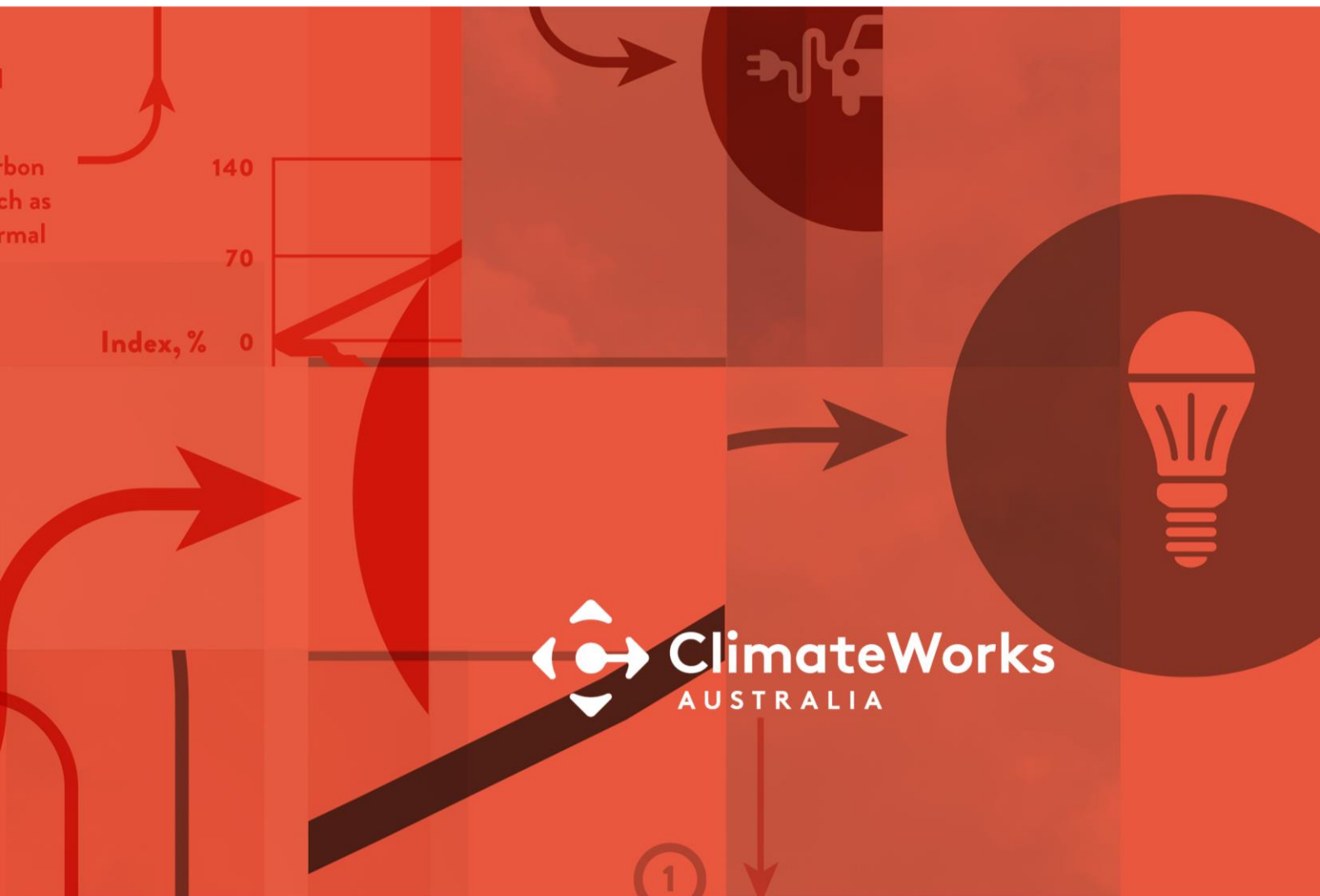


REPORT

Translating Research into Action

Understanding and extending utilisation of the CRC for Low Carbon Living to support the ASBEC industry roadmap to zero carbon buildings

February 2017



Translating Research into Action

Executive Summary

This report maps 29 of the CRC for Low Carbon Living's research projects against the *Low Carbon, High Performance* industry roadmap towards zero carbon buildings.

The report finds good coverage of barriers and policies identified in the roadmap relating to:

- **Consumer motivation:** Many projects explore the drivers and barriers behind the lack of consumer motivation to adopt emissions reduction opportunities, and seek to boost demand, particularly through demonstration, quantification and socialisation of the non-energy benefits of improved energy performance;
- **Data and information:** Many projects aim to improve understanding of data and information gaps and needs, collect data and information required to support implementation of energy performance upgrades, and make that information available to decision makers. A number of projects are directly supporting the delivery of policy solutions, including through the development of energy performance rating schemes and tools. The Knowledge Hub is an important ongoing project to bring together existing data from the CRC and help guide future research.
- **Supply chains:** Numerous projects focus on understanding supply chain barriers, developing and delivering tools, information resources and training to building design and construction professionals and demonstrating the feasibility and affordability of high performance buildings.

The report also identifies gaps and areas of lower alignment or impact, which could form the focus of new and expanded projects to be delivered in the CRC's remaining years. These have been grouped into two categories:

- Making the evidence more accessible and useable
- Filling evidence gaps and translating evidence into policy impact

Making the evidence more accessible and useable

Simply providing greater access to documentation could aid utilisation, while a range of options exist to synthesise, repackage and improve useability of the depth of knowledge within the CRC. In particular:

- The **Knowledge Hub** will be a critical pathway to improving accessibility of the CRC's work, if well designed and integrated with other initiatives such as the CSIRO Energy Use Data Model;
- Existing projects could have much greater impact through creation of **user-friendly communications materials** outlining key insights;
- There are opportunities to synthesise insights across multiple projects and repackage them into a series of '**CRC Guides to...**', '**CRC Handbooks**' or **policy platforms** covering a range of current issues. These could also be used to help scale-up successful pilots by distilling key learnings into manuals that could be used by others;

Filling evidence gaps and translating evidence into policy impact

ClimateWorks has identified numerous opportunities for the CRC to fill evidence gaps and translate research into policy impact, for further consideration by the CRC. In addition to the specific ideas listed below, the CRC could explore the option of running **policy maker utilisation workshops** to collaboratively plan policy-

implementation-focused extension projects that utilise existing CRC findings to provide clear, actionable policy advice.

Identified opportunities are outlined below and detailed in section 4.2 of this report:

- *Policy frameworks*: This area was identified as a gap, but could be addressed by a project currently underway to look at optimal policy frameworks and governance arrangements for energy efficiency and emissions policy;
- *Minimum energy performance standards*: A number of clear opportunities exist for the CRC to influence the upcoming update to the minimum energy efficiency standards for new building work in the **National Construction Code**¹, drawing on extensive pieces of research already completed. Another gap identified in the report relates to **minimum standards for equipment and appliances**, and again opportunities exist to contribute new research to support improved standards.
- *Targeted incentives and programs*: This category of policies was identified as a gap in the mapping exercise, despite a number of notable exceptions. The ASBEC report outlines a number of potential incentives and targeted programs that could be introduced to drive improved energy performance, and CRC research could help support the implementation of these or other programs. These include opportunities to support implementation of incentives for **retrofitting, fuel switching, and battery storage**, development of **standards and methodologies** for emerging technologies, developing a joint policy platform on **low income households**, investigating **action plans and roadmaps** for other key market segments and informing the Commonwealth's **City Deals** and **Smart Cities and Suburbs** programs.
- *Data, information, training, education*: While numerous CRC projects produce information or resources that could support improved training and education, widespread delivery of this remains a major obstacle, particularly in the residential space. Opportunities include partnering with industry to establish a **residential construction education and training partnership**, or developing a broader **low carbon living education and training strategy**. A specific opportunity exists to work with **ARENA** to help it prioritise its investments in energy efficiency.
- *Energy market reform*: Australia's energy market is facing enormous challenges and change, with great uncertainty about the path forward. The CRC could establish a stream of work dedicated to synthesising relevant CRC research and potentially adding new research to create a **CRC Guide to Buildings and Their Role in the Energy Market Transition**, which could inform numerous reviews and policy discussions currently under way.

