

# Low Carbon, High Performance

**How buildings can make a major contribution to  
Australia's emissions and productivity goals**

Summary Report  
May 2016

## About the project partners



The Australian Sustainable Built Environment Council (ASBEC) is the peak body of key organisations committed to a sustainable built environment in Australia. ASBEC members consists of industry and professional associations, non-government organisations and government observers who are involved in the planning, design, delivery and operation of our built environment, and are concerned with the social and environmental impacts of this sector.



Founded by a partnership between the Myer Foundation and Monash University ClimateWorks Australia (ClimateWorks) is an independent, research-based, non-profit organisation committed to catalysing reductions in greenhouse gas emissions in Australia. ClimateWorks has built a reputation as a trusted, credible and fact-based broker by working in partnership with leaders from the private, public and non-profit sectors. With strong links to the US-based ClimateWorks Foundation, ClimateWorks Australia also benefits from an international network of affiliated organisations that support effective policies for greenhouse gas reduction.

## Acknowledgements

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This Summary Report is complemented by a more detailed report available via [asbec.asn.au](http://asbec.asn.au)

## Introduction

**Australia's built environment presents a profound and cost-effective emissions reduction opportunity. It is critical that policies and actions to realise this potential are implemented.**

As the peak body for sustainability in the built environment, the Australian Sustainable Built Environment Council (ASBEC) provides a collaborative forum for organisations who champion a vision of sustainable, productive and resilient buildings, communities and cities.

In 2008, ASBEC released *The Second Plank*, a report which demonstrated that buildings make a significant contribution to emissions, yet offered some of the most affordable forms of greenhouse gas abatement in the economy. *The Second Plank* outlined a suite of energy efficiency policy measures for buildings, which could enhance the planned emissions reduction scheme.

This new report updates the findings in *The Second Plank*, provides current modelling of potential emissions reductions from the sector, and sets out a policy roadmap towards 2050.

The Paris Climate Change Agreement represents a step-change in thinking about the global actions and necessary pathways to address the challenge of climate change. We now know that the long term goal must be zero carbon emissions.

*Low Carbon, High Performance* provides a comprehensive analysis of the sector's performance over the last decade, an exploration of the opportunities at hand, and a policy suite that will pave the way for a smooth and economically efficient transition to zero carbon emissions.

Importantly, *Low Carbon, High Performance* shows how high performing buildings can provide a cost-effective and quality-of-life-enhancing solution to Australia's emissions reduction commitments. This means a national zero carbon buildings plan, stronger minimum standards, ambitious action by industry and governments, targeted incentives and programs, energy market reform and a suite of critical enabling data, information, education and training measures.

Our market leaders have demonstrated the capability to deliver rapid improvements in the quality and performance of buildings, and our industry stands ready to deliver this more broadly across the sector, providing opportunities for significant reductions in Australia's emissions over a short period of time.

ASBEC and its members call upon policy makers to adopt these measures. We look forward to working collaboratively with all spheres of government, towards facilitating the transition of Australia's building sector towards an economy for the future. This will be critical in achieving the future liveability, productivity and sustainability of our communities and cities.

Ken Maher

**President**

Australian Sustainable Built Environment Council

# Executive Summary

## The emissions task

As a signatory to the Paris Climate Change Agreement, Australia has now committed to the global transition to zero net emissions, and to reaching net zero emissions nationally around 2050.

## This report

This report is intended to outline for policy makers the potential for the Australian built environment sector to make a major contribution to meeting this goal, as well as other national priorities including improving energy productivity, supporting innovation, making efficient use of current and future infrastructure, and creating healthier, more liveable cities

## Achievements in buildings energy performance

The technology already exists today to achieve zero carbon buildings. Market leading Australian property companies have demonstrated the potential for energy performance improvements over the past decade, consistently topping international green building benchmarks with world-leading sustainable buildings. These and other improvements across the sector have led to emissions reductions of over 180 megatonnes; nearly 20 times the annual emissions of Australia's largest coal fired power station. The uptake of solar PV has been rapid and continues apace.

## The opportunity

Even without technological breakthroughs, our modelling indicates that cost-effective energy efficiency and fuel switching can reduce projected 2050 emissions from buildings by more than half. There is sufficient opportunity for distributed solar PV to eliminate remaining emissions, resulting in zero carbon buildings by 2050, if barriers can be overcome.

## The benefits

Implementing all of the energy efficiency opportunities identified in this report could deliver almost \$20 billion in financial savings by 2030, in addition to productivity benefits and improvements in quality of life for Australian businesses and households. Buildings could also meet over half of the national energy productivity target, and more than one quarter of the national emissions target.

## The challenge

While market leaders have achieved substantial improvements, the main challenge for policy makers is to extend this progress across the sector as a whole. To date, energy intensity has improved only 2 per cent across the commercial sector and 5 per cent in residential. Accelerating actions across the sector will require strong policy support to address persistent barriers and impediments to energy efficiency and distributed energy.



## Recommendations

To address these issues, ASBEC is calling for the establishment of a national plan to coordinate policy development and implementation, with a suite of policies across five themes:

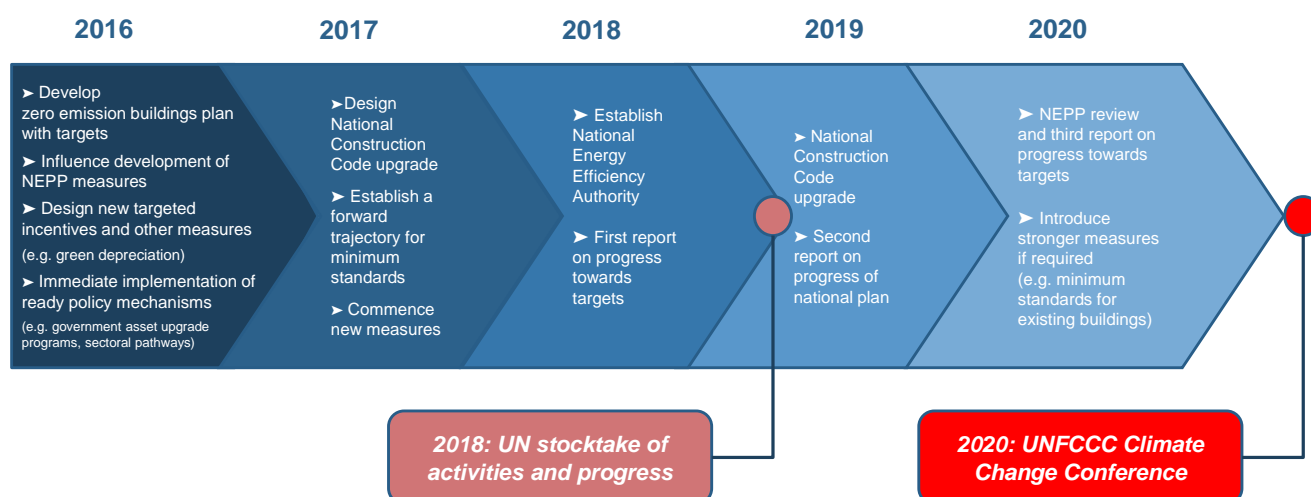
- 1. A national plan with supporting policy frameworks and governance arrangements**, including long-term and interim targets, clear responsibility at a Ministerial level, coordination of action across different levels of government and different government departments and agencies and public reporting requirements;
- 2. Mandatory minimum standards** for buildings, equipment and appliances with a future trajectory aligned with the long-term goal of net zero emissions;
- 3. Targeted incentives and programs** to motivate and support higher performance in the short- to medium-term, including incentives, the use of government market power and targeted programs and support;
- 4. Energy market reforms** to ensure that the energy market supports roll-out of cost-effective energy efficiency and distributed energy improvements;
- 5. A range of supporting data, information, training and education measures** to enable informed consumer choice, and support innovation, commercialisation and deployment of new technologies and business models.

