTEM

In 2016, Alliance HQE-GBC launched the E+C- (energy-plus and low-carbon buildings) voluntary labelling system in conjunction with the French Government as part of the strategy to meet climate change ambitions. The certified E+C- label covers all energy uses during building operation, including energy consumed by equipment owned by occupants, as well as on-site production of renewable energy and emissions linked to building energy demand (both operational and embodied carbon from construction and buildings equipment). The label also provides results in terms of a lifecycle assessment of environmental indicators and also includes GHG emissions due to leaks of refrigerants.

**RECOMMENDATION 5.4**

# ENERGY EFFICIENCY & EMISSIONS TRAINING AND EDUCATION

**Establish a national built environment energy efficiency and emissions training and education agenda**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT: ☑ ☑ ☑

EASE: ☑ ☑ ☑

COST EFFECTIVENESS: ☑ ☑ ☑

## CURRENTLY

The transition to low carbon, high performing buildings cannot be achieved without improving the skills and capacity of local supply chains. To grow the market for sustainable buildings, Australia needs a consistent base of knowledge across the construction supply chain that is accessible and can be tailored to the needs of each industry sub-sector and jurisdiction. Training and education can support industry capacity building, the benefits of which include local economic development, regulatory compliance driving the industry to aspire to higher standards for building performance.

## PATHWAY

The Federal Government should develop a national education and training agenda for building energy efficiency and emissions reduction. Priority should be placed on ensuring effective compliance with minimum standards through skills training and incentives, and improved mechanisms for dispute resolution. Market transformation programs should be tailored for specific characteristics in each state and territory and be delivered locally to suit different building techniques, industry contexts and capabilities as well as climate zones. In addition to operational emissions, the agenda should also support a nationally coordinated strategy to achieve net zero embodied carbon (see Recommendation 7.2).

NATIONAL

### ZERO NET CARBON HOMES PROGRAM

The Victorian Government has provided funding to Sustainability Victoria for a pilot program to develop and market zero net carbon homes in collaboration with volume builders. This pilot program will provide technical and marketing expertise to each of the builders to facilitate the development, marketing and sales of leading-edge zero net carbon homes, which incorporate a range of features, including double glazing, high-efficiency heating, cooling, water heating, lighting and solar PV.

INTERNATIONAL

### EU'S BUILD UP SKILLS PROGRAM

BUILD UP Skills was a strategic initiative which started in 2011 to help achieve European energy targets through skills development and uplift in the construction sector. The project sought to increase the number of qualified workers across Europe to deliver building renovations which offer high-energy performance as well as new, nearly zero-energy buildings. As part of the initiative, projects were funded across a number of EU countries to develop national qualification platforms and roadmaps to train the building workforce to meet energy targets for 2020 and beyond. Based on these roadmaps, the second phase of the initiative involved piloting new qualification and training schemes as well as upgrading existing ones.

**RECOMMENDATION 5.5**

# ENERGY EFFICIENCY & EMISSIONS RESEARCH

**Establish a national built environment energy efficiency and emissions research and innovation agenda**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Research, development and demonstration can unlock further opportunities for energy savings and distributed energy in the built environment, including the development of new technologies and innovative business models. Australia currently lacks a cohesive research agenda on energy and emissions issues, and faces many gaps in the support for built environment innovation. As a result, there is no nationally agreed program to prioritise and deliver low carbon construction methods or technologies, or to consider future opportunities for the built environment and other sectors like transport that will become increasingly connected in a two-way energy system.

## PATHWAY

The Federal Government should establish an independent national research body dedicated to promoting a higher performing, low emissions built environment. The Cooperative Research Centres Program can be adapted to serve this purpose and CRCs could be tasked with developing, delivering and coordinating Australia's research agenda and take responsibility for data gathering, developing new technologies and facilitating research and learnings.

The Federal Government should also commit to funding a reinvigorated ARENA to focus on the research and technical challenges we face in delivering a world-class two-way energy system for Australia. In its next iteration, ARENA should be tasked with innovating our energy system and its increasing interrelationship to the built environment and transport, as well as drive the deployment of innovative, emissions reduction technologies in these sectors.

NATIONAL

### ARENA, CEFC, CSIRO AND COOPERATIVE RESEARCH CENTRES

Australia has a number of well-developed research and innovation entities that are progressing work related to energy efficiency and low carbon buildings, including the Australian Renewable Energy Agency, the Clean Energy Finance Corporation and the CSIRO. With the Cooperative Research Centre for Low Carbon Living recently completing its work, there is also a bid underway to establish a new CRC for Future Cities, which will build on the achievements of CRCLCL through its own research.

INTERNATIONAL

### UK BRE

The UK's Building Research Establishment (BRE) provides impartial research advice, training, testing and certification services for local and national government as well as businesses and private sector organisations. Owned by the BRE Trust, its work is funded through commissioned research, commercial programs and by a number of digital tools for use in the construction sector. Among its services, the BRE carries out research and data generation in support of national and international standards and building codes.