¹ ClimateWorks wishes to acknowledge that it is actively working with ASBEC to progress a project relating to the National Construction Code.

About us

ClimateWorks Australia

ClimateWorks Australia is an expert, independent adviser, acting as a bridge between research and action to enable new approaches and solutions that accelerate Australia's transition to net zero emissions by 2050. It was co-founded in 2009 by The Myer Foundation and Monash University and works within the Monash Sustainable Development Institute.

Since launch, ClimateWorks has made significant progress, engaging key decision makers from all tiers and sides of politics and business. Their collaborative, end-to-end approach to solutions that will deliver greatest impact is informed by a thorough understanding of the constraints of governments and the practical needs of business. This, combined with philanthropic funding and university ties, has earned the organisation an outstanding reputation as a genuine and impartial adviser.

In the pursuit of its mission, ClimateWorks looks for innovative opportunities to reduce emissions, analysing their potential then building an evidence-based case through a combination of robust analysis and research, and clear and targeted engagement. They support decision makers with tailored information and the tools they need, as well as work with key stakeholders to remove obstacles and help facilitate conditions that encourage and support Australia's transition to a prosperous, net zero emissions future.

Acknowledgment of Support

ClimateWorks Australia would like to thank those experts who have provided input to the consultations undertaken for this project.

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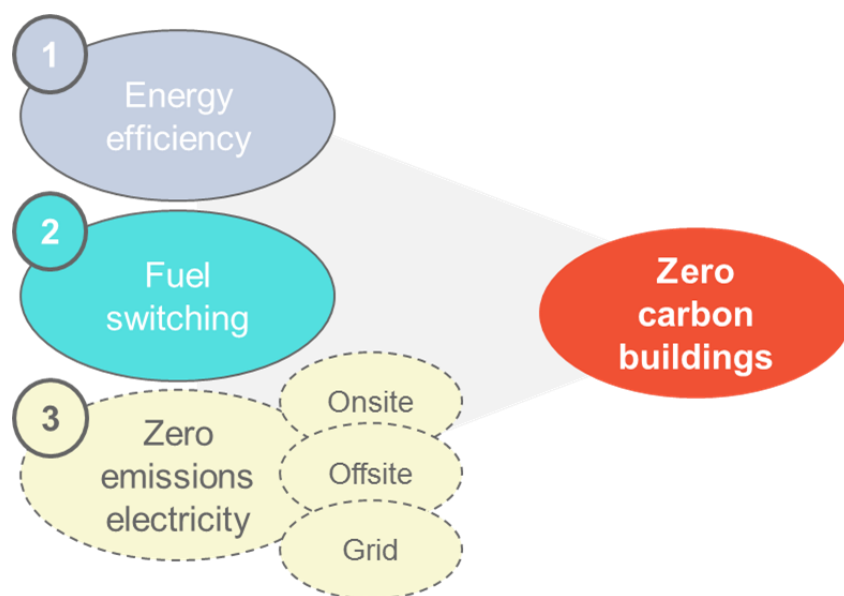
1. Overview

ClimateWorks has mapped the CRC's projects against the ASBEC policy roadmap for zero carbon buildings

The ASBEC *Low Carbon, High Performance* report² focuses on how Australian buildings can transition to net zero emissions from operational energy use by 2050. The report describes the three key 'pillars' of decarbonising the buildings sector operational energy use:

1. Energy efficiency of buildings, equipment and appliances and their operation
2. Switching from non-electric appliances to electric alternatives
3. Procurement of zero carbon energy supply, either on-site, off-site or via decarbonisation of the electricity grid

FIGURE 1. THREE 'PILLARS' OF BUILT ENVIRONMENT DECARBONISATION



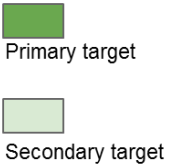
Modelling for the report undertaken by ClimateWorks Australia illustrates that even with existing technologies, it is possible for the buildings sector to achieve zero carbon operations by 2050 through these three pillars. However, the report outlines a set of barriers preventing these opportunities from being fully captured, and a set of policy solutions to overcome these barriers³. Table 2 below illustrates the key barriers identified in the ASBEC report, and the key policy solutions required to overcome those.

² ASBEC, 2016.

³ A detailed description of the ASBEC barriers and policy framework is provided in Appendix 2.

FIGURE 2. LOW CARBON, HIGH PERFORMANCE BARRIER AND POLICY FRAMEWORK

BARRIERS	POLICY TYPES				
	<i>National plan</i>	<i>Minimum standards</i>	<i>Targeted incentives and programs</i>	<i>Data, information, research, education</i>	<i>Energy market reforms</i>
Policy frameworks	Provide the goal and the 'glue' to coordinate actions				
Motivation	Send a strong signal and provide a vehicle for public engagement	Ensure minimum level of performance for least motivated	Provide incentives to go beyond minimum standards	Provide better public information on the benefits	
Capability	Provide a vehicle for industry engagement	Build industry capability through accelerated deployment	Build industry capability through improved performance Provide dedicated support for least equipped	Provide the data, information, training and education required to enable informed choice and quality service provision	
Attractiveness	Provide a vehicle for coordination of energy market reforms	Reduce cost of new technologies and approaches through accelerated deployment	Reduce costs of new technologies and approaches through accelerated deployment	Support innovation & commercialisation of new technologies & business models	Address barriers and market distortions affecting energy efficiency and distributed energy



Primary target

Secondary target

ClimateWorks mapped 29 of the most relevant CRC projects⁴ against these barriers and policy solutions to identify the extent to which CRC projects are helping to overcome these barriers or enable the implementation of required policy measures. In addition, this mapping exercise was intended to illustrate areas where existing CRC projects could be better utilised to have greater impact, and gap areas where new CRC projects could be considered.

Each project was assessed on a 1-5 scale⁵, where 1 is the lowest degree of impact on the barrier or policy, and 5 is the highest, using the following definitions:

1. Explores the policy option / improves understanding of the barrier
2. Provides part of the evidence or resources required to enable a policy response / enable the barrier to be overcome
3. Provides most of the evidence or resources required to enable a policy response / enable the barrier to be overcome
4. Provides an actionable policy pathway / an actionable pathway to overcome the barrier
5. Directly delivers a policy solution / overcomes the barrier

⁴ The projects included in this mapping exercise were agreed with the CRC Program Leaders Group (PLG) based on which projects were most aligned with the scope of the ASBEC framework. This excluded many CRC projects, particularly many of the projects in the CRC's Impact Pathway 2 (relating to embodied emissions) and Impact Pathway 4 (relating to precinct developments).

⁵ This scale provides ordinal rather than interval data.

The results of this mapping exercise are summarised in the table overleaf⁶. Darker colours represent higher 'ratings', with the darkest colours representing a 5. The full table is provided in Appendix 1.

⁶ To assist readability, the results in this paper are presented at an aggregated level, which categorises the 23 barriers and policies into 9 barrier and policy categories.