## The cost of delay

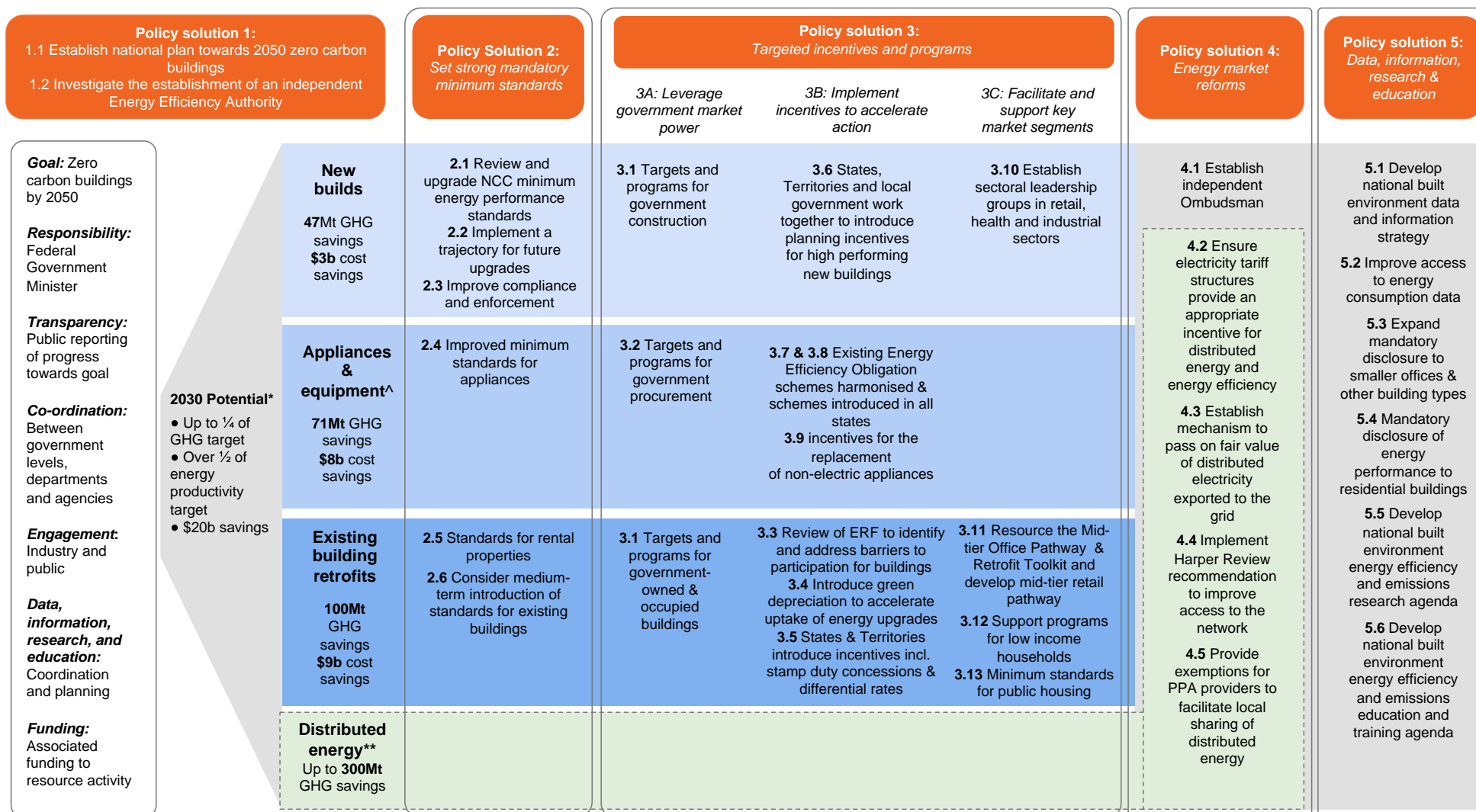
Implementing the recommendations in this plan is urgent. Just five years of delay in implementing the opportunities in buildings could lead to \$24 billion in wasted energy costs and over 170 megatonnes of lost emission reduction opportunities through lock-in of emissions intensive assets and equipment.

Figure 1 provides an indicative timeline for implementation of the recommendations in this report.

Figure 1. Five year implementation timeline



# Outline of proposed National Plan Towards 2050 Net Zero Emissions Buildings



\* Figures shown reflect the cumulative net energy cost savings and emissions reductions between 2015 and 2030 available from each segment; ^ Includes appliances and equipment in new and existing buildings; \*\* Represents upper range of projections of distributed solar PV; Financial savings not calculated; EEOs = Energy Efficiency Obligation schemes; ERF = Emissions Reduction Fund; AER = Australian Energy Regulator; PPA = Power Purchasing Agreement

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**Hon Malcolm Turnbull MP: “Paris... is a step along the way to achieving a net zero-emissions world. That is what we need to do in order to safely arrest global warming.”**

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## **1. Australia’s emissions reduction task**

**Australia is now committed to the global transition to zero net emissions, and to reaching net zero emissions nationally around 2050**

The Paris Climate Change Agreement commits all nations to transition to net zero emissions globally in the second half of this century. For developed countries like Australia, this implies a transition to a zero net emissions economy by around 2050. The Paris Agreement requires countries to:

- Keep global warming under 2 degrees, and to strive for under 1.5 degrees
- Develop mid-century decarbonisation strategies
- Upgrade national emissions reductions targets every five years

In 2018, the UN will undertake a global stocktake of emissions reduction actions and progress, with the next international conference to take place in 2020. Australia along with other countries will be called upon to demonstrate progress towards accelerating emissions reductions by this point.

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**Hon Bill Shorten MP: “...we need to see the world committing to net zero emissions in the second half of the 21st Century”**

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## 2. Achievements over the past decade

**Market leading Australian property companies have achieved a step change in energy performance over the past decade, and there has been rapid uptake of solar PV**

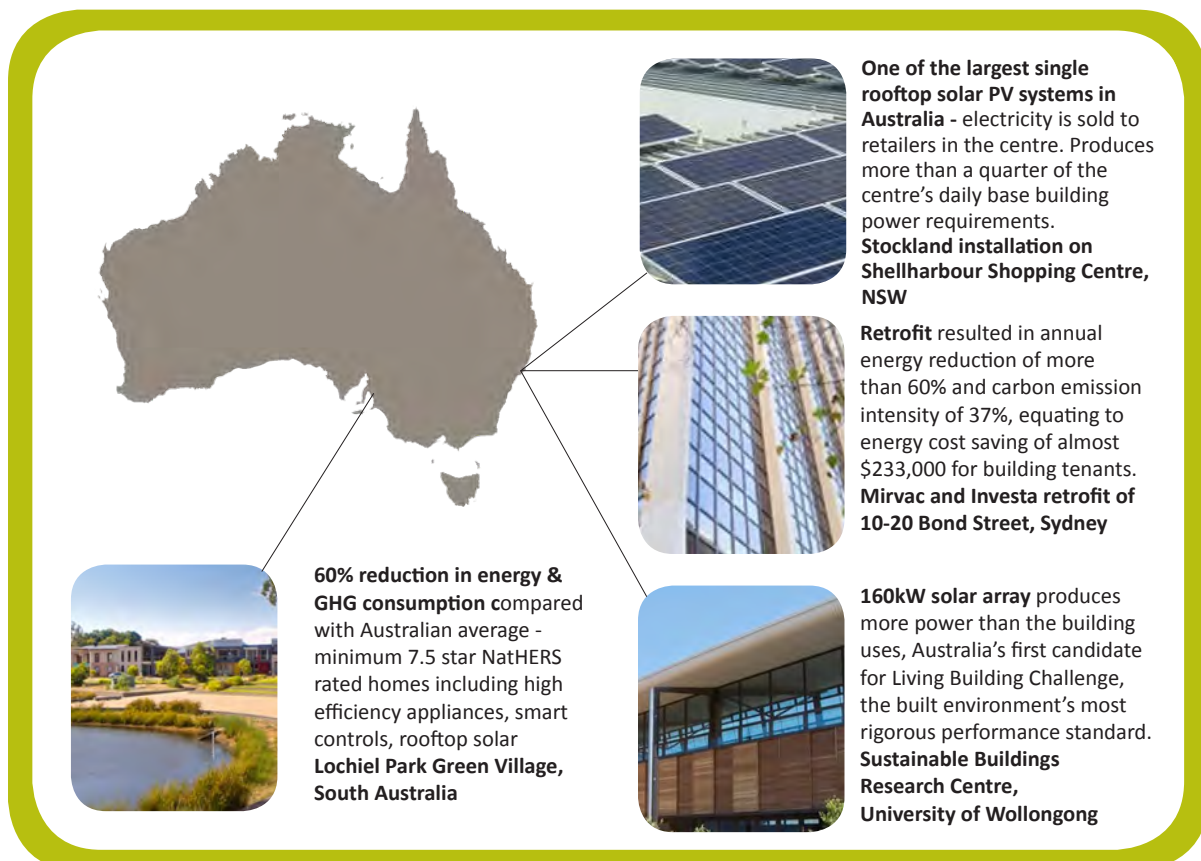
Over the past ten years, market leaders in Australia - particularly in the large office sector - have demonstrated that rapid improvements in buildings energy performance are possible. New Green Star rated office buildings emit less than half as much greenhouse gases as the average ten year old building. Large Australian property companies are now recognised in international benchmarks as global leaders in energy and sustainability.