**RECOMMENDATION 5.6**

# ENERGY EFFICIENCY INFORMATION AND AWARENESS

**Inform consumers on residential energy efficiency**

BUILDING TYPE:

Residential

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Knowledge limitations can produce market failures when consumers are not able to make informed choices about the energy efficiency of their homes, and there is growing research showing that consumers are confused by the plethora of sustainability jargon in the residential building sector and what they promise to deliver. Consumers also find it difficult to choose from the diversity and complexity of technology options and recommended behaviours, and tend to seek decision-making shortcuts that may include withdrawal or deferring to government to 'solve the problem'.

## PATHWAY

Working with other governments, industry and academia, the Federal Government should drive awareness and behaviour change around sustainable housing by providing information and social support to home buyers and renovators at key moments of their decision making. This information, which could include details of available financial incentives and mechanisms (see Recommendations 2.1 and 2.3) must consider timing and context to ensure effectiveness. Government should consider the use of programming in mainstream broadcast media, social media and commercial product placement, to accelerate the adoption of high performance homes and support early adopters to enter the market at scale.

NATIONAL

## RENOVATE OR REBUILD

The CRC for Low Carbon Living's *Renovate or Rebuild* is a lifestyle TV show that promotes sustainable homes as comfortable, affordable, efficient and healthy. The project uses popular storytelling – in the form of reality TV – alongside a 'call to action' website and an 'impact community'. The impact community – modelled on the War on Waste and The Block television shows – includes research partners, peak industry bodies, residential volume builders and developers, construction material suppliers, industry media, utilities, real estate, finance providers, and other state, territory and Federal Government departments. These stakeholders promote engagement through social media and provide partner content for the website.

INTERNATIONAL

## JAPAN'S SETSUDEN CAMPAIGN

The Japanese Government ran a 'Setsuden' (saving electricity) campaign following the 2011 tsunami which saw the closure of generators that had provided 30 per cent of the country's electricity capacity in 2010. The campaign encouraged households to voluntarily reduce their energy demand and set businesses targets to reduce their energy use. Whilst the campaign wasn't intended as a long-term measure, it was hugely successful, reducing peak electricity demand in the Tokyo region by 19 per cent.

**RECOMMENDATION 5.7**

# HIGH PERFORMING COMMUNITY HOUSING

**Support targeted retrofits for worst performing and highest risk housing stock**

BUILDING TYPE:

Residential

LIFECYCLE STAGE:

Retrofit

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Poor energy performing homes affect not only Australians' health and comfort, but they also have an impact on the economy overall through increases in public health spending. Low-income and disadvantaged households are more likely to live in inefficient homes and have less efficient appliances, putting them at risk of higher energy bills as well as increased allergies, respiratory diseases and mortality. High priority should be given to upgrading the worst performing public and community housing stock, which is essential to improve health, wellbeing and energy costs for those most disadvantaged in the community.

## PATHWAY

Working with state and territory governments, the Federal Government should co-fund performance upgrades to the worst performing public and community housing stock around Australia. Upgrades should be targeted at areas with the highest temperature variation, areas with high risk factors and dwellings that require large amounts of energy for heating and cooling and could include insulation, shading, draught proofing and more efficient fixed appliances.

NATIONAL

## NSW CLIMATE CHANGE FUND

The NSW Government, through its Climate Change Fund is providing $50.2 million for up to 16,500 dwellings in community, public and Aboriginal housing to upgrade items such as heating, cooling, hot water, lighting, draught-proofing, sealing and solar PV.

INTERNATIONAL

## THE NETHERLANDS' ENERGIESPRONG PROGRAM

The Dutch Energiesprong ("Energy Leap") program is a whole-house refurbishment and funding approach that seeks to achieve affordable zero energy building retrofits. The initiative involves wrapping houses with insulated panel facades, installing insulated roofs with high efficiency solar panels in addition to heat pumps, hot water storage tanks and ventilation units, over the course of 10 days. The program is now present in five countries – Netherlands, France, Germany, the UK and has recently been adopted in the US.

**RECOMMENDATION 5.8**

# TARGETED SUPPORT FOR VULNERABLE CONSUMERS

**Support vulnerable consumers with targeted assistance and tools**

BUILDING TYPE:

Residential

LIFECYCLE STAGE:

Occupation

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

More and more, consumers need to engage with the energy retail market if they want to reduce their energy bills. While many benefits can flow to informed consumers, those who are more at risk of energy stress, such as low-income or disadvantaged consumers need tailored, ongoing support to engage with their energy use. This is due to barriers that may be related to a lack of capital, language and literacy challenges, split incentives or geography. Better informing and educating consumers about their bills, energy usage and the energy market can help to overcome these barriers.

## PATHWAY

The Federal Government should provide user-friendly information and tools to educate consumers of the long-term benefits of energy efficiency and to encourage improved energy choices. The Federal Government should also co-fund ongoing assistance programs to inform and enable disadvantaged households to engage with the energy market. Where possible, these programs should strengthen relationships between disadvantaged households, support services, advocates and energy retailers.