Rating scale	1	2	3	4	5

FIGURE 3. SUMMARY OF MAPPING EXERCISE- BARRIERS⁷

Stream	Projects	Barriers						
		Policy frameworks	Motivation	Capability	Project attractiveness			
Integrated building systems	RP1008	Industry support mechanisms for renewable heating and cooling						
	RP1023	Forecasting and energy analysis in residential energy management						
	RP1032	Facilitating large energy user deployment of off-site renewables						
	RP1006	Viable integrated systems for zero carbon housing systems						
	RP1009	Closing the loop on evidence-based low carbon non-resi design						
	RP1017	Validating and improving the BASIX Tool						
	RP1010/1019	CSR House & Advanced comfort index for low carbon homes						
	RP1021	Reframing building regulation						
	RP1024	Facilitating the transition to low carbon housing						
Low carbon precincts	RP2010	Low carbon inclusions in government tenders						
	RP2016	Impact of prices and dwelling EE on home electricity use in Sydney						
	RP2018	Retrofitting urban precincts to create low carbon communities						
Engaged communities	RP3001/3038	Lower income barriers to low carbon living						
	RP3002/3028	A virtual market for analysing the uptake of energy efficiency						
	RP3008	Visions and pathways to 2040						
	SP0008	Low carbon built environment knowledge hub						
	RP3007/3023	Opportunities and challenges for community-scale renewables						
Cross cutting	RP2006	FredZED – mainstreaming low carbon housing in WA						
	RP3009	High performance housing ('Josh's House')						
	RP3012	Environmental attitudes – Low Carbon Behavioural Practice						
	RP3016	EnergyFit homes initiative – empowering consumers						
	RP3017	Adelaide living laboratory hub						
	RP3029	Driving a social media conversation on energy efficient housing						
	RP3011	Community carbon reduction and wellbeing enhancement						
	RP3022	Policy impediments and incentives for LCL education and training						
	RP3025	Sydney TAFE carbon reduction website						

⁷ Note that project names have been abbreviated in these tables to assist readability.

FIGURE 4. SUMMARY OF MAPPING EXERCISE- POLICIES

Rating scale	1	2	3	4	5

Stream	Projects	Policies				
		National plan	Minimum standards	Targeted incentives and programs	Data, information, research, education	Energy market
Integrated building systems	<i>RP1008</i> Industry support mechanisms for renewable heating and cooling					
	<i>RP1023</i> Forecasting and energy analysis in residential energy management					
	<i>RP1032</i> Facilitating large energy user deployment of off-site renewables					
	<i>RP1006</i> Viable integrated systems for zero carbon housing systems					
	<i>RP1009</i> Closing the loop on evidence-based low carbon non-resi design					
	<i>RP1017</i> Validating and improving the BASIX Tool					
	<i>RP1010/1019</i> CSR House & Advanced comfort index for low carbon homes					
	<i>RP1021</i> Reframing building regulation					
Low carbon precincts	<i>RP2010</i> Low carbon inclusions in government tenders					
	<i>RP2016</i> Impact of prices and dwelling EE on home electricity use in Sydney					
	<i>RP2018</i> Retrofitting urban precincts to create low carbon communities					
Engaged communities	<i>RP3001/3038</i> Lower income barriers to low carbon living					
	<i>RP3002/3028</i> A virtual market for analysing the uptake of energy efficiency					
	<i>RP3008</i> Visions and pathways to 2040					
	<i>SP0008</i> Low carbon built environment knowledge hub					
	<i>RP3007/3023</i> Opportunities and challenges for community-scale renewables					
Cross cutting	<i>RP2006</i> FredZED – mainstreaming low carbon housing in WA					
	<i>RP3009</i> High performance housing ('Josh's House')					
	<i>RP3012</i> Environmental attitudes – Low Carbon Behavioural Practice					
	<i>RP3016</i> EnergyFit homes initiative – empowering consumers					
	<i>RP3017</i> Adelaide living laboratory hub					
	<i>RP3029</i> Driving a social media conversation on energy efficient housing					
	<i>RP3011</i> Community carbon reduction and wellbeing enhancement					
	<i>RP3022</i> Policy impediments and incentives for LCL education and training					
<i>RP3025</i> Sydney TAFE carbon reduction website						

2. Areas of strongest alignment

Using the methodology outlined above, ClimateWorks has undertaken an assessment of where the identified CRC projects are having the greatest impact on the barriers and policy priorities outlined in the ASBEC framework.

It is important to note that in undertaking this assessment:

- The assessment was based on materials provided via the CRC PLG, and consultation and review of these has been limited to this group rather than the individual project leaders;
- For projects not yet completed, it has been assumed that they will deliver the outcomes outlined in their project proposal

The strongest areas of alignment with ASBEC barriers are in relation to ‘motivation’ and ‘capability’ barriers

‘Motivation’ barriers: The ASBEC report identifies a lack of consumer motivation to adopt energy performance improvements as a key barrier, including the often low priority placed by building owners and occupants on managing energy use (even in the context of rising energy prices), and a low awareness of the potentially much more powerful non-energy impacts of energy performance improvements.

A number of the Impact Pathways include projects that explore the drivers and barriers behind the apparent lack of consumer motivation to adopt emissions reduction opportunities, and opportunities to boost consumer demand for energy efficiency and renewables. In particular, there are a number of projects which investigate the low consumer awareness of the non-energy benefits of improved energy performance in buildings, and seek to address this by:

- highlighting and where possible quantifying these benefits (e.g. RP1010, RP3009)
- building an understanding of the best methods by which to communicate and market the broader benefits of improved energy performance to consumers (e.g. RP1019, RP3009, RP3016, RP3029).

FIGURE 5. EXAMPLES OF HIGHLY ALIGNED PROJECTS TARGETING ‘MOTIVATION’ BARRIERS

Stream	Projects	Barriers			
		Policy frameworks	Motivation	Capability	Project attractiveness
Integrated building systems	RP1008	Industry support mechanisms for renewable heating and cooling			
	RP1023	Forecasting and energy analysis in residential energy management			
	RP1032	Facilitating large energy user deployment of off-site renewables			
	RP1006	Viable integrated systems for zero carbon housing systems			
	RP1009	Closing the loop on evidence-based low carbon non-resi design			
	RP1017	Validating and improving the BASIX Tool			
	RP1010/1019	CSR House & Advanced comfort index for low carbon homes			
	RP1021	Reframing building regulation			
RP1024	Facilitating the transition to low carbon housing				
Low carbon precincts	RP2010	Low carbon inclusions in government tenders			
	RP2016	Impact of prices and dwelling EE on home electricity use in Sydney			
	RP2018	Retrofitting urban precincts to create low carbon communities			
Engaged communities	RP3001/3038	Lower income barriers to low carbon living			
	RP3002/3028	A virtual market for analysing the uptake of energy efficiency			
	RP3008	Visions and pathways to 2040			
	SP0008	Low carbon built environment knowledge hub			
	RP3007/3023	Opportunities and challenges for community-scale renewables			
Cross cutting	RP2006	FredZED – mainstreaming low carbon housing in WA			
	RP3009	High performance housing ('Josh's House')			
	RP3012	Environmental attitudes – Low Carbon Behavioural Practice			
	RP3016	EnergyFit homes initiative – empowering consumers			
	RP3017	Adelaide living laboratory hub			
	RP3029	Driving a social media conversation on energy efficient housing			
	RP3011	Community carbon reduction and wellbeing enhancement			
	RP3022	Policy impediments and incentives for LCL education and training			
	RP3025	Sydney TAFE carbon reduction website			

CSR House / Comfort Index

- Quantify intangible benefits of low carbon building products
- Guidance for builders & consumers re health & comfort benefits of EE, delivered by industry partner CSR