Broader improvements outside the market leaders in Australia have been driven by government programs and regulations, including improved minimum energy performance standards for buildings and appliances.

Deployment of distributed solar PV has been rapid, with more than 1.5 million distributed solar PV systems now installed across the country, one of the highest rates in the world and equivalent to more than 1,600 individual wind turbines.

These activities have led to emissions reductions of over 180 megatonnes, more than nineteen times the annual emissions of Australia's largest coal fired power station.

**Table 1. Case studies of high performing buildings**



### 3. The opportunity

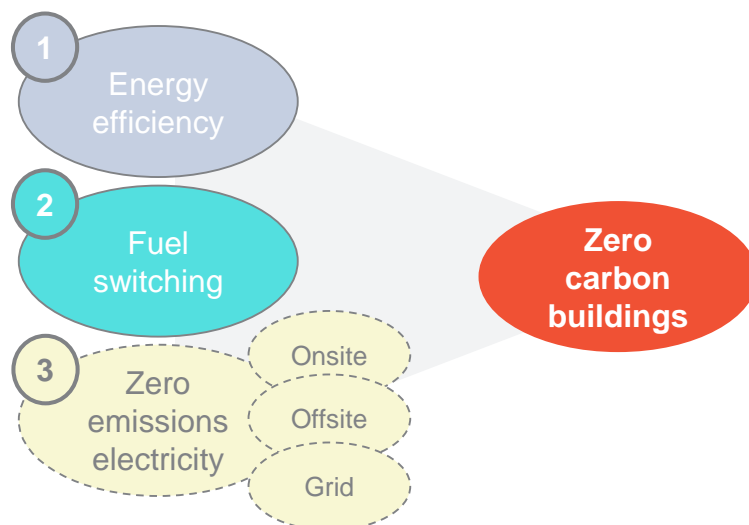
#### The technology already exists to achieve zero carbon buildings

Buildings are a major energy consumer and account for almost one quarter of Australia’s emissions. Residential buildings account for just over half of these emissions, with the remainder from commercial buildings.

At the same time, buildings represent one of the largest and most attractive opportunities to reduce emissions. However real barriers, split incentives and information asymmetries need to be addressed. It is possible to achieve ‘zero carbon buildings’<sup>1</sup> through:

1. **Energy efficiency:** Improvements in the efficiency of appliances and equipment, and improvements to the thermal efficiency of the ‘shell’ or ‘envelope’ of the building.
2. **Fuel switching:** Switching appliances and equipment that use gas, wood or other fuels to electric alternatives.
3. **Zero emissions electricity:** Deployment of zero emissions electricity, including:
  - a. **Onsite:** Installation by building owners of on-site distributed energy systems such as solar PV and, increasingly, battery storage systems;
  - b. **Offsite:** Purchase by building owners or occupants of off-site low carbon electricity, for example through a power purchase agreement or through GreenPower;
  - c. **Grid:** Decarbonisation of the electricity grid through replacement of fossil fuel power stations with large-scale centralised renewable energy.

**Figure 2. Opportunities to reduce emissions in the built environment<sup>2</sup>**



<sup>1</sup> This report defines a ‘zero carbon building’ in line with the definition of ‘zero carbon occupied building’ in ASBEC’s 2011 report ‘Defining Zero Emission Buildings’. This definition excludes embodied and transport emissions associated with the construction, renovation and deconstruction of buildings.

<sup>2</sup> Offsets may be required for residual energy consumption that cannot be switched to electricity. In the short- to medium-term, offsets can enable building owners to achieve zero carbon early, but by mid-century it is expected that the cost of reducing residual emissions will be high and the availability of offsets constrained.

## Even without technological breakthroughs, energy efficiency and fuel switching can reduce 2050 emissions from buildings by more than half

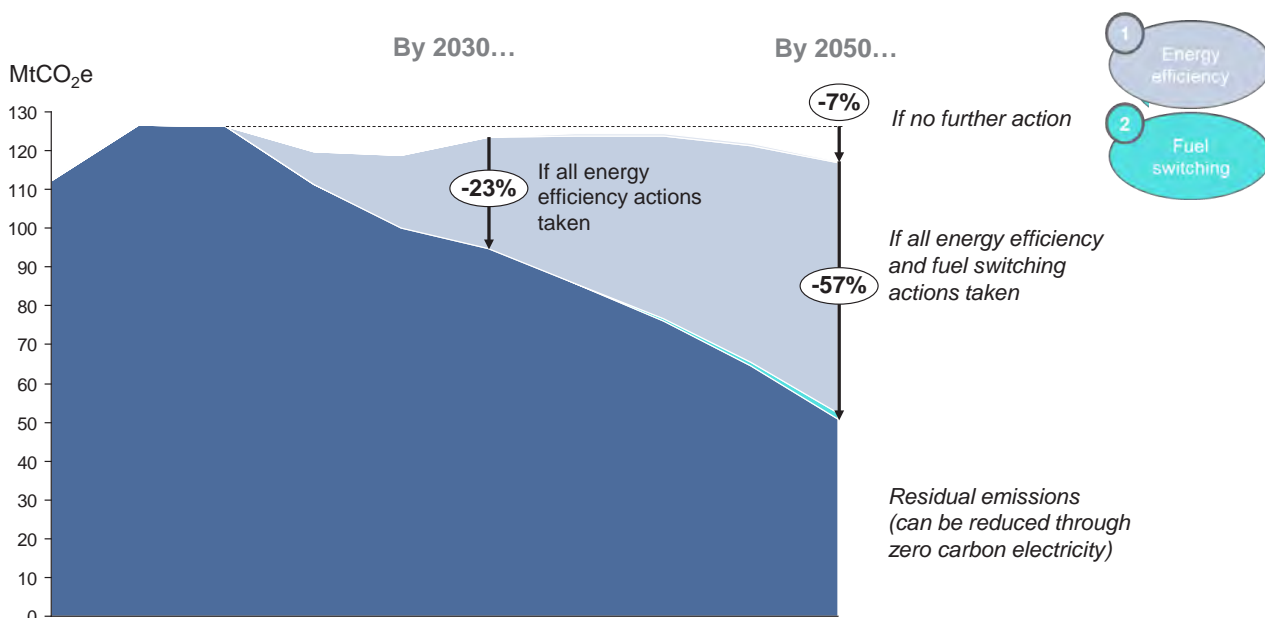
Our modelling indicates that without further action, 'business-as-usual' improvements will lead to emissions from buildings dropping slightly (7 per cent) by 2050.

