

Research Node for Low Carbon



University of
South Australia



LOW CARBON LIVING
CRC



The Research Node for Low Carbon Living, part of the Low Carbon Living CRC and based at the University of South Australia, will contribute to technological, social and economic research that will facilitate the development and utilisation of low carbon products and services in the built environment sector.

The Node is South Australia's premier hub for multi-disciplinary research into all aspects of low carbon living, which will seek to develop world class, industry driven research projects and attract higher degree research candidates across a range of areas, including, but not limited to:

- technology innovation
- energy systems integration
- building renovation
- urban design
- consumer choice making; and
- the economics of low carbon precincts

Research conducted at the Node will develop new technologies, new applications for technologies and new approaches in achieving low carbon living.

The Node connects the vast expertise at the University of South Australia with the real world challenges of anthropogenic climate change faced locally and nationally, and will partner with industry and government to develop the solutions that lead to a better and more sustainable quality of life.

The expertise and resources of the Node are available to all government and industry organisations committed to a deeper understanding of the solutions that will transform the South Australian economy towards a low carbon future.

Low Carbon Living at Lochiel Park

LIKE-MINDED COMMUNITY AT LOCHIEL PARK

Moving to Lochiel Park for their retirement was an easy decision for Willie and Elizabeth Smyth (pictured right). The couple have long aimed to live sustainably and were impressed by the sustainable elements of houses in the village.

Like all houses in Lochiel Park, their home is built with sustainable features, meaning the couple have reduced costs and demand on the electricity network.

"Lochiel Park sets a benchmark for the future of building design. We scarcely notice the extremes of outdoor temperatures. The house maintains a fairly steady temperature indoors throughout the year, and it is extremely comfortable to live in".

Retiring in an area like Lochiel Park with such a community atmosphere means the pair always has something to do.

They believe the village has brought together people with similar thinking and attitudes to urban sustainable living which has enabled the development of a cohesive community and involvement of households to generate improvements in the wider surrounds.

The community has initiated particular groups such as a Book Club, Arts Group, Community Garden and the Friends of Lochiel Park, all of which Willie and Elizabeth play a very active role in.



Willie and Elizabeth Smyth tending to their patch in the Lochiel Park Community Garden



Pam and Ken in their Lochiel Park home, enjoying the naturally cooled courtyard

SAVOURING THE BENEFITS OF SUSTAINABLE LIVING

Lochiel Park residents Ken Dyer and Pam Gunnell (pictured left) know living a low carbon lifestyle is packed with benefits for both the environment and their day-to-day lives. Having lived in the low carbon housing precinct Lochiel Park for several years, they chose sustainable living because of their values.

"We chose a low carbon living lifestyle because we anticipated being able to achieve greater energy efficiency. We care about looking after the planet, and in the process we save money".

The house has a range of features including a northern facing orientation which assists in keeping the house warm in winter and cool in summer. The windows have eaves and awnings to prevent summer sun on windows, and

the roof is fitted with solar panels and whirlies that evacuate heat.

Double glazed windows, heat absorbing tiles and efficient insulation also help keep the house at a comfortable temperature all year round.

Ken and Pam are able to consistently keep their energy usage down, and feel they are helping change the world for the better.

They believe the Lochiel Park community reflects these values.

"We live among people who take environmental issues seriously and therefore have values in common with us".

Research Capabilities of the Node

Human impact on the global climate is most likely the greatest economic, social, political and environmental challenge facing this generation and our immediate future generations. In the context of global climate change, research into solutions for low carbon living has never been more important.

An urgent issue

What we build and how we operate our buildings has a huge impact on the environment and on our quality of life. In Australia, the carbon embodied in building materials combined with the operation of buildings is responsible for around 40% of national emissions. The quality of our built environment, particularly our ability to maintain affordable thermal comfort, has a direct impact on our physical and mental health.

The University of South Australia, under the guise of the Low Carbon Living Research Node, is leading the charge to find solutions to low carbon living, and is helping industry and government transition to better business models and apply new technologies and practices. UniSA researchers are conducting critically important research to support policies that deliver improved environmental, social and economic outcomes to all South Australians.