Josh's House

- Demonstrate achievability, affordability and performance of 10 star homes

Adelaide Living Lab

- Engage with Living Lab communities to build and share evidence on low carbon living costs and benefits

Driving social media on EE housing

- Drive social media conversations and monitor conversations to understand motivational barriers

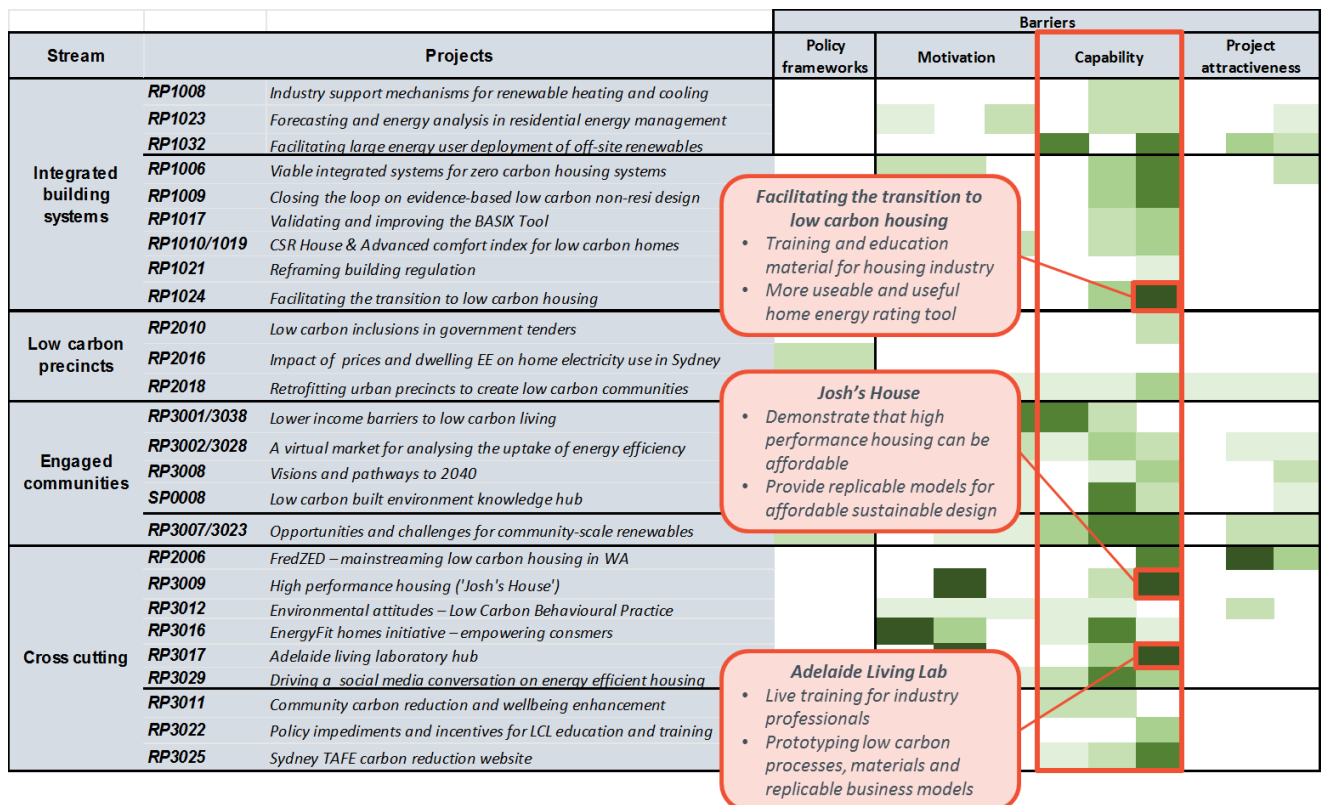
‘Capability’ barriers: The ASBEC report identifies a range of ‘capability’ barriers to improved energy performance, including a lack of consumer resources to investigate and implement opportunities, a lack of data and accessible, useable information, and a range of complex supply chain barriers. All of the Impact Pathways have projects targeting ‘capability’ barriers.

Almost all projects include a component dedicated to **data and information** barriers, including understanding data and information gaps and needs (e.g. RP3016, RP3029), collecting data and information required to support implementation of energy performance upgrades (e.g. RP1006, RP1009, RP3017), and making that information available to decision makers (e.g. RP3002/3028, RP3007/3023, RP3011, RP3025). The Knowledge Hub (SP0008) is currently in development and, if well designed to meet the needs of industry, policy makers and consumers, could help address an overarching issue in this sector, which is the extreme fragmentation, duplication and overlaps in available information which causes confusion and acts as a major brake on uptake of opportunities.

Equally, almost all projects include a component dedicated to **supply chain** barriers, with a particular focus on:

- understanding supply chain barriers (e.g. RP1032, RP2010, RP2018, RP3022)
- developing and delivering tools, information resources and training to building design and construction professionals (e.g. RP1006, RP1008, RP1017, RP1019, RP2009, RP1024, RP3017, RP3025)
- demonstrating that very high performance buildings are feasible and can be delivered at low cost (e.g. RP1009, RP3009, RP3017).

FIGURE 6. EXAMPLES OF HIGHLY ALIGNED PROJECTS TARGETING ‘CAPABILITY’ BARRIERS



The strongest areas of policy alignment are in relation to ‘data, information, research and education’ related policies, with a few individual projects delivering strong impacts in relation to other policy areas

‘Data, information, research, education’ policy solutions: Of the five key policy solutions identified in the ASBEC framework, the ‘data, information, research, education’ solution includes a range of measures necessary to address a range of identified barriers and support and enable the shift to high energy performance buildings.

Many of the CRC projects are relevant to these policy measures, with a focus on:

- Providing **actionable information** that consumers can use to make decisions about purchasing, leasing and upgrading based on robust information about building energy performance, including projects which are progressing all the way through to implementation of an energy performance rating scheme (RP3016) and an energy performance rating tool (RP1006/RP1024);
- Improving **training and education** of consumers, of professionals involved in the design, construction, valuation, sale and leasing of buildings, and of ancillary service providers such as lawyers and accountants, by developing training and education resources (e.g. RP1006, RP1024, RP3022, RP3025) and in some cases extending to actually delivering or partnering within training providers to deliver training and education programs (RP1009).

In addition to these particular focus areas, many CRC projects collect **data and information** which is intended to be aggregated and provided in a useable form through the Knowledge Hub project (SP0008), and identify gaps in research which will help in establishing a future research agenda and allocating research funds and resources. The ASBEC report calls for the establishment of a permanent built environment research institution that is capable of coordinating and funding (or informing funding allocation of) research efforts in the future, and we note that the CRC's research hubs could potentially provide a vehicle for this coordination effort.