Cost-effective<sup>3</sup> energy efficiency actions across the sector could deliver a 23 per cent reduction in emissions by 2030, and 55 per cent by 2050, as shown in Figure 3 below. This assumes no technological breakthroughs.

Non-electric fuels can be nearly eliminated by switching to electric alternatives, which is necessary to pave the way for space heating, water heating and cooking (currently fuelled in large part by gas) to be powered by zero emissions electricity.

These two activities could reduce emissions from buildings by more than half (57 per cent) by 2050.

**Figure 3. Built environment emissions and energy efficiency and fuel switching opportunities to 2050 (MtCO<sub>2</sub>e)**



Source: ClimateWorks team analysis

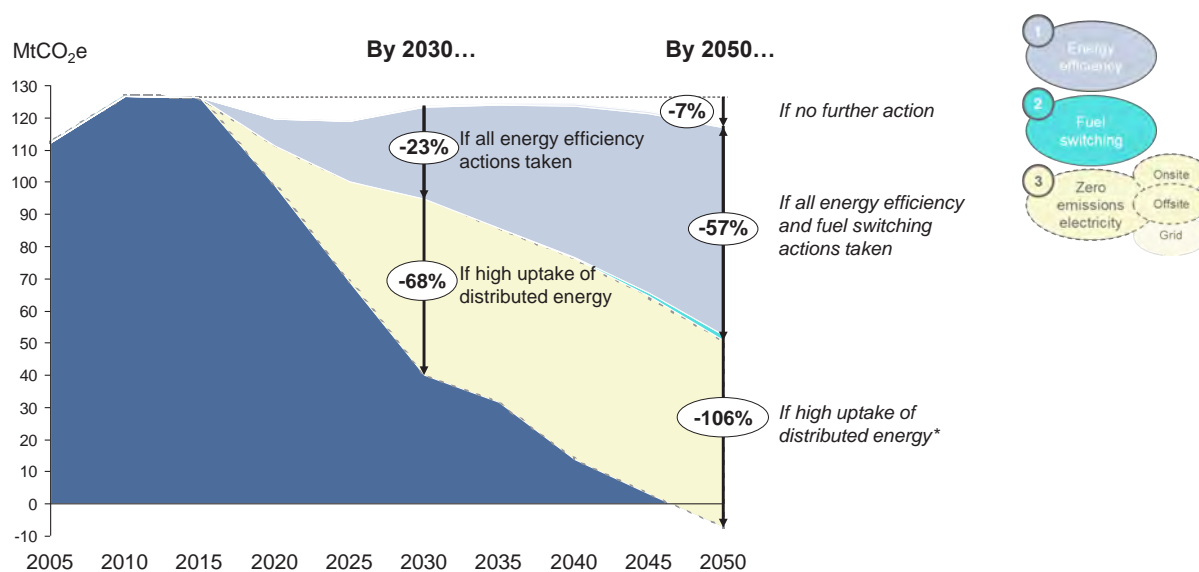
<sup>3</sup> All energy efficiency opportunities modelled are NPV positive (taking into account capital costs and energy savings over the lifetime of the asset, but not transaction costs).

## Zero carbon buildings can be achieved by 2050 through deployment of zero emissions electricity

After energy efficiency actions are implemented and most non-electric appliances and equipment are switched to electricity, remaining emissions from buildings can be eliminated through deployment of zero emissions electricity.

According to recent studies, enough distributed solar PV could be installed to meet over half of the remaining energy demand from buildings in 2030, and more than 100 per cent of remaining demand by 2050. Some of this will require power to be shared between building owners who have access to substantial roof space and those who do not. This scenario is illustrated in Figure 4.

**Figure 4. Built environment emissions and opportunities to achieve zero carbon buildings (MtCO<sub>2</sub>e)**



\* Distributed energy potential presented in this chart is based on the modelled potential uptake of distributed solar PV from the Future Grid Forum *Rise of the Prosumer* scenario (Graham et al, 2015).

Source: ClimateWorks team analysis

Zero carbon buildings could also be delivered through a mix of solar PV and other distributed energy, as well as broader decarbonisation of the electricity grid. While distributed energy offers some advantages, including avoidance of energy losses through transport of electricity over long distances from centralised power stations, the optimal balance between distributed and centralised electricity generation is yet to be determined.

## **High performing buildings can deliver almost \$20 billion in financial savings by 2030, in addition to productivity benefits and improvements in quality of life for Australian businesses and households**

All energy efficiency opportunities modelled are NPV positive, delivering a financial return to building owners and occupants. Implementing all of the energy efficiency opportunities in this report would deliver almost \$20 billion in energy savings by 2030, equivalent to the total asset value of over 32,000 average homes.

Solar PV and battery storage technology is projected to continue to rapidly improve, offering great potential for additional cost savings in addition to emissions reductions. Recent research suggests that solar PV is likely to become cost-competitive with grid-supplied electricity in the 2020s for homes and small businesses, and in the 2030s for larger businesses.

Improving the energy performance of buildings is about more than just saving energy or reducing energy bills. Australia is highly urbanised, and the quality of our buildings increasingly determines our quality of life and Australia's attractiveness as a place to live and work. Buildings that are well-designed and constructed for energy efficiency are also more comfortable, quieter, and tend to have better indoor air quality. These features also help boost resilience to the adverse effects of extreme weather.

Research shows that patients recover faster and go home quicker in hospitals which are well-designed to save energy, students in highly efficient school buildings learn better and achieve better academic results and office workers in high performing buildings think more clearly, are more productive and produce higher quality work.

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**Buildings that are well-designed and constructed for energy efficiency are also more comfortable, quieter, and tend to have better indoor air quality.**

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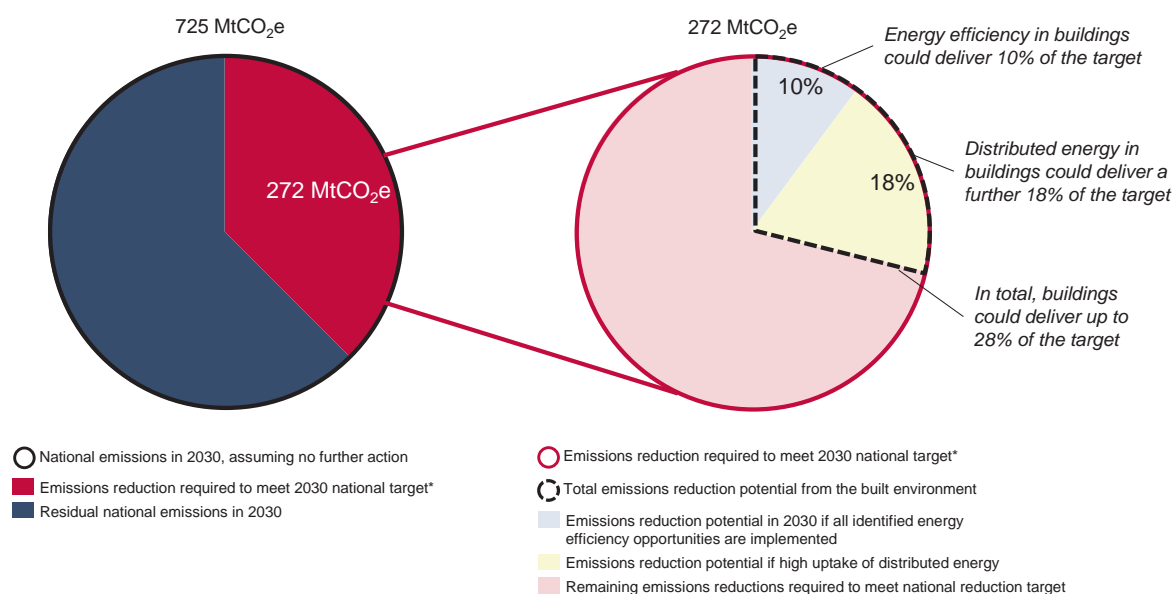
## Buildings can make a major contribution to meeting national energy productivity and emissions reduction targets

Australia's national energy productivity target is targeting an improvement in energy productivity of 40 per cent by 2030<sup>4</sup>. Buildings can contribute more than half of the energy productivity target through NPV positive energy efficiency measures identified in this report.