NATIONAL

## QUEENSLAND'S ENERGY SAVVY PROGRAM

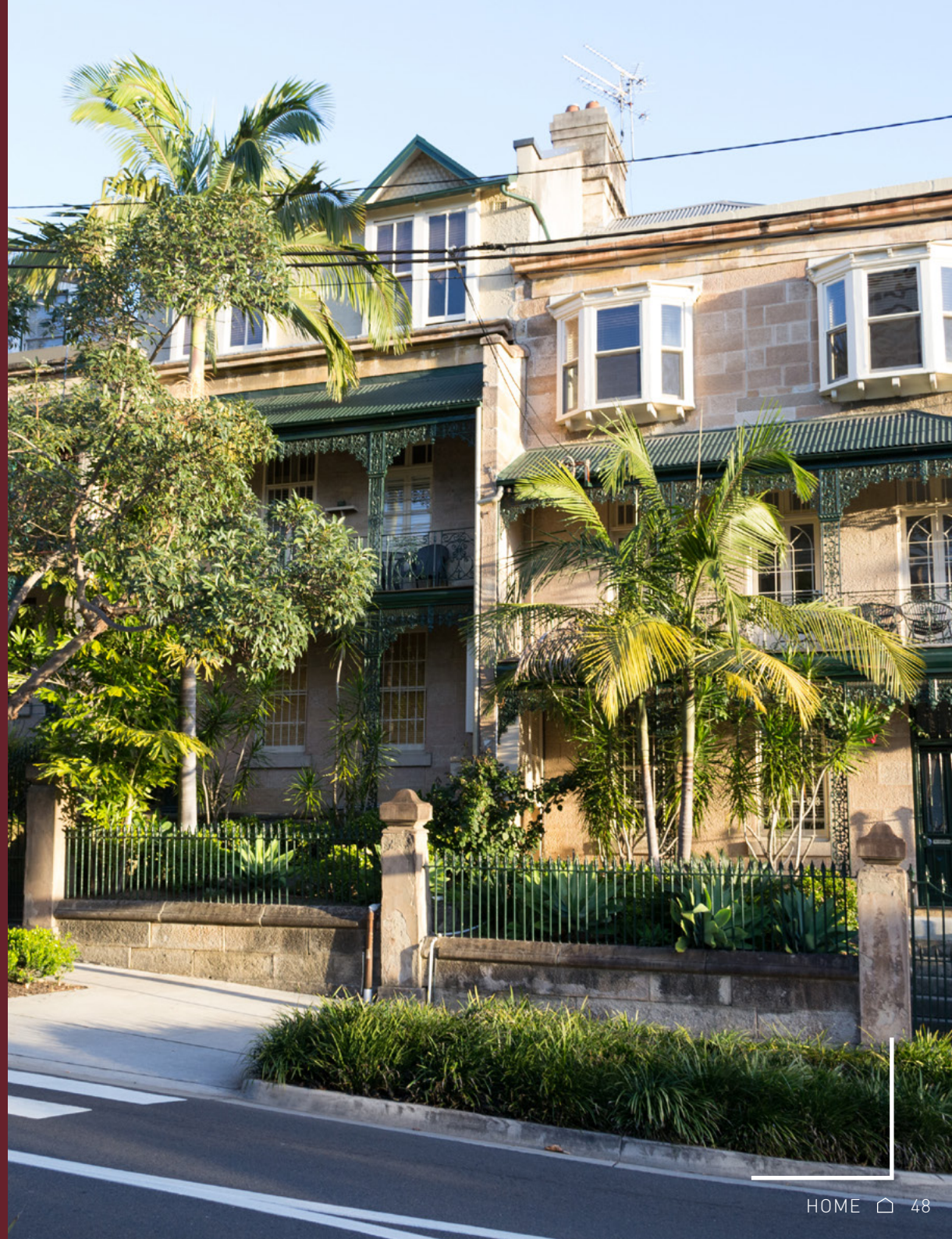
The Queensland Government, with Ergon Energy Retail, QCOSS and CitySmart operate the Energy Savvy Families Program, which helps low income families in regional Queensland learn about their electricity usage and manage their bills. The program offers eligible participants a digital meter at no extra cost and the convenience of monthly e-billing that makes it easier to budget. It also includes access to valuable tools and information to understand and monitor how electricity is used at home, plus personalised support from a local community champion. More than 5,500 families have taken part in the program.

INTERNATIONAL

## HOME ENERGY SCOTLAND

Home Energy Scotland are a network of local advice centres across Scotland with a mission to help residents create warmer homes and reduce energy bills. The Program is funded by the Scottish Government and managed by the Energy Saving Trust, and offers a number of services and tools providing free, impartial advice on energy saving, keeping warm at home, renewable energy, greener travel and reducing waste.