FIGURE 7. EXAMPLES OF HIGHLY ALIGNED PROJECTS TARGETING 'DATA, INFORMATION, RESEARCH, EDUCATION' POLICIES

Stream	Projects	Policies						
		National plan	Minimum standards	Targeted incentives and programs	Data, information, research, education	Energy market		
Integrated building systems	RP1008	Industry support mechanisms for renewable heating and cooling						
	RP1023	Forecasting and energy analysis in residential energy management						
	RP1032	Facilitating large energy user deployment of off-site renewables						
	RP1006	Viable integrated systems for zero carbon housing systems						
	RP1009	Closing the loop on evidence-based low carbon non-resi design						
	RP1017	Validating and improving the BASIX Tool						
	RP1010/1019	CSR House & Advanced comfort index for low carbon homes						
	RP1021	Reframing building regulation						
Low carbon precincts	RP1024	Facilitating the transition to low carbon housing						
	RP2010	Low carbon inclusions in government tenders						
	RP2016	Impact of prices and dwelling EE on home electricity use in Sydney						
Engaged communities	RP2018	Retrofitting urban precincts to create low carbon communities						
	RP3001/3038	Lower income barriers to low carbon living						
	RP3002/3028	A virtual market for analysing the uptake of energy efficiency						
	RP3008	Visions and pathways to 2040						
	SP0008	Low carbon built environment knowledge hub						
Cross cutting	RP3007/3023	Opportunities and challenges for community-scale renewables						
	RP2006	FredZED – mainstreaming low carbon housing in WA						
	RP3009	High performance housing ('Josh's House')						
	RP3012	Environmental attitudes – Low Carbon Behavioural Practice						
	RP3016	EnergyFit homes initiative – empowering consumers						
	RP3017	Adelaide living laboratory hub						
	RP3029	Driving a social media conversation on energy efficient housing						
	RP3011	Community carbon reduction and wellbeing enhancement						
	RP3022	Policy impediments and incentives for LCL education and training						
RP3025	Sydney TAFE carbon reduction website							

Closing the loop on evidence-based low carbon design

- Education materials, workshops and decision-support tool for professionals to integrate low carbon design

Facilitating the transition to low carbon housing

- New home energy rating tool and associated education and training material for industry and community

EnergyFit Homes

- Driving establishment of national framework for home energy rating disclosure program, with pilot in NSW

Driving social media on EE housing

- Social support network for households to provide trusted peer-to-peer information
- Data mining to enable deeper research on consumer attitudes and behaviours

Other policy types: While the mapping exercise revealed a strong focus on 'data, information, research, education' policy types, there are individual projects which have contributed to the development and implementation of other policy measures. Examples include:

- A number of projects which aim to provide the evidence base for improved **mandatory minimum standards** for new building works, particularly RP1017 which has supported the proposed upgrade to the NSW BASIX standards;
- Projects which aim to support the introduction of particular policy **incentives**, for example RP1008 (which aims to support the inclusion of renewable heating and cooling into State and Territory 'white certificate' schemes), and RP3002/3028 (which provides decision makers with an analytical tool to explore and compare the impact of different policy programs on uptake of opportunities);
- A project which aims to leverage **government market power** by working to include low carbon requirements in government tenders (RP2010).

FIGURE 8. EXAMPLES OF HIGH-IMPACT PROJECTS TARGETING OTHER POLICIES

Stream	Projects	Policies					
		National plan	Minimum standards	Targeted incentives and programs	Data, information, research, education	Energy market	
Integrated building systems	RP1008	Industry support mechanisms for renewable heating and cooling					Industry support mechanisms for renewable heating & cooling <ul style="list-style-type: none"> Evidence base to incorporate renewable heating & cooling into 'white certificate' incentive schemes
	RP1023	Forecasting and energy analysis in residential energy management					
	RP1032	Facilitating large energy user deployment of off-site renewables					
	RP1006	Viable integrated systems for zero carbon housing systems					
	RP1009	Closing the loop on evidence-based low carbon non-resi design					
	RP1017	Validating and improving the BASIX Tool					
	RP1010/1019	CSR House & Advanced comfort index for low carbon homes					
	RP1021	Reframing building regulation					
Low carbon precincts	RP2010	Low carbon inclusions in government tenders					Low carbon inclusions in government tenders <ul style="list-style-type: none"> Working to leverage government market power through procurement processes
	RP2016	Impact of prices and dwelling EE on home electricity use in Sydney					
	RP2018	Retrofitting urban precincts to create low carbon communities					
Engaged communities	RP3001/3038	Lower income barriers to low carbon living					Virtual market for analysing uptake of energy efficiency <ul style="list-style-type: none"> Provides decision makers with analytical tool to support assessment of potential policy incentives and programs
	RP3002/3028	A virtual market for analysing the uptake of energy efficiency					
	RP3008	Visions and pathways to 2040					
	SP0008	Low carbon built environment knowledge hub					
Cross cutting	RP3007/3023	Opportunities and challenges for community-scale renewables					Validating & improving BASIX <ul style="list-style-type: none"> Evidence to support improved minimum standards in NSW
	RP2006	FredZED – mainstreaming low carbon housing in WA					
	RP3009	High performance housing ('Josh's House')					
	RP3012	Environmental attitudes – Low Carbon Behavioural Practice					
	RP3016	EnergyFit homes initiative – empowering consumers					
	RP3017	Adelaide living laboratory hub					
	RP3029	Driving a social media conversation on energy efficient housing					
	RP3011	Community carbon reduction and wellbeing enhancement					
RP3022	Policy impediments and incentives for LCL education and training						
	RP3025	Sydney TAFE carbon reduction website					

3. Gaps and areas of lower alignment

ClimateWorks has also identified barriers and policies which are either not targeted by CRC projects, have very few projects focusing on them, or where projects remain at earlier stages of impact and utilisation to actually overcome barriers or support implementation of policy measures. This section outlines those gaps, and potential solutions for filling gaps or improving the impact and utilisation of existing projects are identified in section 4 below.

In assessing the gaps and areas of lesser alignment between the identified CRC projects and the ASBEC framework, it is important to remember that this assessment is not designed to assess the performance of the CRC in delivering on its own objectives, but rather the extent to which the CRC is delivering on industry priorities as outlined in the ASBEC framework.

There is limited coverage of policy frameworks and project attractiveness barriers, and few projects investigating fuel switching

Policy frameworks: The ASBEC roadmap cites as a key barrier a lack of effective, integrated and coordinated frameworks for the development, implementation, monitoring and upgrading over time of policies relating to built environment energy performance and emissions, across different levels of government and different departments and agencies within governments.

The mapping output reveals that while a number of projects consider policy frameworks at a relatively micro level (e.g. RP3022 considers frameworks for low carbon living training and education and RP3007/3023 considers an integrated set of policies to support community renewables across multiple levels of government), very few projects investigate this barrier holistically. There is the potential for RP3008 (Visions and Pathways to 2040), which is close to completion, to fill this gap if it provides tangible options for improving the coherence of policy frameworks.

'Project attractiveness' barriers: The ASBEC roadmap identifies three barriers that affect the financial attractiveness of projects. Some technologies that could further reduce emissions and energy use are not yet commercially viable and require further research, development and commercialisation to be brought down the cost curve. In many cases, despite the fact that technologies and opportunities deliver a financial return, that return is not sufficiently large to stimulate uptake, especially when fragmentation of the market across many building owners, occupants and other decision makers lead to high transaction costs. Finally, market structures can act as a barrier, particularly through barriers to entry in the energy market for new technologies, and pricing structures that do not adequately reward building owners or occupants for energy efficiency or distributed generation.

The mapping output reveals that very few projects target 'project attractiveness' barriers. In addition, a number of projects targeting these barriers (particularly energy market barriers) could potentially be utilised to drive greater impact. This said, there are a small number of projects which investigate business models (e.g. RP2006, which is piloting a model for delivery of distributed energy in strata title developments) and market segmentation (e.g. RP3012, which may help companies to target the most receptive market segments) to help reduce transaction costs for delivery of energy performance upgrades. And a number of projects that investigate energy market barriers particularly to distributed energy (e.g. RP1032, RP3007/3023, RP2006), or provide data on the peak demand reduction impact of energy efficiency that could be used to help address such barriers (e.g. RP1032, RP1006, RP3002/3028). It is also worth noting that a number of projects not included in this analysis, particularly in the 'Harnessing the Australian Sun' Impact Pathway (e.g. RP1001/1015, RP1002, RP1003 and RP1007), do focus on improving the cost-effectiveness of emerging technologies.