Australia's current emissions reduction target is a 26 to 28 per cent reduction in emissions below 2005 levels by 2030<sup>5</sup>. As shown in Figure 5, buildings could contribute up to one tenth of this target through implementation of energy efficiency measures, and more than a quarter of the national emissions target with high levels of uptake of distributed energy.

### Buildings can contribute more than half of the energy productivity target and more than one quarter of the national emissions target

**Figure 5. Contribution of buildings emissions reductions to Australia's 2030 emissions reduction target (MtCO<sub>2</sub>e)**



\* This chart shows the lower end of the 2030 target, which is for a 26-28% reduction below 2005 levels. This equates to 272-287 MtCO<sub>2</sub>e emissions reductions.

Source: ClimateWorks team analysis based on data from Department of Environment (2015a & 2015b)

<sup>4</sup> Compared to 2015

<sup>5</sup> A 26-28 per cent reduction below 2005 levels by 2030



## Unlocking this opportunity is crucial to achieving a smooth transition over the longer term to zero net emissions by 2050 for Australia

Buildings are ‘shovel-ready’ to decarbonise using today’s technologies, if policies and other measures can overcome barriers to increased deployment. Zero carbon buildings are already being built in Australia and internationally, and emerging technologies are expected to make this easier and cheaper - policy needs to pave the way for rapid uptake of new technologies.

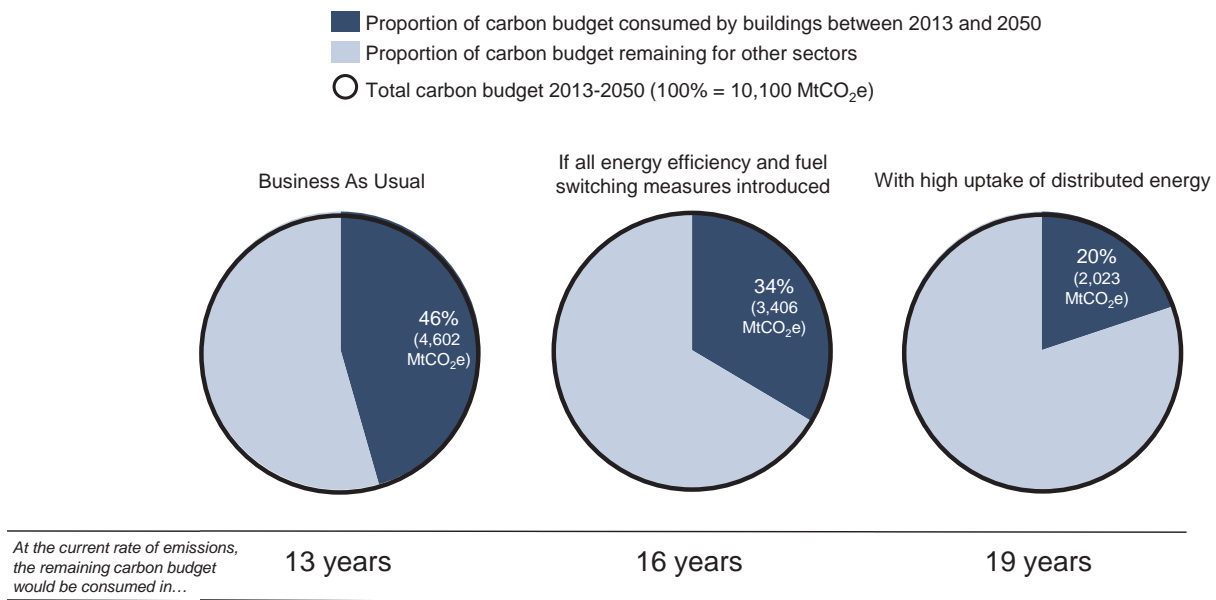
**Table 2. Emerging technologies**



However, without further action to address barriers, buildings would emit 4,600 Mt of greenhouse gases by 2050. This is almost half (46 per cent) of Australia's 'carbon budget', the total amount of emissions Australia can release into the atmosphere before reaching zero net emissions<sup>6</sup>. This leaves only around half of the carbon budget for other sectors of the economy, including emissions-intensive sectors. At current rates, other sectors would 'spend' the remaining 54 per cent in only 13 years.

If all the opportunities identified in this report are implemented, cumulative buildings emissions to 2050 could be reduced by more than half. This could reduce the share of the 'carbon budget' consumed by buildings to only 20 per cent, providing the equivalent of an additional six years of emissions from the rest of economy at current rates. Unlike buildings, some sectors will require fundamental transitions and research and development to reduce technology costs or develop new technologies. For example, considerable technological improvements are required to reduce emissions from aviation, steel and cement production, and long-haul freight. Accelerating action in buildings can therefore provide crucial time for other sectors to work through and resolve technological challenges.

**Figure 6. Impact of buildings emissions reductions on Australia's carbon budget, 2013-2050**



Source: ClimateWorks team analysis based on data from the National Greenhouse Gas Inventory and Commonwealth Office of the Chief Economist

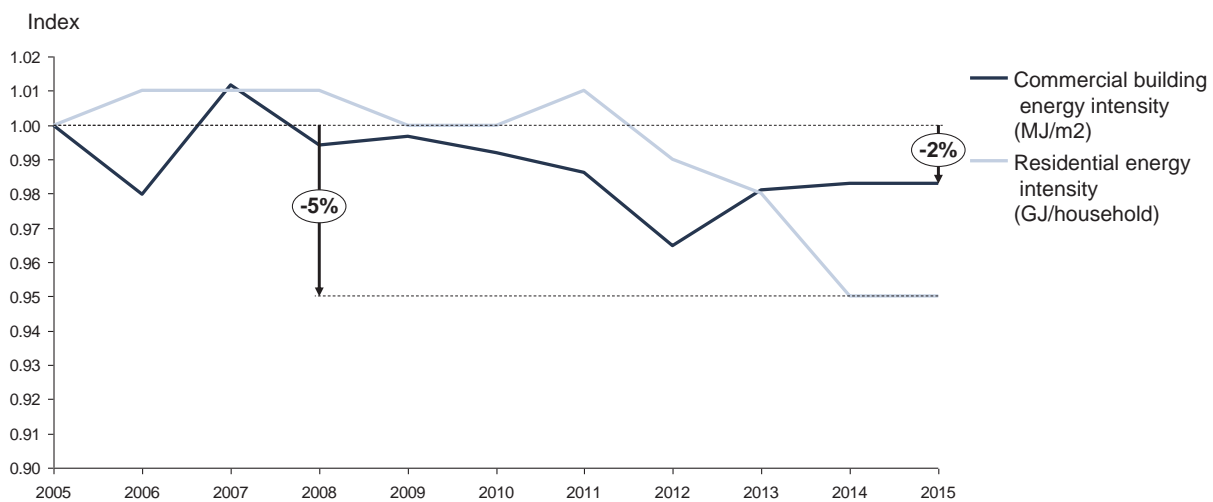
<sup>6</sup> Australia's 'carbon budget' as calculated by the Climate Change Authority is 10.1 gigatonnes (10,100 megatonnes) of emissions. This is Australia's share of the global 'carbon budget' required to have a reasonable change of limiting global warming to 2 degrees. Climate Change Authority, 2014.

