

Australian-first study at Fairwater shows power saving benefits of geothermal tech

Residents in flagship Frasers Property community in western Sydney reap rewards

- ◆ Three-year study of 750 homes at Fairwater community showed **21 per cent reduction in annual electricity consumption**
- ◆ Findings will **inform government policy** and be shared with other developers
- ◆ One of the **largest geothermal installations in the southern hemisphere**
- ◆ Technology can potentially help smooth grid peaks thanks to reduction in peak demand

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Homes at Fairwater, a world-leading sustainable community in western Sydney by Frasers Property Australia, use 21 per cent less electricity than comparable nearby suburbs because of geothermal technology, an independent study has found¹.

The \$1.64 million, three-year project known as the **Fairwater Living Lab** was funded by the Australian Renewable Energy Agency (ARENA), Frasers Property Australia and the NSW Office of Energy and Climate Change and examined the effects of ground source heat pumps which deliver geothermal heating and cooling, installed in 750 homes at the Fairwater community.

The study was led by Climate-KIC Australia and carried out by researchers from University of Technology Sydney and Curtin University. The findings of the study will now inform government policy and encourage broader industry adoption of the efficient energy geothermal infrastructure.

Ground source heat pumps use the stable ambient temperature below ground to heat and cool homes. In summer the units take heat from inside the home and transfer it via a series of underground pipes to the ground for cooling before returning it to the home. In winter they take natural heat from the ground and reverse the process.

The study found that when installed at scale, and at the beginning of the building process, the technology can be both a profitable and environmentally beneficial addition to a home. The ground source heat pumps added value to houses, and reduced power consumption by 21 per cent on average, as compared to nearby homes without the technology.

The project, which spanned three years from September 2019 to August 2021, and encompassed the Sydney COVID lockdowns, also found that the demand reduction aspects of the geothermal technology had the potential to “smooth out” electricity grid usage, which could help avoid spikes that can lead to blackouts and power cuts in extreme weather. Fairwater homes recorded an average of 3kW of avoided power demand per household during critical peak events².

While the study focused on the benefits of the ground source heat pumps, it also looked at the other environmentally sustainable aspects of Fairwater, including its light-coloured roofs. It found that the roofs already produced a cooling effect of three to four degrees. As trees at Fairwater mature it is expected the ambient temperatures in the community will reduce even further.

¹ <https://climate-kic.org.au/wp-content/uploads/2022/06/Fairwater-Living-Lab-Residential-Heat-Pump-Study-Annual-Public-Report.pdf>

² <https://climate-kic.org.au/wp-content/uploads/2022/06/Fairwater-Living-Lab-Residential-Heat-Pump-Study-Annual-Public-Report.pdf>

Fairwater is located on a 38-ha former golf course and features 9.5-ha of open space and 3.5-ha of wetlands. The picturesque surrounds include lakes and ponds, boardwalks, walkways, cycleways, pramways, playgrounds, learn-to-ride bike track and connections to local transport and shopping amenities.

Professor Leena Thomas, Research Project Lead, University of Technology Sydney says the research offers a number of insights in relation to environmental performance as well as occupant behaviour and experience

“It is pleasing to see that the research demonstrated clear energy benefits from geothermal technology and high ratings for comfort in the Fairwater homes.”

“An overwhelming majority of residents at Fairwater also reported that living in the precinct has had a positive effect on their health and wellbeing.”

“Our findings highlight that an integrated precinct-based approach for incorporating sustainability and energy efficient technologies when combined with an understanding of occupant practices offers the best pathway for decarbonisation and getting beyond net zero.”

Cameron Jackson, General Manager Development NSW, Frasers Property Australia says the company has an ambitious target of being net zero in development and operation by 2028, and that means investigating new technology and spending the time to analyse and evaluate it.

“This has been such an interesting project to support, and watch unfold,” he says. “We were confident the installation of geothermal heating and cooling technology in our Fairwater homes would help our customers reduce their energy consumption, and their bills, and now we have confirmation of that.

“We will use the findings of this ground-breaking study to guide us on our pathway to net zero.”