FIGURE 9. GAPS AND AREAS OF LOWER ALIGNMENT IN RELATION TO BARRIERS

Stream	Projects	Barriers			
		Policy frameworks	Motivation	Capability	Project attractiveness
Integrated building systems	RP1008	Industry support mechanisms for renewable heating and cooling			
	RP1023	Forecasting and energy analysis in residential energy management			
	RP1032	Facilitating large energy user deployment of off-site renewables			
	RP1006	Viable integrated systems for zero carbon housing systems			
	RP1009	Closing the loop on evidence-based low carbon non-resi design			
	RP1017	Validating and improving the BASIX Tool			
	RP1010/1019	CSR House & Advanced comfort index for low carbon homes			
	RP1021	Reframing building regulation			
RP1024	Facilitating the transition to low carbon housing				
Low carbon precincts	RP2010	Low carbon inclusions in government tenders			
	RP2016	Impact of prices and dwelling EE on home electricity use in Sydney			
	RP2018	Retrofitting urban precincts to create low carbon communities			
Engaged communities	RP3001/3038	Lower income barriers to low carbon living			
	RP3002/3028	A virtual market for analysing the uptake of energy efficiency			
	RP3008	Visions and pathways to 2040			
	SP0008	Low carbon built environment knowledge hub			
	RP3007/3023	Opportunities and challenges for community-scale renewables			
Cross cutting	RP2006	FredZED – mainstreaming low carbon housing in WA			
	RP3009	High performance housing ('Josh's House')			
	RP3012	Environmental attitudes – Low Carbon Behavioural Practice			
	RP3016	EnergyFit homes initiative – empowering consumers			
	RP3017	Adelaide living laboratory hub			
	RP3029	Driving a social media conversation on energy efficient housing			
	RP3011	Community carbon reduction and wellbeing enhancement			
	RP3022	Policy impediments and incentives for LCL education and training			
RP3025	Sydney TAFE carbon reduction website				

Fuel switching: Fuel switching away from gas, wood and other fuel sources to electricity in order to pave the way for zero carbon electricity supply was identified in the ASBEC report as the second ‘pillar’ of decarbonisation of the buildings sector. Though somewhat outside the scope of the methodology for this analysis, it is worth noting that there appears to be little coverage amongst CRC projects of the barriers or policy solutions required to drive fuel switching.

There are significant gaps in coverage of policies, and large opportunities to increase utilisation and impact across the suite of policy measures

The mapping exercise reveals substantial gaps in coverage of policies, despite individual projects delivering high impact (see section 2 above).

As discussed above, there are very limited projects covering the development of **integrated policy plans and frameworks**, although this has to some degree been progressed outside the CRC with a number of states, particularly NSW, recently having put substantial work into developing coherent strategies. It is also noted that the CRC has recently commenced a project targeting this issue. More critically, there are few projects that target **energy market reform**. This is a major opportunity for the CRC in light of the strong focus on energy market issues and the clear need for better evidence to support reform efforts and better thinking around potential solutions.

In relation to **targeted incentives and programs**, while there are many projects that provide some evidence or support for the development of these policy measures, there are few projects that have translated the research and evidence into actionable plans or roadmaps for implementation of measures (with some exceptions noted in section 2 above). Likewise in relation to **mandatory minimum standards**, while a number of projects provide evidence that may support efforts to improve standards, particularly building standards, there is an opportunity to increase impact by synthesising the relevant components of these (along with other work outside the CRC) to drive policy change (again, with notable exceptions outlined in section 2 above). The same is true for the **data, information, research, education** category of policies.

FIGURE 10. GAPS AND AREAS OF LOWER ALIGNMENT IN RELATION TO POLICIES

Stream	Projects	Policies					
		National plan	Minimum standards	Targeted incentives and programs	Data, information, research, education	Energy market	
Integrated building systems	RP1008	Industry support mechanisms for renewable heating and cooling					
	RP1023	Forecasting and energy analysis in residential energy management					
	RP1032	Facilitating large energy user deployment of off-site renewables					
	RP1006	Viable integrated systems for zero carbon housing systems					
	RP1009	Closing the loop on evidence-based low carbon non-resi design					
	RP1017	Validating and improving the BASIX Tool					
	RP1010/1019	CSR House & Advanced comfort index for low carbon homes					
Low carbon precincts	RP1021	Reframing building regulation					
	RP1024	Facilitating the transition to low carbon housing					
	RP2010	Low carbon inclusions in government tenders					
Engaged communities	RP2016	Impact of prices and dwelling EE on home electricity use in Sydney					
	RP2018	Retrofitting urban precincts to create low carbon communities					
	RP3001/3038	Lower income barriers to low carbon living					
	RP3002/3028	A virtual market for analysing the uptake of energy efficiency					
	RP3008	Visions and pathways to 2040					
Cross cutting	SP0008	Low carbon built environment knowledge hub					
	RP3007/3023	Opportunities and challenges for community-scale renewables					
	RP2006	FredZED – mainstreaming low carbon housing in WA					
	RP3009	High performance housing ('Josh's House')					
	RP3012	Environmental attitudes – Low Carbon Behavioural Practice					
	RP3016	EnergyFit homes initiative – empowering consumers					
	RP3017	Adelaide living laboratory hub					
	RP3029	Driving a social media conversation on energy efficient housing					
	RP3011	Community carbon reduction and wellbeing enhancement					
RP3022	Policy impediments and incentives for LCL education and training						
	RP3025	Sydney TAFE carbon reduction website					

4. Ideas for increasing utilisation and impact

ClimateWorks has identified a range of potential new projects and extensions of existing projects that could help fill gaps and increase utilisation and impact of existing work. ClimateWorks believes there is enormous potential to build on the existing work and successes of the CRC to tackle some of the most challenging issues facing the built environment sector in its transition to net zero emissions, and to take a leading role in driving policy reform and ensuring that policy conditions support and enable Australia's built environment to get on a trajectory towards net zero emissions.

This report does not aim to comprehensively assess the research needs to deliver on policies identified in the ASBEC roadmap, however a number of opportunities have been identified below, grouped into two categories:

- Making the evidence more accessible and useable
- Filling evidence gaps and translating evidence into policy impact through a range of additional activities, including:
 - Providing cross-project briefings or facilitating workshops for policy makers on relevant policy issues informed by CRC research
 - Making submissions to relevant policy processes
 - Creating joint policy platforms with industry and community partners
 - Creating authoritative 'handbooks' on key policy issues which synthesise evidence from multiple projects
 - Scaling-up or expanding successful existing projects
 - New research projects

4.1 Make the evidence more accessible and useable

Simply providing greater access to documentation could aid utilisation, while a range of options exist to synthesise, repack and improve useability of the depth of knowledge within the CRC

A detailed review of the evidence base produced through the CRC reveals an extraordinary depth and breadth of knowledge relating to barriers and solutions to accelerate the transition to zero carbon buildings. However, much of this evidence is currently difficult to access, or difficult to access in a form that is easily useable. The current CRC website does not allow searching of resources, and does not provide access to many useful documents relating to project outputs and impacts. In some cases, ClimateWorks has found it difficult to find reports, articles and other documents that record the findings of research projects. In other cases, potentially useful documents are only available in a form that does not appear to be finalised or formal, limiting their ability to be referenced or relied upon.

