

The Hot Topic in Australian Design

Why We Must Re-evaluate our Approach to Heating in Modern Design



ComfortHeat
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Introduction

Open plan design is prominent within the Australian housing market. It combines living, kitchen and dining areas to create both a functional and aesthetically pleasing area.¹ Open plan design often connects internal and external areas,² brings the “outside in” and allows more natural light in whilst creating the illusion of more space.

A survey by the Real Estate Buyers Agents Association of Australia (REBAA) has revealed open plan living is at the top of the list for what makes a “perfect home” in Australia.³

“In Melbourne the demand is for alfresco dining, stylish, modern and bright design features with lots of natural light and stone bench tops,” said REBAA president Rich Harvey



Certain design elements of modern design are problematic due to their thermal mass, which is the ability of a material to absorb and store heat energy

The challenges

While these floorplans suit Australia’s moderate daily temperatures of Spring through to Autumn, in Winter they pose a major challenge to keep warm.

Certain design elements of modern design are problematic due to their thermal mass, which is the ability of a material to absorb and store heat energy. A lot of heat energy is required to change the temperature of high density materials like concrete, bricks and tiles.⁴ In contrast, large windows capture heat in summer but quickly lose it in winter, with up to 40 per cent of a home’s heat lost through

the windows.⁵ A single pane of glass can lose almost 10 times as much heat as the same area of insulated wall.⁶ Furthermore, heating or cooling an open, large space without walls and doors will use more energy.⁷

Open plan’s combination of slow-heating high density materials such as marble bench tops and tiles, open spaces and large windows from which heat is lost sees what little heat may be stored in the house from the sun or a heater, quickly lost. This can make for large heating bills and a cold, uncomfortable house.

Eliminating comfort

The cost of building and property costs are putting increasing pressure on budgets. Building a house today costs four times more than it would have over twenty years ago⁸ and construction costs have risen, particularly in the past 10 years.⁹ The increasing cost of property is also relentless. Between the 2015 June quarter and September quarter, residential properties in the eight capital cities rose an average of two per cent. Year on year, the quarter saw a whopping 10.7% increase in property prices.¹⁰ Needless to say, the compounding effect of these price rises are putting architects and their budgets under the pump.

Unfortunately, this may prompt substitution of high quality and effective materials or systems for cheaper and inadequate materials. Particularly at risk are minor, or sub-system components hidden within walls, floors, and ceilings, which are not visible and less likely to be scrutinised upon inspection.¹¹ Cost-pressure may also see furnaces and AC units without enough capacity installed, despite the need for all the systems in the house to be adequately sized and powerful enough to handle their jobs.

This leaves occupants with little choice but to spend money on modifying their new home with add-on elements to keep their home comfortable. This includes covering tiles with carpet, windows with curtains and blinds, cluttering walls with wall radiators and retrofitting central heating systems and ceiling insulation.



Long term challenges

Opting for cheaper, inadequate options in a design has contributed to a systemic problem within Australia's housing supply, with much of Australia's housing stock simply unable to meet the demands of its climates.

Surprisingly though it is not the famed Australian heat which is of greatest concern. A study from medical journal The Lancet found that cold weather contributes to 6.5 per cent of deaths in Australia, with the heat accounting for just 0.5 per cent.

Experts agree that these deaths are preventable and come as a direct result of Australia's poor housing construction, maintaining over 1,000 lives could be saved if Australian housing was better constructed and better insulated.¹²

Basic insulation measures which improve thermal performance will not only help save lives, but assist in significantly reducing energy bills, with households that achieve a five star energy rating cutting their energy bills by about 40 per cent.¹³

This is particularly worthy of attention in Victoria, where the housing stock averages at a worrying two star or less energy rating, meaning most Victorians are using more energy and spending more money than they should just to keep their homes at a liveable temperature.¹⁴