Learning by example

A good example is our research at Lochiel Park, Australia's most environmentally sustainable community. The Lochiel Park Green Village represents a genuine attempt through government policy processes to create a suburb of (nearly) zero-energy homes in a near zero-carbon estate.

The development includes 103 highly energy efficient homes of various sizes, all utilising solar thermal and solar photovoltaic sources, and built to stringent environmental urban design guidelines. The energy used and generated at each house is being monitored and analysed to extend our understanding of what happens when families bring their energy habits to near zero-energy homes. Appliance and equipment audits are conducted to extend our knowledge of the energy services utilised in contemporary digital-age lifestyles.

Low carbon living results

Our research shows that Lochiel Park

households use significantly less energy per unit floor area than similar age homes, the average for South Australian homes, or the national average. This is due to a combination of factors including a more thermally efficient building fabric, the application of passive solar design, higher lighting and appliance efficiency, and the use of solar technologies.

Not only are the homes cheaper to run, but they remain more comfortable even in the extremes of summer heatwaves and winter chills. The results show that the average Lochiel Park house uses about 63% less electrical heating and cooling energy than that used by nearby monitored houses, and although each household differs in their perception of thermal comfort, Lochiel Park families switch on heating and cooling a third less days than nearby monitored households.

From a policy perspective, our research shows that all South Australians would be better off if we moved to low carbon living, with a net economic benefit of over \$1.28 billion if we transitioned new construction to a net zero energy standard similar to those at Lochiel Park. Most importantly, residents love low carbon living. Our research shows residents value taking action on climate change, enjoy improved levels of thermal comfort and low energy bills, and value the sense of community created at Lochiel Park.

Research Partners

As well as working with local end users, the Node will connect with researchers nationally and internationally to seek solutions. The Node will work collaboratively with other CRC-Low Carbon Living supported research hubs, such as the Curtin University Node of Excellence in Regenerative Cities which focuses on city planning and policy issues, and the Swinburne University Node of Excellence in Low Carbon Built Environments which plans to work on precinct design, materials and community engagement.

The Node will also draw on and expand the research program of the Adelaide Living Laboratory, an initiative already funded by the CRC-LCL, which is increasing our understanding of how Lochiel Park, Bowden and Tonsley urban developments are helping to transition to a lower carbon impact built environment.

Key research tasks

Our research will assist industry and government transition to zero carbon homes and estates, help create low energy and highly productive workplaces, and encourage the transition to healthy walkable cities where urban design puts people ahead of cars.

Our research will incorporate techniques such as choice modelling to understand how consumers make purchase decisions in relation to cleantech and to link this with the benefits to the community and local industry (wellbeing, health, economic and environmental). We will assist our partners to understand the value propositions that will encourage the adoption of low carbon urban design principles, products and solutions.

The Research Node for Low Carbon Living will allow UniSA to extend our working relationship with industry and government, research new solutions, and build the evidence base to help all of us transition to low carbon living.



NURTURING A THRIVING FAMILY THROUGH CONNECTING TO NATURE AND COMMUNITY

Since becoming parents, Fern Hudson and Andrew Adair have wanted to build a family home which was sustainable and close to nature to raise their family in. Within hours of hearing about Lochiel Park, the pair knew it was the perfect community for their family.

"We instantly fell in love with the area; surrounded by and integrated with nature, the uniqueness of the architecture and the addition of the community garden."

Andrew and Fern also thank their move to Lochiel Park for improving their lifestyle, saying it has enriched their "connectedness to community".

"We live in an environment where people of all generations work together to create a beautiful place to live. We ride bikes and catch public transport more often, which is much less stressful than driving."

Living in a house connected with nature means they have reduced their carbon footprint and energy bills. The house makes the most of its surroundings by being orientated to best utilise the changing position of the sun, and it's also fitted with solar panels to power the house.

The family say they are now also more aware of nature.

"We love seeing the effect of the seasons on the lakes. It makes you very aware of how much it has, or has not, rained. Also seeing and hearing the birds and frogs, we often find a frog on our front path after it has rained"

More information

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The Research Node for Low Carbon Living is supported by:



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CRICOS provider number 00121B