It is clear that the **Knowledge Hub** (SP0008) will be a critical pathway to improving accessibility of the work of the CRC. The design of the Hub is key to the ultimate impact it will have, and it will be important to ensure key end users are involved in the design process, including the research community, policy makers, analysts, building energy modellers, energy efficiency and renewable energy professionals, energy utilities, economists, engineers, architects, builders and developers, training organisations and others. It is also critical that the Hub is well aligned with other knowledge hubs such as the **Energy Use Data Model** under construction by CSIRO - data from CRC projects should if possible be incorporated into the Energy Use Data Model, and it may be that the CRC should be seeking to integrate the Knowledge Hub itself with this CSIRO project, or at least provide strong links between the two. Considering that the Knowledge Hub remains some time away from completion, the CRC could consider improving the current system for making documents and resources relating to current and previous projects more comprehensive and useable, for example by creating a searchable (ideally public) library of documents and ensuring that all finalised documents are collected therein.

At a more micro level, there are opportunities to improve the accessibility of information relating to existing projects by creating more **user-friendly communications materials** outlining key insights from CRC projects. A good example is RP3012 (Low Carbon Living Readiness Index), which provides a framework for understanding the factors that influence low carbon behaviour, and which could be better utilised by distilling this knowledge into an infographic on low carbon living motivations that could be shared via social media. Many opportunities exist to translate robust academic research currently available in the form of reports or academic posters into communications collateral.

At the other end of the spectrum, there are opportunities to synthesise insights across multiple CRC projects (and potentially relevant work outside the CRC) and repackage them into a series of '**CRC Guides to...**' or '**CRC Handbooks**' covering a range of current issues. For example, numerous CRC projects gather evidence relating to the costs and benefits of low carbon housing, and key insights from these could be synthesised into 'The CRC Guide to the Costs and Benefits of Increased Minimum Energy Efficiency Standards for Buildings'. These could be used to not only form the basis of good advice to policy makers, but also help **scale-up** successful pilots by distilling the success factors and key learnings into manuals that could be used by others. For example, RP2010, which targets low carbon inclusions in state government tenders in partnership with UrbanGrowth NSW appears to have been successful to some degree, but has no published resources and if such resources existed it might help facilitate other states adopting similar measures.

Similarly, there are opportunities to synthesise CRC insights on particular policy issues into **policy platforms**, ideally joint policy platforms in partnership with industry or community partners, that can form the basis of solid contributions to policy debates and processes. A number of opportunities along these lines are highlighted in the sections below, and ClimateWorks believes that such papers could become valuable reference guides for policy makers and industry.

4.2 Filling evidence gaps and translating evidence into policy impact

ClimateWorks has identified numerous opportunities for the CRC to fill evidence gaps and translate research into policy impact, for further consideration by the CRC

Some of the most impactful projects identified above have succeeded in translating high quality research from an academic evidence base into clear policy advice which can be used to drive policy impact. Many opportunities exist to leverage CRC projects to achieve a similar impact. A number of suggestions are provided below, grouped into the five key policy solutions in the ASBEC framework.

Another avenue to explore in order to further scope these and other options for additional CRC research is running policymaker utilisation workshops to get relevant policy makers together, brief them on the key findings of relevant projects, and collaboratively plan policy-implementation-focused extension projects that utilise existing CRC findings to provide clear, actionable policy advice. These workshops could be focused on particular projects to engage with policy makers on how the projects could be utilised to address policy challenges (e.g. RP3002/3028, which provides a tool for policy makers to assess the potential impact of existing policies and optimise program design) or on particular policy areas to collaboratively assess the value of existing research and discuss how to fill research gaps (e.g. energy market reform).

4.2.1. Policy frameworks

Effective policy frameworks and plans has been identified through this mapping exercise as a gap area. ClimateWorks understands that the CRC has recently commenced a new project to identify best practice policies for emissions reductions across different levels of government. This project has the potential to fill this gap if it is able to provide advice that will assist policy makers in putting in place more stable and coherent policy frameworks and governance arrangements for energy efficiency and emissions policy.

4.2.2. Minimum energy performance standards

A clear opportunity exists for the CRC to influence the upcoming update to the minimum energy efficiency standards for new building work in the National Construction Code⁸. Establishing appropriately ambitious minimum standards is

⁸ ClimateWorks wishes to acknowledge that it is actively working with ASBEC to progress a project relating to the National Construction Code.

identified in the ASBEC report as an essential component of the required policy mix, and this has been acknowledged and confirmed by many others including the COAG Energy Council in the National Energy Productivity Plan⁹.

One issue that has plagued previous efforts to increase the stringency of the energy efficiency standards is debate over the costs and benefits of increased standards. The CRC could help address this issue by:

- Building on the outputs of relevant CRC projects (including RP1006, RP1017, RP1010, RP1019, RP1024 and RP1021) and other work outside the CRC (e.g. the Australian Zero Emissions House), undertaking any necessary additional work such as the research needs identified in the Scoping Work for NEPP Measure 31¹⁰, and synthesising this into a **CRC Guide to Costs-Benefit Analysis of Increased Minimum Energy Efficiency Standards for Homes**. This could be used to inform the NCC update process via briefings for the Australian Building Codes Board and other relevant policy officers, industry engagement and public communications.
- A related opportunity may be to partner with AIRAH and draw on the extensive CRC research around green construction to develop their proposed **Greener Construction Standard**, which could sit alongside the NCC minimum energy efficiency standards, encouraging builders to innovate and go beyond minimum standards. Both of these NCC-related opportunities could link in with improved training and education programs (see section 4.2.4 below).
- Drawing on the above, the CRC could seek greater participation in the Technical Working Groups established to develop the provisions for the 2019 NCC.

A gap identified in the mapping exercise relates to **Greenhouse and Energy Minimum Standards (GEMS¹¹)** for equipment and appliances. While the National Energy Productivity Plan outlines some actions to improve GEMS for priority products (Measure 30¹²), ClimateWorks understands that there is not currently any comprehensive benchmarking study of Australian GEMS compared to international standards in place in comparable developed economies. Such a study could highlight gaps and areas where Australian GEMS are lagging, quantifying the impact and proposing a course of action to address gaps and lagging areas.

4.2.3. Targeted incentives and programs

This category of policies was identified as a gap in the mapping exercise, despite notable exceptions outlined in section 2 above. The ASBEC report outlines a number of potential incentives and targeted programs that could be introduced to drive improved energy performance, and CRC research could help support the implementation of these or other programs. A number of examples are outlined below:

- Investigate the most appropriate **retrofitting incentives**, which could include research to segment existing buildings into relatively homogenous typologies and associated retrofitting strategies (building on existing work by the CRC, Sustainability Victoria¹³ and others), and analysis of the most cost-effective and impactful form of incentive (e.g. accelerated depreciation, stamp duty concessions, land tax incentives);
- Investigate the appropriate form and timing of policy incentives or other programs to encourage **fuel switching** from gas, wood and other fuels to electricity;
- Investigate the barriers to, and appropriate form and timing of incentives or other programs to accelerate uptake of **battery storage**, having first considered work already in progress by the Clean Energy Council and others;

⁹ Australian Government (2015), *National Energy Productivity Plan 2015-2030*, p 22.

¹⁰ Pitt&Sherry (2016), *Initial Scoping Work for Implementation of NEPP #31 – Advancing the National Construction Code*, available via www.nathers.gov.au/publications.

¹¹ Also referred to as Minimum Energy Performance Standards (MEPS).

¹² Australian Government (2015), *National Energy Productivity Plan 2015-2030*, p 22.

¹³ See <http://www.sustainability.vic.gov.au/services-and-advice/households/energy-efficiency/toolbox/reports/technical-reports>.