# THEME 6
# ROBUST RATING TOOLS FOR DIFFERENT BUILDING TYPES



# ROBUST RATING TOOLS FOR DIFFERENT BUILDING TYPES

**6.1** **Empower owners, buyers and renters with a single national rating for home energy performance**

6.2 Implement mandatory performance disclosure for homes at the point of sale or lease

6.3 Expand robust benchmarks for operational energy performance of commercial buildings

**RECOMMENDATION 6.1**

# A NATIONAL RATING SCHEME FOR HOMES

**Empower owners, buyers and renters with a single national rating for home energy performance**

BUILDING TYPE:

Residential

LIFECYCLE STAGE:

Occupation

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Australian homeowners and renters value sustainability, but lack a credible and widely accepted benchmark to easily assess the sustainability of homes. A single rating scheme consistently applied across the country would not only make it easier to compare the efficiency of homes, but would also create an incentive for building upgrades, whilst providing added consumer protection for buyers and tenants.

## PATHWAY

Working with state and territory governments, the Federal Government should develop a single, coherent national rating scheme to facilitate disclosure of performance in residential buildings, that includes:

- Providing benchmarks for market comparison of best practice sustainability performance; and
- A best practice governance model based on NABERS that brings the Commonwealth, state and territory governments together to collectively manage benchmarks for new homes.

NATIONAL

## NATIONAL ENERGY PRODUCTIVITY PLAN MEASURE 5

Through Measure 5 of the National Energy Productivity Plan, all Australian Governments are working collaboratively to improve residential building energy ratings and disclosure. Though not including work to develop a single national rating, this program is considering different tools to improve information on residential buildings.

INTERNATIONAL

## NEW ZEALAND'S HOMESTAR RATING TOOL

In New Zealand, Homestar is a comprehensive, independent rating tool managed by the Green Building Council of New Zealand that measures and rates the performance of homes. It awards points across the categories of energy, health and comfort, water, waste, materials, site, home management and an optional innovation category. Houses, apartments or multi-unit residential developments are rated on a 1–10 scale. There are two stages for a Homestar rating: the design phase which rates the development's full and final plans; and the built phase which occurs after a home is constructed, and certifies that the features in the design rating have been fully implemented.

**RECOMMENDATION 6.2**

# NATIONAL RESIDENTIAL MANDATORY DISCLOSURE

**Implement mandatory performance disclosure for homes at the point of sale or lease**

BUILDING TYPE: Residential

LIFECYCLE STAGE: Sale/lease

IMPACT: ☑ ☑ ☑

EASE: ☑ ☑ ☑

COST EFFECTIVENESS: ☑ ☑ ☑

## CURRENTLY

Australia has an established disclosure scheme for commercial office buildings, but lacks one for residential properties. This means that many homeowners and tenants are choosing homes to buy or rent without adequate information about their expected energy performance, comfort and likely future energy costs. Introducing disclosure at the point of sale or lease can unlock the power of the market by ensuring that buyers and tenants who are willing to pay more for efficient homes can find these properties. In combination with other policies such as minimum rental standards and financial incentives, it would also help to overcome multiple barriers to energy efficiency upgrades.
The introduction of mandatory residential disclosure requires first an established rating scheme for homes (see Recommendations 6.1).

## PATHWAY

Working with state and territory governments, the Federal Government should implement mandatory disclosure of energy performance in residential buildings, that includes:

- Setting minimum regulatory performance standards in new buildings, that covers building energy, thermal comfort, water and other sustainability issues;
- Developing a program and training for the residential building sector to market these benchmarks;
- Supporting training for real estate agents, volume home builders and land developers to deliver a sales narrative that underscores the benefits of these benchmarks; and
- Delivering communication messages explaining the value of sustainability features to renovators and homebuyers, including at the point of sale and lease.

NATIONAL

### CIVIL LAW (SALE OF RESIDENTIAL PROPERTY) ACT 2003

The ACT Government requires all homes being sold or leased in the ACT to carry an energy efficiency rating. Research has shown that homes in the ACT that have higher ratings have higher market values, and 50 per cent of sellers in the ACT claim they have undertaken works to enhance the energy efficiency of their dwelling.

INTERNATIONAL

### EU ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE

The EU Directive on the Energy Performance of Buildings was first adopted in 2002, and recast in 2010 to strengthen energy performance of buildings and reduce the impact of climate change. Its principal aim is to make the energy efficiency of buildings transparent by requiring an energy performance certificate showing the energy rating of buildings. An important feature of the 2010 revision is that certification should also include recommendations on how to improve the building's energy performance. The Directive suggests that recommendations should include all cost effective improvements and should provide an estimate of the range of payback periods or costs and benefits over each measure's economic life cycle.

**RECOMMENDATION 6.3**

# NABERS EXPANSION

**Expand robust benchmarks for operational energy performance of commercial buildings**

BUILDING TYPE:

Commercial

LIFECYCLE STAGE:

Occupation

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Since 2011 the National Australian Built Environment Rating System (NABERS) has been used as the benchmarking tool for Australia's Commercial Building Disclosure scheme. NABERS is only available in six sectors of the built environment, with major parts of the economy unable to participate in the program. This impedes the expansion of mandatory disclosure of energy performance into new sectors.