## 4. The challenge

**While market leaders have achieved substantial improvements, the main challenge for policy makers is to extend this progress across the sector as a whole**

Despite the achievements of market leaders, broader progress in energy efficiency - particularly retrofitting of existing buildings - has been slow, with overall energy intensity improving by only 2 per cent across the commercial sector and 5 per cent in residential (see Figure 7). Accelerating uptake of energy efficiency improvements and facilitating ongoing deployment of distributed energy is the main challenge for policy makers.

**Figure 7. Energy intensity in residential and commercial buildings, 2005-2015**



Source: ClimateWorks team analysis

## 5. The cost of delay

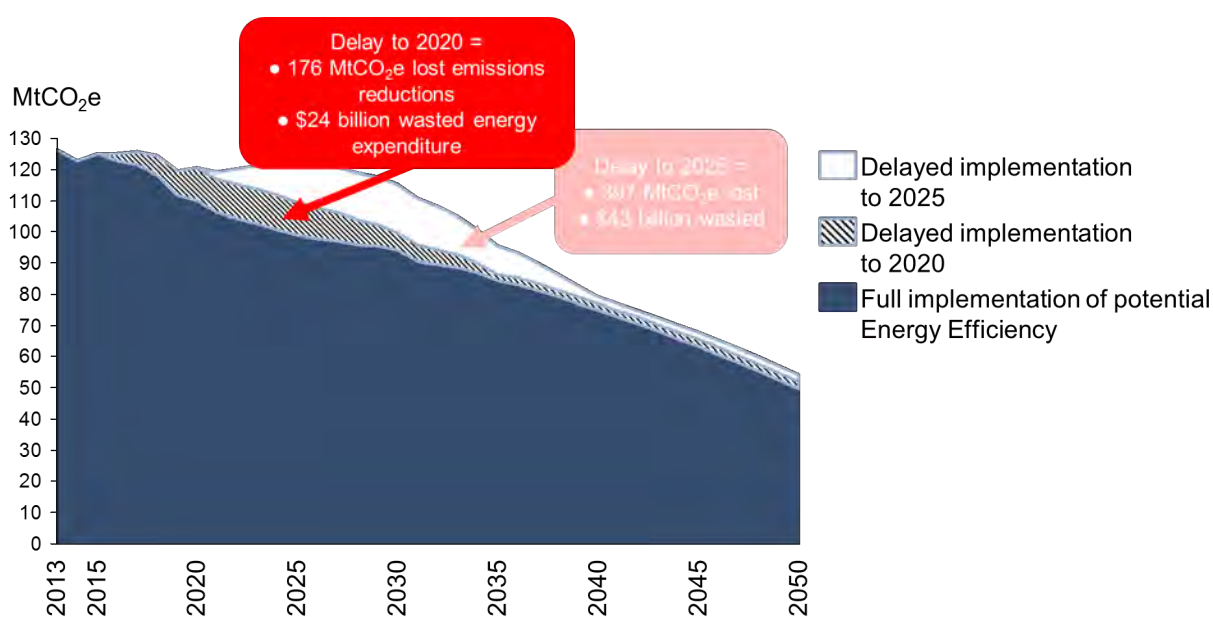
### Just five years of delay in implementing the opportunities in buildings could lead to \$24 billion in wasted energy costs and over 170 Mt of lost emission reduction opportunities

ASBEC's policy recommendations are outlined on the following pages. These policies have the potential to overcome the barriers and impediments to the built environment sector achieving its full potential to contribute to national emissions reductions.

Addressing these barriers is urgent. Each year of delay leads to the construction of new buildings and installation of new equipment that is less energy efficient and more emissions intensive than necessary. Buildings and central equipment such as water heaters and heating and cooling systems are long-lived assets - each year of delay therefore 'locks-in' high emissions infrastructure, and poor performing building stock for many decades to come.

Figure 8 below shows emissions from buildings in three scenarios, and shows that just five years of delay would result in 176 MtCO<sub>2</sub>e of lost emissions reduction opportunity, and \$24 billion in wasted energy expenditure.

Figure 8. Cost of delay (MtCO<sub>2</sub>e)



Source: ClimateWorks Team Analysis

## 6. Summary of policy recommendations

#	RECOMMENDATION	RATIONALE	INDICATIVE TIMELINE
<b>Policy Solution 1 - Create National Plan Towards 2050 Net Zero Emissions Buildings and improve governance</b>			
1.1	Establish a <b>National Plan</b> Towards 2050 Zero Carbon Buildings	<p>Opportunities presented by energy efficiency and emissions reductions in the built environment sector are large but the impediments are numerous and complex. Numerous stakeholders are involved, including multiple levels of government, multiple different government departments, agencies and regulators, and multiple private and community sector stakeholders. Overcoming this level of complexity requires supportive governance arrangements, including:</p> <ul style="list-style-type: none"> <li>• targets for emissions and energy in the built environment;</li> <li>• coordination of activity across levels of government and government entities;</li> <li>• regular public reporting of progress;</li> <li>• public and industry engagement;</li> <li>• coordination and planning of research, education and training; and</li> <li>• clear responsibility for implementation, review and updating over time.</li> </ul>	<p>By end 2016, establish a working group to develop national plan</p> <p>By June 2017, establish national plan</p>
1.2	Investigate the establishment of an <b>independent Energy Efficiency Authority</b>	<p>An independent authority could coordinate energy efficiency policy development and implementation, and evaluation and reporting of the effectiveness of energy efficiency policies. This would provide greater regulatory certainty and stability.</p>	<p>By June 2017, report on options for the establishment of an independent authority, for implementation by the end of 2017</p>
<b>Policy Solution 2 - Set strong mandatory minimum standards</b>			
2.1	Review and upgrade minimum energy performance standards in the <b>National Construction Code</b>	<p>Minimum standards for commercial buildings currently lag far behind best practice, and need to be updated urgently. A range of other potential improvements to both residential and commercial standards have been proposed.</p>	<p>Commence immediately for implementation at the scheduled 2019 Code update</p>
2.2	Implement a trajectory for <b>future upgrades</b> to minimum energy performance standards in the National Construction Code	<p>Currently the Code is updated every three years, but the minimum energy performance standards are not necessary adjusted at this point. Establishing a trajectory for upgrades would enable industry to prepare for higher standards in the future and reduce the regulatory uncertainty and burden associated with ad hoc upgrades.</p>	<p>Commence investigation immediately</p>
2.3	<b>Improve compliance</b> and State/Territory-level enforcement of standards	<p>Recent reports have provided increasing evidence of under-compliance with existing NCC requirements. The NEEBP is focusing on this issue, and should be supported to continue to promote improved compliance and enforcement through improved compliance tools, and to monitor the impact of these tools and identify additional improvements required to address under-compliance. States and Territories should also work to improve their enforcement regime.</p>	<p>2016-17</p>
2.4	Implement the recommendations of the GEMS Review to expand, strengthen and accelerate future improvements in <b>minimum equipment and appliance standards</b>	<p>The GEMS review identified opportunities to improve minimum energy performance standards for appliances and equipment, and the process for updating standards over time. These recommendations should be implemented</p>	<p>By June 2016</p>