- Building on RP1008, establish a broader program of work with Standards Australia and white certificate scheme administrators to co-develop **standards and methodologies** for emerging technologies to ensure they are in place in a timely manner to facilitate the introduction of incentives (such as white certificates or ERF funding) for and rapid rollout of new technologies;
- Partner with the social services sector and other relevant stakeholders to develop an agreed set of policy recommendations and **joint policy platform on low income households**, building on relevant CRC projects (e.g. RP3001/3038), and then produce accessible, concise policy briefing documents outlining the key recommendations for policy makers and make these easily available online and ideally via relevant partner organisations particularly in the social services sector;
- Support the delivery of additional research identified through the Mid-Tier Office Pathway¹⁴, and investigate the establishment of **action plans and roadmaps** for other key market segments, including small retail and low income households.
- Utilise the low carbon precinct manual to be developed as part of RP2018 to inform the Commonwealth **City Deals**¹⁵ and **Smart Cities and Suburbs**¹⁶ programs.

4.2.4. Data, information, training, education

The CRC has collected an enormous body of data and information, and opportunities to better leverage that evidence base are discussed in section 4.1 above.

While numerous CRC projects produce information or resources that could support improved training and education, widespread delivery of this remains a major obstacle, particularly in the residential space. The CRC could consider partnering with leading home builders, industry associations and training organisations to establish a **residential construction education and training partnership**, pulling together data from relevant CRC projects (e.g. RP1010, RP1019, RP1009) and other projects external to the CRC into a high quality professional training program on low carbon design and construction. As a broader exercise, the CRC could take upon itself to develop a broader **low carbon living education and training strategy**, including proposed changes to university curriculums and training programs throughout the design and construction supply chain.

A specific opportunity exists to work with the **Australian Renewable Energy Agency (ARENA)**, which has recently had its mandate extended to include energy efficiency, to help it prioritise energy efficiency technologies and other areas for early-stage investment.

4.2.5. Energy market reform

Australia's energy market is facing enormous challenges and change. The best solution to these issues is unclear, with multiple reviews ongoing. It is clear that the built environment, as the consumer of almost half of all of Australia's grid electricity¹⁷ and an increasingly large source of distributed renewable energy generation, has a potentially powerful role to play. However, this sector is often under-emphasised in energy market reform discussions.

The CRC could establish a stream of work dedicated to synthesising relevant CRC research and potentially adding new research to create a **CRC Guide to Buildings and Their Role in the Energy Market Transition**, with a view to using this to inform existing energy market reform investigations such as the CSIRO Future Grid Forum¹⁸, the Finkel Review¹⁹, relevant AEMO and AEMC reviews and discussions through the COAG Energy Council. Such a guide could also be used as the basis for upskilling built environment sector industry stakeholders to more actively participate in these reform processes, and could potentially be undertaken as a partnership with key industry associations such as the Property Council of Australia.

¹⁴ See new.gbca.org.au/initiatives/research/mid-tier-commercial-office-buildings-pathway-project/.

¹⁵ See <https://cities.dpmc.gov.au/city-deals>.

¹⁶ See <https://cities.dpmc.gov.au/smart-cities-program>.

¹⁷ Australian Government, Office of the Chief Economist, Australian Energy Statistics, Table F.

¹⁸ See www.csiro.au/en/Research/EF/Areas/Electricity-grids-and-systems/Economic-modelling/Future-Grid-Forum.

¹⁹ See coagenergycouncil.gov.au/independent-review-reliability-and-stability-national-electricity-market.

Appendix 1 - Mapping analysis detailed table

Attachment available upon request.

Appendix 2 – ASBEC Barrier and Policy Framework

The tables below provide descriptions of barriers and policy types identified in the ASBEC report. Further details available in the full report²⁰.

BARRIER DESCRIPTIONS

Category	Sub-category	Barrier
Project Attractiveness	Technology not commercial	Some opportunities not yet commercially feasible
	Project not sufficiently attractive	Some energy efficiency projects offer a low return-on-investment that is offset by high transaction costs
	Market distortions reduce project attractiveness	Energy market does not recognise or reward value of energy efficiency and renewables
		Discounted energy pricing for large consumers can disincentivise energy efficiency and renewables
		Energy market reforms towards more fixed pricing could undermine energy efficiency and renewables
Capability	Lack of consumer resources	Particularly for low income households and small businesses, a lack of capability to investigate and implement energy efficiency opportunities and a lack of resources to meet upfront costs or source finance
	Lack of energy data and user-friendly and trusted information	Limited collection of and access to energy consumption data and lack of clear and engaging information provided in the right form and at the right time to enable consumers and investors to compare between low and high performing buildings and appliances
		Low minimum standards, and poor compliance and enforcement
	Supply chain issues	Lack of education and training in identification and implementation of energy efficiency opportunities
		Lack of valuation techniques that appropriately value energy performance and features in asset value
		Ancillary services (finance providers, lawyers and accountants) are not experienced in landing energy efficiency
		Perception that building more efficient buildings is too costly
		View amongst service providers that energy efficiency is not part of their job
		Limited availability of high efficiency equipment and appliances at reasonable cost
	Motivation	Low energy priority
Priority on other building characteristics for owners, purchasers and occupants		
Low awareness of non-energy benefits		Low awareness of potential benefits beyond energy savings
Split incentives		Split incentives prevent efficient allocation of costs and benefits between building owners and occupants
Policy frameworks		Complex governance and limited policy co-ordination resulting in regulatory uncertainty and inconsistencies across jurisdictions
	Lack of valuation of full benefits in regulatory assessment processes	

²⁰ See www.climateworksaustralia.org/project/buildings-transport/zero-carbon-buildings-policy-roadmap.

POLICY MEASURE DESCRIPTIONS

Policy measures		Description
National Plan		Including targets, clear accountability, co-ordination across different levels of government, public reporting of progress, co-ordination of research and public and industry engagement
Minimum standards	Buildings	To avoid lock-in of high-emissions infrastructure and ensure a minimum level of energy performance for all buildings which increases over time and is aligned with the long-term goal
	Equipment and appliances	
Targeted incentives and programs	Use government market power	Use of government market power in leasing and procurement to drive development of the energy efficiency and distributed energy market and accelerate and reduce the cost of deploying new technology
	Incentives for higher performance	Policies to address market distortions and externalities (e.g. carbon price, white certificates) or achieve short-term boost in market demand (product subsidies/rebates, tax incentives, planning incentives)
	Facilitation of industry leaders	Policy support for voluntary industry initiatives to share knowledge and overcome shared barriers.
	Support for least equipped	End-to-end programs for those least capable of responding, including low-income households and small businesses
Data, information, research, education	Data collection and access	Ensure adequate energy consumption data is collected and easily accessible to consumers, third parties (subject to privacy measures) and researchers e.g. through a government-administered open data platform
	Actionable information	Including building and appliance rating tools and labelling, provided in the right form and at the right time, to enable consumers to make informed decisions and to support increased investment and financing
	Training and education	Education, training and accreditation for property, design, construction and ancillary service providers
	Research	Policy support for research to address gaps in knowledge, evaluate existing measures and support improved policy-making (e.g. CRC funding, establishment of research institution)
	Support innovation and commercialisation	Support for R&D, pilots and commercialisation of new technologies, finance mechanisms & business models
Energy market reform		Addressing fundamental issues that inhibit distributed energy and energy efficiency in the electricity market

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ClimateWorks Australia is an expert, independent adviser, committed to helping Australia transition to net zero emissions by 2050. It was co-founded through a partnership between Monash University and The Myer Foundation and works within the Monash Sustainable Development Institute.