The solution

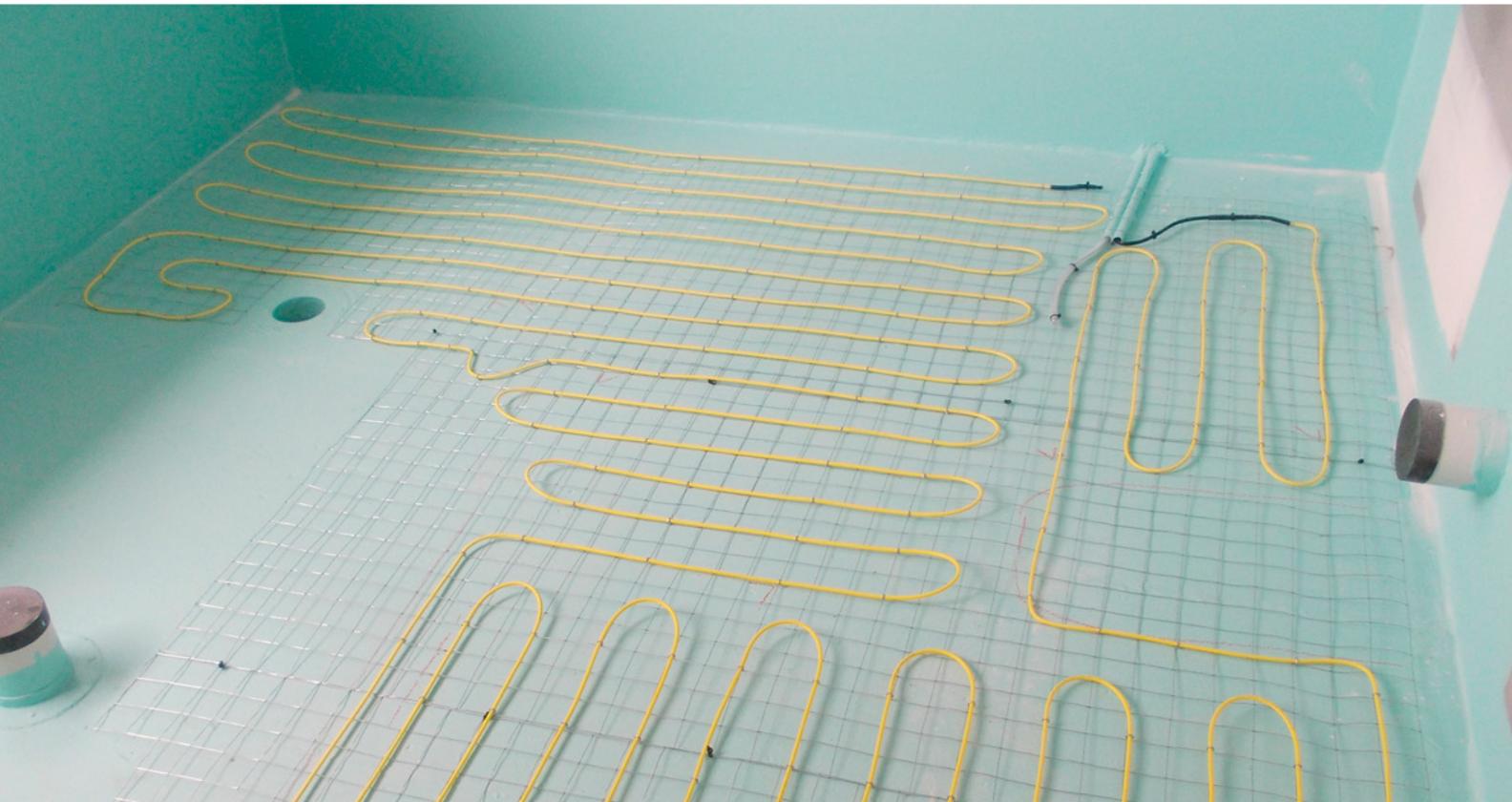
Australia's housing stock needs architects to not only cater for a client's aesthetic desires, but also for the end users' needs. A well-designed home needs to be a comfortable and practical living space, in all seasons. Architects can achieve this by specifying year-round temperature control systems that are cost effective to build and run, in addition to Passive Design measures.

The most efficient means of keeping a home at an optimum temperature is Passive Design. Passive Design takes advantage of the climate, utilising natural sources of heating and cooling to maintain a comfortable temperature range in the home. It minimises the need for additional heating or cooling by effectively 'locking in' thermal comfort, resulting in low heating and cooling bills. Passive Design is most effective and economic when it is incorporated into the initial design and building process. Options include insulating the ceiling, walls and floor, sealing draughts around doors and windows, allowing winter sun to warm the house through north facing windows and using natural airflow to help with cross-ventilation.¹⁵

Floor heating systems are an efficient and cost effective heating system for open plan design. Floor heating is a low heat system laid underneath flooring and provides an even heat throughout the property without dust, noise, air movement, dehydration or overheating. Installed under the floor, the system can heat from one square metre up to a factory floor, meaning it is a great option for open plan, when large spaces require heating. It can be used for residential and commercial properties and doesn't waste energy to heat non usable spaces (such as ceilings) or by producing excess heat. Floor heating can be electric or hydronic and use sources such as gas, a heat pump, solar or a wood stove. Unlike many heating systems, floor heating can be managed to provide the maximum level of comfort and has floor and room sensing capabilities so the user can set the heating to their level and budget.



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The options: Electric and Hydronic

A number of options exist that provide effective heating solutions for even the most spacious of open plan designs, with the first choice being between electric and hydronic heating.

Electric floor heating: is a simple and effective heating solution for small and large areas. Electric floor heating is gentle, ambient and in bathrooms, one of very few safe heating options. Heating bathrooms with electric floor heating can be programmed with a digital thermostat so it can be switched on at the beginning of winter. It will automatically turn up and down throughout the day, guaranteeing warm floors when they are needed and it will switch off to save power when not required. Electric heating can also be used under carpet and floating timber floors. These heating mats are easily installed and create a warm radiant heat that is comfortable and healthy.¹⁶

Hydronic floor heating: Hydronic Floor heating is energy efficient, ensuring running costs are kept under control. Hydronic floor heating relies on pipes laid in the concrete slab or screed to carry heated water. The water can then be heated by various energy sources. The most efficient is a natural gas boiler, but other sources can be used such as electric heat pumps, geothermal heat pumps, wood fired stoves and to a more limited extent solar hot water systems.¹⁷

Comfort Heat Australia are experts in both electric and hydronic floor heating systems and stock the full range of world leading hydronic and electric underfloor heating products to suit all your heating needs, for all floor coverings. Comfort Heat can provide the most effective and efficient heating solution for your project, from large industrial projects to small bathroom renovations.

Australia's housing stock and the wellbeing of those occupying it relies on the decisions of architects. Despite increasing cost pressures, an architect has a responsibility to provide a plan which meets the needs of its end user. It is vital to bring up the standard of Australia's housing by ensuring year-round temperature control systems form an integral part of designs. To find out how to ensure your design caters for Australia's weather year-round, contact the experts at Comfort Heat Australia.

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