

# MAINSTREAMING ZERO ENERGY HOUSING

## PROJECT OVERVIEW



LOW CARBON LIVING  
CRC



## BACKGROUND

Residential housing in Australia is recognised as a significant contributor of greenhouse gas (GHG) emissions, with the majority of emissions being generated during the operational phase of buildings. With around 100,000<sup>1</sup> houses built each year, and with the average operational GHG emissions in the order of 7 tonnes per dwelling<sup>2</sup>, total emissions could be reduced by around 700,000 CO<sub>2</sub>-e per year if all new home were built as 'Zero Energy Homes'<sup>3</sup>. Simply put, Zero Energy Homes, (or Net Zero Energy Buildings), are designed and built to consume the same, or less, energy than they produce on an annual basis. Typically, ZEH buildings are highly energy efficient, through good design and quality construction, and include an appropriately sized roof-top solar power generation system to match their estimated power load during occupancy.

As Australia works towards meeting its carbon reduction target of zero emissions by 2050, the housing sector can play an important role in meeting this goal. Internationally the European Union and the State of California (USA) already have regulations in place to adopt ZEH for all newly constructed homes by 2020.<sup>4,5</sup> Meanwhile, Australia is still taking relatively early steps towards improving residential energy efficiency. This project aims to develop a better understanding of the construction cost implications and consumer interest of ZEH in Australia, whilst building industry support for ZEH homes amongst residential developers.

## RESEARCH TEAM

The research project is being lead by Dr Josh Byrne and Professor Peter Newman of Curtin University. The research team will include post-doctoral research staff support, plus specialist input from CSIRO and Josh Byrne & Associates. The project will also draw on the experiences from other related CRCLCL and industry projects and activities, such as [RP3029: Driving a National Conversation on Energy Efficient Housing](#), CSIRO Liveability and CSR Comfort Tune.

## CRC for Low Carbon Living

The CRC for Low Carbon Living (CRCLCL) is a national research and innovation hub that seeks to enable a globally competitive low carbon built environment sector and is supported by the Commonwealth Government's Cooperative Research Centres (CRC) programme.

With a focus on collaborative innovation, the CRCLCL brings together property, planning, engineering and policy organisations with leading Australian researchers. The CRCLCL develops new social, technological and policy tools for facilitating the development of low carbon products and services to reduce greenhouse gas emissions in the built environment. For more information visit [www.lowcarbonlivingcrc.com.au/](http://www.lowcarbonlivingcrc.com.au/)





# PROJECT ACTIVITIES & ANTICIPATED OUTCOMES

Three ZEH display homes will be built in partnership with land developers in new display villages around Australia and used for data gathering and engaging industry. The activities for this project are grouped under three stages:

## STAGE 1: RECRUITMENT OF PARTNERS

Stage 1 will focus on recruiting partner developers and builders who will be responsible for the delivery of the ZEH display homes. Recruitment will target different cities and regions around Australia (e.g. Perth, Canberra and Townsville) for the purpose of understanding the impact of different climate types and markets on cost and consumer interest. Expressions of interest to participate have already been received from a number of developers and these partnerships are currently being explored. An important part of the recruitment process of the partner builders will be to agree on ZEH and broader performance criteria of the display homes, plus formalise agreement on the methodology to capture the required data to evaluate the research questions.



## STAGE 2: DESIGN AND CONSTRUCTION OF THE ZEH DISPLAY HOMES

This phase will see the Research Team facilitate design support for the ZEH display homes, drawing on additional CRCLCL researchers and partners as required. Each display house is likely to be different in terms of product. For example, they may be single or double story, fully detached or strata with common wall and services etc. The design responses and materials used will also be relevant to the particular location. The commonality to all the projects will be there need to work to agreed performance criteria and be targeted to the volume market. Each display house builder will be required to maintain cost documentation so that the cost implications of additional features or products that are linked to increased performance can be easily assessed and reported, with acceptance by industry.



## STAGE 3: EVALUATION OF THE ZEH DISPLAY HOMES

In addition to capturing the practical industry learnings and detailed construction cost implications for the design and building phase as outlined above, information will also be collected on consumer and broader market interest in the features of the houses. A digital surveying tool will be used to enable feedback to be collected from visitors viewing the ZEH display homes and compare this to regular product of similar type in the same development. The survey will not be overtly 'sustainability' related but gather a wide variety of consumer preference data that can feed into the marketing departments of builders and developers. Video diary segments will capture the key stages of the project and will be used to communicate progress and learnings directly to industry via the CRCLCL and industry channels.



# PROJECT SCHEDULE

## Stage 1

Secure partner developers/builders who are committed to building ZEH display homes and participate in the study with agreement on the methodology.

By April 2017

## Stage 2

Facilitate design support for the builders.

From Partner engagement through to commencement of construction

Apply (and test) industry leading evidence based tools for performance and comfort communication.

By June 2017

Oversee cost estimation and documentation so that the cost implications of additional features or products that are linked to increased performance can be easily assessed and reported.

Throughout construction (to be completed by December 2018)

## Stage 3

Undertake consumer research and market evaluation on the houses, plus performance monitoring.

January 2018 – June 2018

Reporting.

By December 2018

NOTE: The above timeline should be considered as a guide only. Final timing of milestones and deliverables can be negotiated during Stage 1.

## FURTHER INFORMATION

For more information on the project, please contact:

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## REFERENCES

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