## PATHWAY

The Federal Government should provide long term funding commitments to support the expansion of NABERS to other building types. This would ensure the breadth of the Australia's built environment can benefit from the ongoing measurement, verification and performance management of buildings the program provides, as well as providing a pathway towards mandatory disclosure into the future.

NABERS should be further leveraged to drive emissions abatement in buildings through a targeted national program. The Commonwealth should fund emissions reduction in buildings by establishing a national program targeting annual improvements in certified NABERS Energy ratings, modelled on the NABERS method in the NSW Energy Savings Scheme.

NATIONAL

### NATIONAL AUSTRALIAN BUILT ENVIRONMENT RATING SYSTEM

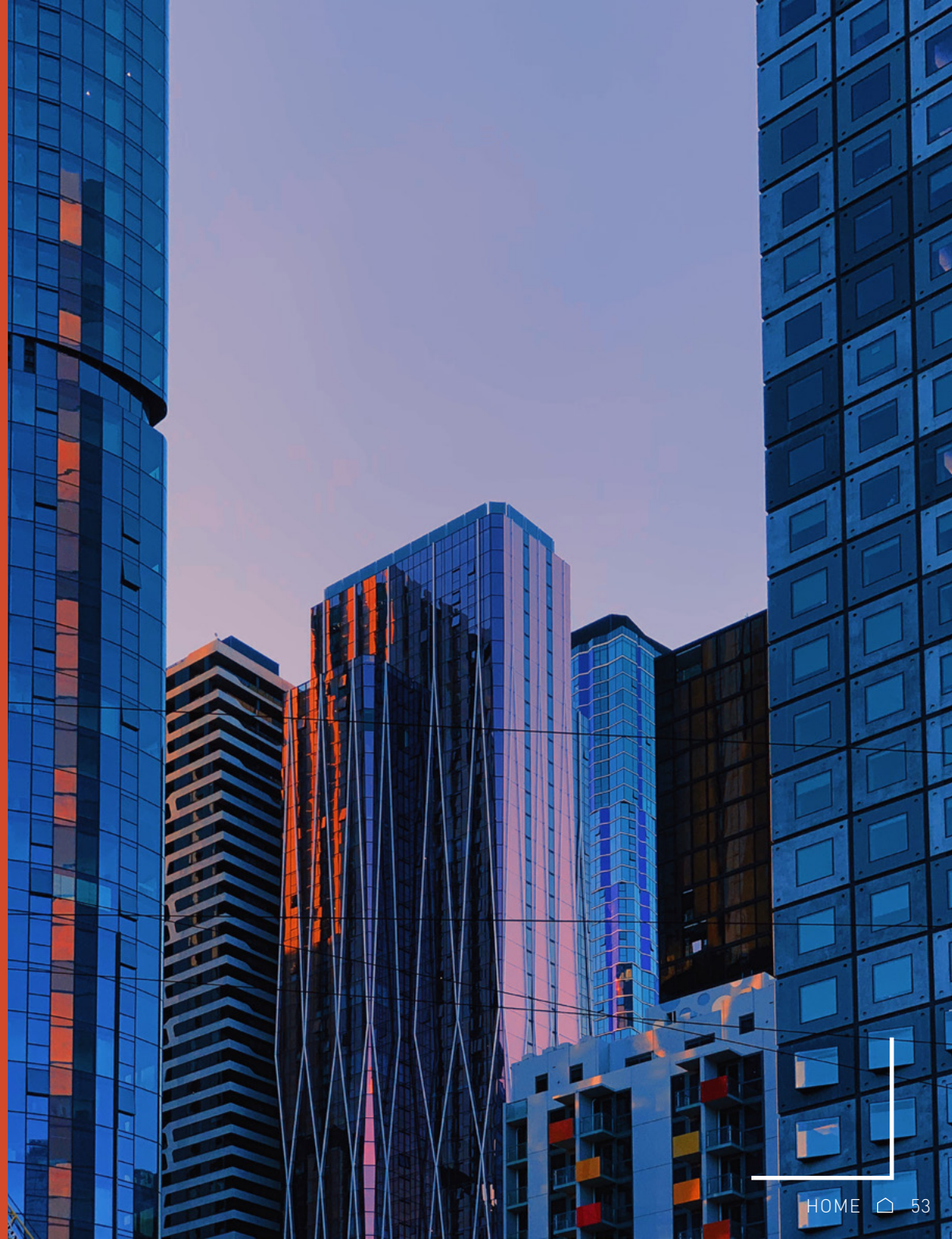
NABERS' recently updated five-year strategy for 2019–2023, included two goals: enable every large building type to be rated by NABERS (Goal 1); and double the number of NABERS ratings by driving uptake and improving existing tools (Goal 2). Under Goal 1, NABERS has committed to significantly expand into all large building types in Australia where there is a demonstrated major gap in building performance management such as schools, industrial buildings, retail stores and healthcare buildings.