2.5	Develop a proposal for introduction of minimum standards for <b>rental properties</b>	Low income and vulnerable households in rental properties face much stronger barriers to improving the energy performance of their homes than other households, particularly split incentives and power imbalances with landlords. This provides a strong consumer protection rationale for introducing mandatory minimum standards. In addition, improving the performance of rental properties would reduce the burden on state and territory budgets of providing financial assistance to households unable to pay energy bills.	Develop proposal by the end of 2016, for implementation by June 2017
2.6	Undertake a review to investigate the introduction of minimum energy performance standards for <b>existing buildings</b>	Minimum standards for existing buildings may be justified if the suite of measures in the NEPP fail to drive sufficient retrofitting activity. Simply signalling the future introduction of minimum standards may in itself drive substantial additional activity. Further investigation would be required to understand the need, potential impacts, timelines and costs and benefits of this measure.	In 2017, for potential introduction from 2020
<p><b>Policy Solution 3 - Targeted incentives and programs</b></p> <p><b>Policy Solution 3A - Leverage government market power</b></p>			
3.1	Commonwealth, State and Territory governments should set ambitious targets for <b>government-owned and occupied buildings</b> and for government procurement, and implement mechanisms to facilitate these improvements	Government-occupied premises account for 14 per cent of the identified opportunity for energy efficiency improvements. Governments can use their strong market presence drive large improvements in energy performance, which will provide leadership and demonstrate the benefits of improved energy performance, deliver financial savings for government budgets, reduce costs for others and build skills and capability, and improve public facilities such as schools and hospitals. Programs to improve energy use in government operations are well understood, and could be rapidly expanded to jurisdictions that do not currently have them in place.	Review existing programs (where they exist) in 2016, and establish new/improved programs by June 2017
3.2	Commonwealth, State and Territory governments should fund programs to support <b>local governments</b> to improve their efficiency	Local governments have more limited skills and resources to identify and implement energy upgrade projects and improvement programs. Commonwealth, State and Territory governments should individually or jointly fund programs that provide access for local governments to advisory teams that can assist them to implement similar energy improvement programs.	By June 2017
<p><b>Policy Solution 3B - Implement incentives to accelerate action</b></p>			
3.3	A review should be undertaken of the <b>Emissions Reduction Fund</b> to identify and address barriers to participation for buildings	Of the 129 contracts awarded in the second ERF auction, only three projects used the one available buildings method. The ERF in its current form appears to be unsuited to incentivising emissions reductions in buildings, and following the next auction scheduled for April 2016 should be reviewed to identify and address barriers to participation for buildings. This review should include consideration of whether a portion of the ERF funds should be redirected to other incentives or programs better suited to buildings.	By the end of 2016
3.4	The Commonwealth should introduce <b>green depreciation</b> to accelerate uptake of energy upgrades to existing commercial buildings at the time of refurbishment	The Commonwealth is currently considering a range of potential tax reforms, and should include consideration of green depreciation in this context. Green depreciation would influence building owners undertaking refurbishments to include green measures at the same time. By allowing investors to defer tax payments, green depreciation can reduce the 'timing gap' problems of energy efficiency investments, where early capital expenditure must be incurred at the outset but financial savings accrue over the life of the asset. Green depreciation would appear as a revenue loss on government budgets, but would be offset by increased tax revenue in later years.	By end of 2016



3.5	<p>States and Territories should introduce incentives for high performing buildings, and as a priority investigate the introduction of <b>stamp duty concessions</b> and differential council rates in partnership with local government</p>	<p>A number of States and Territories are currently developing energy efficiency, renewable energy and climate change mitigation strategies, including Victoria, Queensland and South Australia. These work programs should include consideration of the introduction of incentives for retrofitting existing appliances, for new buildings and for the purchase of high efficiency equipment and appliances. Priority should be placed on:</p> <ul style="list-style-type: none"> <li>• Stamp duty concessions for high performance homes, which could have a similar impact to green depreciation by targeting the point at which homeowners are considering making investments in their home prior to sale;</li> <li>• Planning incentives such as density bonuses and green door policies, which could support accelerated deployment of high performing new buildings by targeting one of the highest priorities for new building developers - the cost, time invested and uncertainty of planning processes</li> </ul>	By mid 2017
3.6	<p>States, Territories and local government should work together to introduce <b>planning incentives</b> for high performing new buildings</p>	<p>Planning incentives such as density bonuses and green door policies could support accelerated deployment of high performing new buildings by targeting one of the highest priorities for new building developers - the cost, time invested and uncertainty of planning processes.</p>	By June 2017
3.7	<p>Existing <b>Energy Efficiency Obligation schemes</b> should continue to be harmonised and integrated</p>	<p>Harmonising and integrating existing schemes will reduce transaction costs, reduce the cost of expanding to other states and territories, reduce administrative costs particularly for smaller jurisdictions and reduce the cost of reviews and updates. Victoria and New South Wales are already working on harmonising and integrating their schemes, and this should be extended to other jurisdictions and potential new schemes. Existing and new schemes should seek to include project-based methodologies that reward deeper retrofits rather than single product replacements.</p>	By the end of 2016
3.8	<p><b>Energy Efficiency Obligation schemes</b> should be introduced in Queensland, Western Australia, Tasmania and the Northern Territory</p>	<p>Jurisdictions which do not currently have schemes should introduce them and design them to integrate with existing schemes.</p>	By June 2017
3.9	<p><b>Energy Efficiency Obligation schemes</b> should begin to incorporate incentives for the replacement of non-electric appliances</p>	<p>Non-electric appliances will eventually need to be phased out, and Energy Efficiency Obligation schemes should be reviewed to ensure that they are not incentivising installation of new non-electric appliances (e.g. gas water heaters) and eventually, to introduce incentives for the replacement of existing electric appliances. This should be initially piloted in states with rapidly decarbonising electricity supply, such as South Australia.</p> <p>Remove incentives for installation of new non-electric appliances by end 2017</p> <p>Design and introduce pilot measures in states with low grid emissions intensity by end 2017, for extension to other jurisdictions by 2020</p>	

### Policy Solution 3C - Facilitation and support for distinct market segments

<p>3.10 Consider the establishment of <b>sectoral leadership groups</b> in retail, health and industrial sectors.</p>	<p>Government can help facilitate the establishment of sectoral leadership groups for market segments with strong consolidation, either nationally or in regions, cities or districts. These groupings can help market leaders overcome common barriers and accelerate improvements in their own buildings. In turn, this can have an effect on the broader market by demonstrating the potential for improvement and the benefits of doing so, and by changing mainstream practices within the supply chain. The Better Buildings Partnership in Sydney is an excellent example, and a similar model could be extended to other areas and other sectors, particularly retail, health and industrial sectors where strong consolidation exist.</p>	<p>In 2016-17, piloting in local government areas, States and Territories currently reviewing energy and climate strategies.</p> <p>Potential expansion in 2018-19.</p>
<p>3.11 Resource the <b>Mid-tier Office</b> Pathway and develop <b>mid-tier retail</b> pathway.</p>	<p>Offices and retail represent the largest share of the identified opportunity in the commercial sector. Despite improvements in the top-tier, mid-tier building owners still face significant barriers to realising these energy savings and the associated benefits. The opportunity is significant. For example, mid-tier offices are estimated to make up 52 million square meters of the 64 million square meters of office space in Australia. A multifaceted approach to connect and transform these sectors is required. Significant work has already been undertaken in the mid-tier office sector, culminating in the development of the industry-led Mid-tier National Office Pathway including the Building Retrofit Toolkit. If resourced, this pathway could be implemented within the next five years. A similar approach should be taken for mid-tier retail.</p>	<p>Mid-tier National Office Pathway resourced immediately for implementation over the next five years.</p> <p>Industry-led pathway for small retail to be resourced and scoped in 2016 for development and implementation in 2017.</p>
<p>3.12 The Commonwealth, States and Territories should develop end-to-end support programs for <b>low-income households</b>.</p>	<p>Low income households tend to live in more inefficient dwellings than other households, spend more of their household income on energy, and face stronger barriers to upgrading including strong split incentives between tenant and landlord and low capability to fund upgrades. Poor housing can increase the financial and health vulnerability of low income households, creating a strong rationale for establishment of targeted end-to-end programs aimed at low-income households. Programs should be developed building on insights from the NEPP best practice guidelines project and the Commonwealth Low Income Energy Efficiency Project.</p>	<p>Scoping of potential programs in 2016 for implementation in 2017.</p>
<p>3.13 State and Territory governments should establish rising minimum standards for <b>public housing</b> and facilitate funding mechanisms to facilitate public housing retrofits.</p>	<p>State and Territory governments control a substantial portion of low-income housing stock through public housing. There is a strong case for standards to be introduced for existing assets, and mechanisms be provided to facilitate upgrades of these publicly owned assets to unlock emissions reductions and support low income households reduce their cost-of-living.</p>	<p>Investigation in 2016 for implementation in 2017.</p>

