GEELONG SUSTAINABILITY

Climate Safe Rooms Executive Summary

Climate Safe Rooms

Building resilience to extreme weather

September 2023

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Accessibility
This document is available in PDF format on Geelong Sustainability website.

Declaimer

Geelong Sustainability acknowledges that we walk upon the traditional lands of First Nations peoples. We pay our respects to them and recognise the continuing gift of their cultures to the life and spirit of Australia. Sovereignty has never been ceded. It always was and always will be, Aboriginal land.

The Climate Safe Rooms project aimed to retrofit one room in a household to create a safe haven in the homes of individuals most vulnerable to the health impacts of climate extremes. The project also sought to improve home energy efficiency and explore its benefits for energy use, thermal comfort, and overall well-being.

Research shows 6.5% of deaths in Australia are attributed to cold weather, and that the average temperature value of nearly 85% of the homes across Victoria is below 18°C during winter, which is the "safe and well-balanced" indoor temperature according to World Health Organisation. Geelong, with its extreme temperature variations and poor energy efficiency standards, provided the context for this initiative.

Geelong Sustainability led the Climate Safe Rooms initiative, which received financial support from the Victorian Government's Climate Change Innovation Grant. The project was conducted through collaboration with City of Greater Geelong, CSIRO Uniting and ecoMaster.

The project focused on retrofitting one room in the homes of eligible residents who faced financial constraints and chronic health conditions exacerbated by climate conditions. The initiative aimed to provide a cost-effective solution for reducing energy costs and improving living conditions and health. This project was initiated

The houses underwent initial evaluations using the Nationwide House Energy Rating Scheme (NatHERS) and Residential Efficiency Scorecard Assessments. Based on these evaluations, upgrades were planned to optimise thermal performance within the allocated budget in the most frequently used room in the house, typically the living or dining room. The implemented upgrades encompassed measures such as draught proofing, insulation, energy-efficient lighting, and highly efficient reverse cycle air-conditioning systems, as well as solar systems to cover the energy usage of the air-conditioners. The pre and post-retrofit data included self-reported surveys, energy billing records, energy distributor metering data by Powercor, solar generation data from Solar Analytics, and temperature readings from the CSIRO Smarter Safer Homes sensors.

The project was planned from July 2018 to February 2019, with participants recruited by July 2019. However, COVID-19 caused significant delays, and the home energy efficiency upgrades were completed in July 2021. Data monitoring continued until December 2022, and the data analysis and report were finalised in September 2023.

The outcomes of the Climate Safe Rooms project have been remarkable. Participants reported increased comfort, health, and happiness. Participants reported feeling 33% more comfortable during winter, even without the use of heaters, due to insulation and draught proofing. They also experienced 142% fewer days where they felt cold. In hot weather, participants felt 100% more comfortable and encountered 75% fewer days where they experienced discomfort from excessive heat. The enhanced thermal comfort resulted in positive effects on participants' health and well-being with participants reporting reduced levels of depression, anxiety, pain, and discomfort. They also exhibited increased activity levels, higher self-care ability, and fewer visits to doctors.

Participant satisfaction with the program was notably high, with 77% strongly agreeing that they felt more comfortable in their homes during both summer and winter. Additionally, over 70% strongly agreed that they experienced reduced energy bills and benefited from the program, expressing a willingness to recommend it to others.

Another significant outcome of the upgrades was a substantial reduction in energy consumption. Electricity bills were reduced by an average of more than 45% in the months of summer when solar PV efficiency is at its peak. Furthermore, the solar PV systems generated an electricity surplus of 3,226 kWh per year, resulting in an additional annual saving of $168 in electricity bills per household. The upgrades also led to decreased gas consumption, especially during the colder months of the year. Households that switched from gas heater to electricity experienced up to 52% less gas usage throughout the year. In summary, an average participant saved approximately $1,462 on health and energy combined.

Moreover, the upgrades resulted in reduced exposure to unhealthy temperatures. On average, exposure to temperatures below 18°C decreased by two hours per day in 2021 and one hour per day in 2022. In terms of summer comfort after the upgrades, houses were exposed to six and half hours less time at temperatures exceeding 30°C in 2022. These findings strongly support the need for a larger-scale project that can replicate and expand upon the positive outcomes of the pilot study.

The success of the Climate Safe Rooms project has gained recognition through media coverage and presentations, creating opportunities to share the project's success and inspire others. The advantages of the Climate Safe Rooms project go beyond creating a comfortable environment for participants; the flow-on economic and health implications include a lighter load on the public health system, and an overall happier, healthier, more equitable community. A similar study[1] found that the upgrades resulted in cost savings of $887 per person in the healthcare system over one winter period. A cost-benefit analysis indicated that the upgrades would yield net savings of $4,783 over 10 years by saving on energy costs and reducing healthcare expenses.

In summary, the Climate Safe Rooms project has achieved significant improvements in health, sustainability, and energy savings for vulnerable households in Geelong. Looking ahead, the project has the potential for expansion on a larger scale. The initiative's cost-effective approach, targeting those most in need and retrofitting only one room, sets a replicable model that can be implemented across municipalities in Victoria and beyond. Geelong Sustainability aims to secure further support and funding from both State and Federal Governments to scale the project and deliver 1,000 retrofits for vulnerable households.

[1] The Victorian Healthy Homes Program conducted by Sustainability Victoria delivered thermal comfort and energy efficiency upgrades to 1000 homes of low-income Victorians with a health or social care need. It ran over three study years (2018, 2019, 2020) across western Melbourne and the Goulburn Valley.