INTERNATIONAL

### US ENERGY STAR PROGRAM

Energy Star, a voluntary high performance labelling system operated by the US Environmental Protection Agency for equipment, building products and buildings has become the basis for a number of mandatory building disclosure policies in the US. Commercial buildings with an Energy Star Performance Score of 75 or higher (i.e., the building outperforms 75% of similar buildings) are eligible for the Energy Star Buildings Label. To hold onto the Energy Star designation, the building must demonstrate continued top performance through ongoing annual certification.

# THEME 7
# TRANSFORM MARKETS FOR MATERIALS AND PRODUCTS



# TRANSFORM MARKETS FOR MATERIALS AND PRODUCTS

**7.1 Make Australia a global leader in high performance building products**

7.2 Develop a nationally coordinated strategy to achieve net zero embodied carbon

7.3 Grow the availability of cost-effective low emissions building materials

**RECOMMENDATION 7.1**

# HIGH PERFORMING PRODUCTS & MATERIALS

**Make Australia a global leader in high performance building products**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Materials and products selection contributes greatly to a building's overall emissions impact, including its operational emissions. Government support can draw new products, practices and services into the market faster at scale through positive financial incentives combined with engagement, information, tools and assistance. The Federal Government should work together with industry to drive the uptake of high performing products that reduce operational emissions, by helping consumers make informed choices, facilitating product innovation and technology improvements.

## PATHWAY

Working with industry, the Federal Government should develop market transformation initiatives to support the early adoption of advanced materials and best practice technologies, such as high performance glazing and heat recovery ventilation systems. These initiatives should directly compliment the national energy efficiency and emissions research and innovation agenda (see Recommendation 5.5). At the same time, minimum energy performance standards (MEPS) and labelling could be expanded to cover all major building components. A high efficiency performance standard (HEPS) would be set for each product, providing a ready benchmark for above-code purposes.

NATIONAL

## TASMANIA'S ENERGY EFFICIENCY LOANS SCHEME

The Tasmanian Government's Energy Efficiency Loans Scheme offered zero interest financing for up to 36 months on a range of energy efficiency products from $500 up to $10,000. The scheme supported a range of technologies, including but not limited to solar panels, double/triple glazing, energy efficient fridges, freezers and washing machines, and could be used to partially fund purchases that exceeded $10,000, such as small business building upgrades.

INTERNATIONAL

## US HIGH INSULATING WINDOWS VOLUME PURCHASE PROGRAM

The US Department of Energy's High Insulating Windows Volume Purchase Program was set up in 2009 with the primary goal of reducing the average incremental costs of high performing windows and raising public awareness of their value. The program included developing specifications for approved high performance windows, undertaking a tender process and entering into an agreement with manufacturers meeting these specifications, developing a website from which customers could access and purchase these products, tracking sales of products and providing an additional information campaign to raise awareness of the benefits of high performing windows.

**RECOMMENDATION 7.2**

# NET ZERO EMBODIED CARBON STRATEGY

**Develop a nationally coordinated strategy to achieve net zero embodied carbon**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

All stages

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Research shows that embodied carbon will be responsible for half of the entire carbon footprint of new construction between now and 2050. As operational carbon in buildings is reduced, this embodied carbon will also grow as a proportion of a building's total emissions. Addressing this requires a new response that sees action taken across the value chain. The Australian Government is uniquely placed to act, as it has the widest reach to facilitate collaboration, stimulate market demand and integrate holistic approaches.

## PATHWAY

Working with other levels of government and industry, the Federal Government should develop a national strategy to achieve net zero embodied carbon. Key actions include:

- Defining a clear strategy and policy pathway for government, that includes baselines at jurisdiction level, timeline of climate objectives with targets for the built environment sector, embodied carbon disclosure requirement for large public projects, policy incentives and legislation to require and support embodied carbon reductions and consideration of the greatest embodied carbon reduction opportunities at different levels of government;
- Developing joint commitments and sharing knowledge through intergovernmental networks, organisations, partnerships and stakeholder forums; and
- Supporting industrial research and development.

NATIONAL

## CARBON OFFSET STANDARD FOR BUILDINGS

In October 2017 the Federal Government launched a National Carbon Offset Standard for Buildings. The Standard was developed in close collaboration with sector stakeholders, and provides best-practice guidance on how to measure, reduce, offset, report and audit emissions from building operations. It uses well-established rating programs such as Green Star and NABERS as pathways to demonstrate compliance and sets rigorous requirements for achieving carbon neutrality by reducing energy demand in buildings, procuring renewable energy and purchasing carbon credits to offset any remaining emissions.

INTERNATIONAL

## CITY OF OSLO 2030 STRATEGY

By 2030, the City of Oslo intends to reduce carbon emissions by 95 per cent from the 1990 baseline and become completely fossil fuel free. This includes zero emissions construction sites, which are one focus of the city's Smart Oslo Strategy. The City is working towards reducing its greenhouse gas emissions in dialogue with construction contractors with the goal of defining a zero emissions standard for tender specifications for public projects. A quantitative embodied carbon target is being investigated.