## Policy Solution 4 - Energy market reforms

<p>4.1 Establish an independent <b>industry Ombudsman</b> or other independent authority to investigate and recommend solutions to address energy market barriers.</p>	<p>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 including built environment stakeholders to participate. A number of these processes are underway at the moment. The establishment of an independent Ombudsman or other 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, would help ensure that these processes support and do not disincentivise cost-effective uptake of energy efficiency and distributed energy.</p>	<p>By the end of 2016.</p>
<p>4.2 Ensure that <b>electricity tariff structures</b> provide an appropriate incentive for distributed energy and energy efficiency, including through the current shift to 'cost-reflective pricing'.</p>	<p>Electricity distribution network service providers are currently implementing a shift towards more cost-reflective pricing for electricity. This may result in an increase in fixed charges, which could create a strong disincentive for the installation of distributed solar PV, as well as a disincentive to improving energy efficiency. Electricity network companies currently develop their own proposals for tariffs. A better approach would be to establish a national process similar to the CSIRO Future Grid Forum to develop 'model tariff structures' to help guide the AER's consideration of new tariff proposals.</p>	<p>Establish a national process in the first half of 2016.</p>
<p>4.3 Establish a mechanism to identify and pass on to distributed generators the <b>fair value of distributed electricity</b> exported to the electricity grid</p>	<p>Electricity generated locally by distributed generators including solar PV systems may deliver a range of network benefits that are not currently recognised in the rate paid to generators. A mechanism should be established to identify any benefit identified, and pass this on to distributed generators.</p>	<p>Following the completion of current Rule Change proposals and inquiries (expected to be resolved in 2016).</p>
<p>4.4 Establish <b>standards for connection</b> of embedded generators and implement the recommendation of the Harper Review of Competition Policy to <b>improve access</b> to the electricity network.</p>	<p>Connection of distributed generators to the electricity network presents a strong barrier to further uptake of medium-scale solar PV and other distributed energy, as a result of a lack of standardisation, un-transparent costs and delays and a lack of an effective access regime. These barriers need to be addressed. Two processes exist to address these issues. The Clean Energy Council (CEC) is currently investigating the possibility of standardisation of connection processes, while the Harper Review of Competition Policy recommended improvements in the access regime for energy networks.</p>	<p>The CEC project is due to report in 2016, and standards could be implemented in 2017.  Commence work on the implementation of the Harper Review recommendation immediately.</p>
<p>4.5 The Australian Energy Regulator (AER) should provide exemptions for <b>Power Purchasing Agreement (PPA) providers</b> as has been provided already in Victoria to facilitate local sharing of distributed solar and other distributed energy.</p>	<p>Exemptions for PPA providers would significantly reduce transaction costs and barriers to entry for businesses seeking to install distributed energy systems including solar PV and sell the electricity to the occupants of the building or nearby buildings. This model could apply to building owners seeking to install solar PV and on-sell the electricity to tenants, or to energy companies that install solar PV on others' roofs and sell the electricity to the tenants.</p>	<p>Short term, 1-2 years.</p>

## Policy Solution 5 - Improve energy data, information, research, education and training

<p>5.1 Develop a national built environment <b>energy data and information strategy</b> in partnership with relevant industry and research organisations.</p>	<p>Energy data and information is currently managed by a range of different organisations. Many other policies and programs rely on the data collected and tools administered by these organisations. For example, the Commercial Building Disclosure Scheme requires disclosure of energy performance based on NABERS ratings, while the National Construction Code references the NatHERS residential rating tool to set the minimum energy performance standard for homes. A national strategy should be developed to ensure that ongoing improvements in energy data and information are coordinated and funded.</p>	<p>Development in 2016 alongside related NEPP measures, for implementation by June 2017.</p>
<p>5.2 Improve access to <b>energy consumption data</b>.</p>	<p>For energy consumption data to be useful, it is essential that it is accessible to both consumers and third party service providers at low effort, at low or zero cost and via cloud-based smart phone apps. The current process for accessing energy consumption data is not streamlined and varies depending on the geographic location and electricity distribution network service provider. An inquiry should be undertaken as part of NEPP Measure 24 ('improving the exchange of market data') to investigate ways to facilitate better access to energy data, with consideration of the establishment of a central, streamlined and highly accessible open data platform for energy consumption and performance data. The platform should also facilitate public access to aggregated and de-identified data for researchers.</p>	<p>Investigation in 2016/17, for potential implementation in 2017</p>
<p>5.3 Expand <b>mandatory disclosure</b> to smaller offices and investigate the possibility of requiring disclosure for other building types.</p>	<p>The Commercial Building Disclosure (CBD) scheme requires large commercial office buildings (above 2,000 m<sup>2</sup>) to disclose their NABERS energy rating at the point of sale or lease. In combination with government and large corporate tenant leasing requirements, this scheme has been instrumental in driving improvements in the large office sector. The Commercial Building Disclosure review recommended extending this scheme to all commercial offices above 1,000m<sup>2</sup>, and ASBEC supports this recommendation. The needs of other building types outside the office sector may be different, however the potential expansion of disclosure policies to other building types should be investigated.</p>	<p>Implementation in 2016</p>
<p>5.4 Implement <b>mandatory disclosure</b> of energy performance for residential buildings, beginning with pilots in one or more jurisdictions.</p>	<p>In the residential sector, disclosure is already required for homes at the point of sale or lease in the ACT, with good results. There is a strong case to extend residential disclosure to other jurisdictions, beginning with a pilot in one or more states over the next two years, while developing the framework for implementation of a nationally consistent scheme in 2018. This will also allow time to investigate potential improvements in and harmonisation of residential rating schemes.</p>	<p>Piloting in 2016-18, and implementation of national scheme from 2018</p>



5.5	Develop a national built environment energy efficiency and emissions <b>research agenda</b> , and establish a permanent energy efficiency and distributed energy research institution.	Australia has a very well-developed set of research and innovation entities, including in particular the CRC for Low Carbon Living working on primary research relating to energy and emissions in the built environment amongst other areas, ARENA which provides funding for early stage renewable energy technologies and the Clean Energy Finance Corporation to support commercialisation. What is missing in Australia is a mechanism to coordinate research on built environment energy efficiency and emissions. To fill this gap, it is recommended that government consider the development of a permanent national built environment energy efficiency and emissions research agenda and the establishment of a national built environment research body. In addition, ARENA's mandate should be expanded to include energy efficiency, building on the work of the CRC for Low Carbon Living, and the forthcoming establishment of Innovation and Science Australia.	Development of a national strategy in 2016-17 Expansion of ARENA's mandate in 2017
5.6	Develop a national built environment energy efficiency and emissions <b>education and training agenda</b> .	In recognition of the broad need for upskilling amongst many different industry sectors, the national buildings plan should include the development of a national built environment energy efficiency and emissions education and training agenda and co-ordination with existing industry bodies such as the Energy Efficiency Council and Clean Energy Council, and education and training institutions such as the Industry Skills Council and AQSA.	Development of national strategy in 2016 for implementation in 2017