The study found installing geothermal technology at scale at Fairwater added additional upfront cost to the construction but combined with other environmentally friendly features of Fairwater homes, it contributed a cost saving the users and value to the properties at completion.

Belinda Whelan, Director of Strategic Projects, Climate-KIC Australia says the study will provide governments and the property industry with solid information on which to base their geothermal decision-making.

“The built environment sector in Australia has a really important role to play in helping Australia meet its net-zero ambitions. Studies like Fairwater provide policy makers and the property sector with deep insight and data to guide informed decision-making to make rapid change at scale,” she says.

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About Frasers Property Australia

Since 1924, Frasers Property Australia has created stronger, smarter, happier neighbourhoods. We are one of Australia’s leading diversified property groups and an Australian division of Frasers Property Limited.

We develop residential land, housing, and apartments and have delivered over 145,000 homes during our legacy; and develop build-to-rent, commercial, retail and mixed-use properties. Our activities also encompass the ownership and management of investment property, incorporating property and asset management services.

We work sustainably to ensure the places we create leave a positive environmental legacy and enhance the way people live life together. Frasers Property in Australia has certified over 7.2 million square metres of Green Star space across our communities, and our commitment to reduce carbon has been approved by the global Science-Based Targets initiative. We are also certified by the Australian Government’s Climate Active initiative. Frasers Property Australia owns Real Utilities, a licensed Australian energy retailer that owns and manages energy infrastructure within some of our communities with the mission to be greener, cheaper and simpler.

We value diversity and firmly believe that together, we're better. We employ over 500 people nationally and are recognised as an Employer of Choice for Gender Equality by the Australian Government's Workplace Gender Equality Agency.

To find out more about Frasers Property Australia, visit frasersproperty.com.au or follow us on [LinkedIn](#).

About UTS and the Faculty of Design, Architecture and Building

The University's vision is to be a leading public university of technology recognised for our global impact. It is a dynamic and innovative university, ranked by the Times Higher Education as Australia's top young university, and located centrally in one of the world's most liveable cities. With a culturally diverse campus life and extensive international exchange and research programs, UTS prepares graduates for the workplaces of today and tomorrow.

The University's mission is to produce the highest quality education for the professions at both undergraduate and postgraduate level and to carry out research and consultancy of relevance to the professions, business, government and the wider community.

The Faculty of Design, Architecture and Building (DAB) is a creative and vibrant faculty. The Faculty is known for impactful research, a strong focus on industry and global engagement and a distinct model of collaborative learning. The Faculty provides high quality, innovative programs of research, teaching and professional education to clients of diverse backgrounds, both nationally and internationally in a spectrum of related disciplines.

For more information on UTS, please visit www.uts.edu.au and for the Faculty of Design Architecture and Building see <https://www.uts.edu.au/about/faculty-design-architecture-and-building>.

About Curtin University

Curtin is an innovative, global university known for its high-impact research, strong industry partnerships and commitment, ranked in the top one per cent of universities worldwide in the highly regarded Academic Ranking of World Universities 2022.

Curtin's vision is to provide richly interactive and personalised learning experiences for our students, equipping them with leadership skills for the future and valuing them as partners in education and research. Through high-impact research in areas of strategic importance, we aim to deliver outcomes of significant value to our communities locally, nationally and globally.

The Curtin University Sustainability Policy Institute is a leading-edge, internationally recognised research, teaching and policy advice provider in sustainability with an innovative approach to its implementation through demonstrations and partnerships with business, government and the community. Our pillars of sustainability cover four key areas: sustainable cities, participatory sustainability, green innovation systems and resilient systems.

About Climate-KIC Australia

Climate-KIC Australia (CKIC) is an independent, not-for-profit organisation established in 2017. We play an orchestrating role, often together with delivery partners, to develop and deliver transformative systems innovation activities with diverse sets of stakeholders. Together with our collaboration network, we bring systems change intent and agency, working with diverse stakeholders using a broad range of skills, capabilities and knowledge that increases the effectiveness and scale of our impact.

For more information on Climate-KIC Australia, please visit climate-kic.org.au or follow us on [LinkedIn](#).

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