**RECOMMENDATION 7.3**

# BETTER BUILDING MATERIALS

**Grow the availability of cost-effective low emissions building materials**

BUILDING TYPE:

All buildings

LIFECYCLE STAGE:

Design

Construction

IMPACT:

EASE:

COST EFFECTIVENESS:

## CURRENTLY

Embodied carbon can represent around 50 per cent of a building's total emissions over a 30-year period. Reducing this source of emissions therefore has a significant impact on the total lifecycle emissions of buildings. While many solutions for reducing carbon emissions in building materials are already known, these solutions need to be rapidly scaled with government support through the right policy settings.

## PATHWAY

As part of a national strategy to achieve net zero embodied carbon, the Federal Government should work with manufacturers and suppliers to implement carbon reduction strategies, including maximising process energy efficiency, switching to low carbon and renewable energy sources, minimising use of virgin materials through design optimisation, using recycled materials and avoiding producing waste, exploring and implementing circularity principles such as maximising design life, product to services switching and product take back schemes, and design for deconstruction and re-use.

Government should also encourage the development and publication of Environmental Product Declarations to help product consumers to make informed choices, and work closely with manufacturers to explore the right finance and policy settings that will enable broader market transition.

NATIONAL

## GREEN STAR RATING SYSTEM

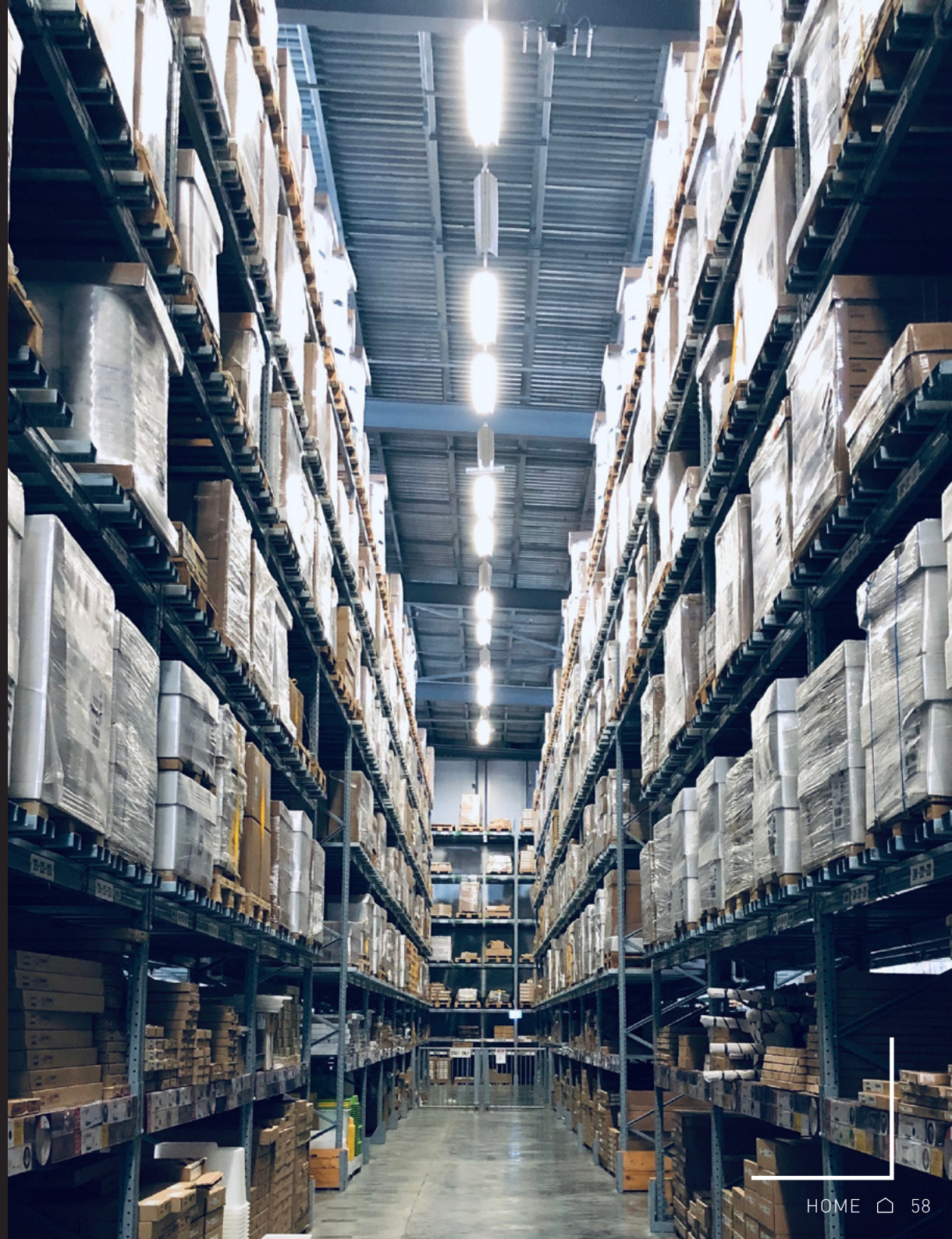
The Green Building Council's Green Star building sustainability rating scheme provides targets for lifecycle assessments in order to calculate embodied carbon emissions, and rewards projects for improvements against a benchmark or from a reference design. Green Star is progressively moving towards addressing operational and embodied carbon emissions equally. In 2020, Green Star will be introducing a mandatory 10 per cent reduction of upfront carbon emissions for projects seeking a rating.

INTERNATIONAL

## ARCELORMITTAL CARBON NEUTRALITY COMMITMENT

ArcelorMittal has committed to achieving carbon neutrality in Europe by 2050 in line with the objectives of the Paris Agreement and the science-based trajectory for emissions reductions in the steel sector. To reduce emissions within the timeframe needed, ArcelorMittal is exploring opportunities for combining different innovative technologies that use more clean power, involve circular sources of carbon, prioritise carbon capture, utilisation and storage. ArcelorMittal has invested in R&D for these technologies and the company has also set out clear policy recommendations at both the global and European level that will create the right market conditions to support its transition.

# **APPENDIX:** SOURCES



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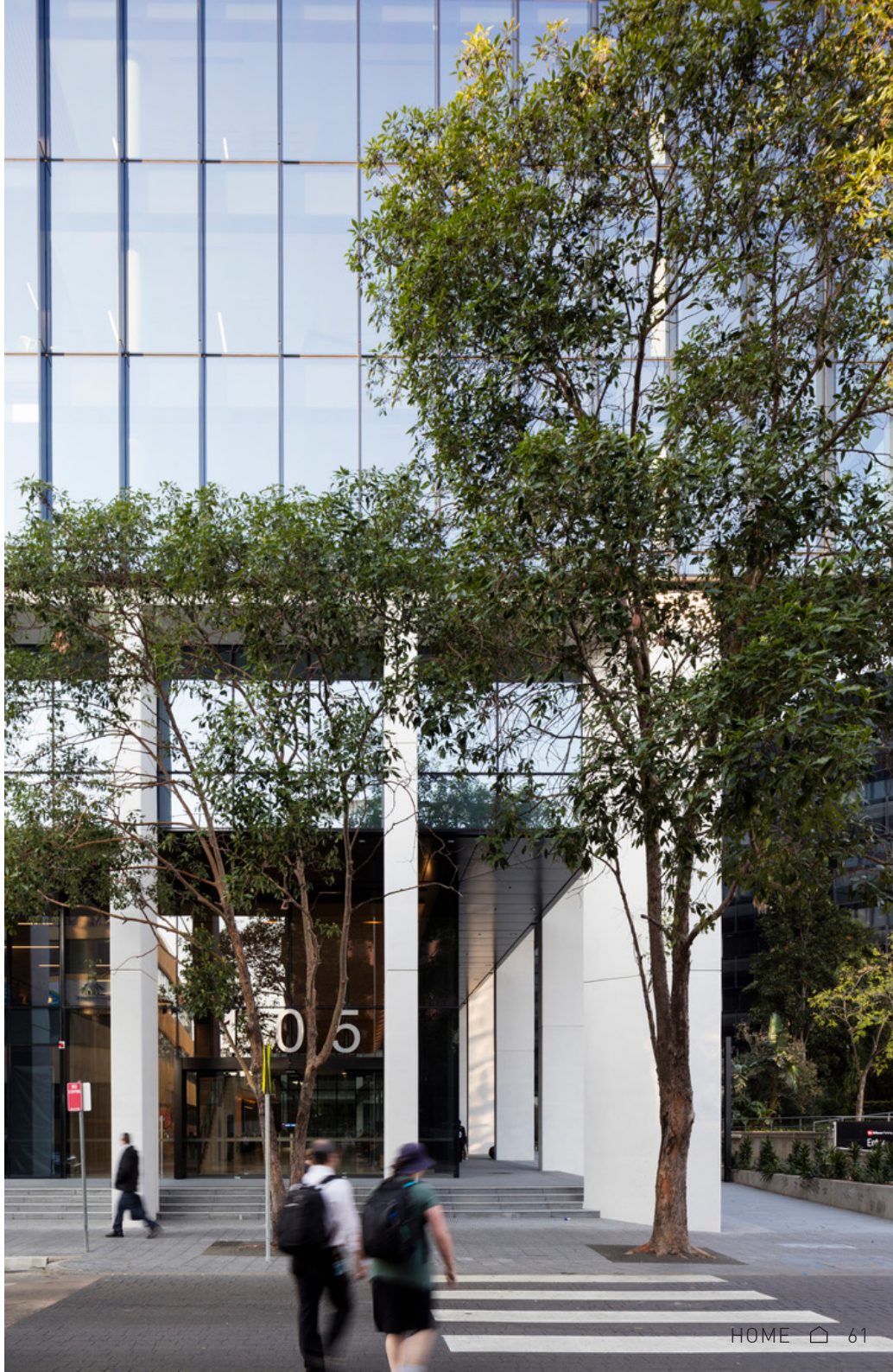

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