

Life Cycle Assessment

Think Brick Australia's commissioned report looks at the environmental impact of building and living in a house.



What does an 8-Star House look like?

The external cladding used on a house creates little difference to total emissions, so when Daniel Smee built his 8-star home he decided on brick because of its superior thermal mass (See page 44).

To understand the true environmental impact of building and living in a house, you need to look at more than simply what it's made of. You even need to look further than how the building products were actually manufactured. In fact, examining everything from how they were transported to how people go on to live in the house in the decades that follow, and even what happens during the end-of-life disposal process is also crucial - particularly if you're interested in making a comparison between different building materials.

Which is where Think Brick Australia comes in.

Two years ago, Think Brick Australia commissioned Energetics to undertake a total Life Cycle Assessment (LCA) of the brick industry to not only calculate the environmental impact of clay bricks, but to accurately compare how different building materials stack up against each other. ▶

Putting the focus purely on brick, compared to heating, ventilation and air conditioning, a brick wall represents just

5%

of the emissions in a typical Australian home.

► The goal was that the advantages and disadvantages of both heavy and lightweight construction methods would be fairly balanced across all four stages of a building's lifecycle – extraction and manufacture, transport and construction, the operation of a lived-in house over a 50-year period and finally, demolition and disposal. Taking all four stages into account means that the LCA is revolutionary.

Up until now, previous LCAs of building materials have either stopped at the gate of the manufacturing facility, or, even when they have incorporated a 'cradle-to-grave' way of thinking, examining manufacturing, construction and demolition, they've failed to include the impact of actually living in the building. While these methods and measures are sufficient to make like-with-like comparisons for many products, for building materials only a total LCA – one that combines both embodied and operational energy emissions – is accurate. Embodied emissions being the energy used and greenhouse gas emissions produced in the manufacture and construction of a building; and operational energy emissions being those produced by the operation of everything from the home's heating and cooling systems, its lighting, appliances and even what it takes to heat the water, over the lifespan of the building.

The final report, released in February, paints an interesting picture.

Confirming that household-produced emissions far outweigh the emissions produced during the construction process, the report's findings also reveal that the type of walling material used has very little impact on the total emissions created by a house. In fact, the embodied emissions of the average home represent just 11 per cent of the

total emissions over a 50-year life cycle, regardless of walling material. But putting the focus purely on brick, compared to heating, ventilation and air conditioning (which account for 51 per cent of a home's emissions) a brick wall represents just five per cent of the emissions in a typical Australian home.

Looking specifically at the cradle-to-grave construction emissions, the LCA found that on average, they're between 64.4t CO₂-e for an insulated timber weatherboard house and 67.4t CO₂-e for an insulated brick veneer home.

Not only is this an incredibly small difference, the study also found that when total emissions over 50-years are taken into account, these can be offset

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if it's been well designed, and used in an energy-efficient way.

These findings are significant because they demonstrate that improving how houses are designed and how they operate is currently the most effective way to reduce greenhouse gas emissions produced by residential homes. With conclusive evidence that the external cladding used on a house creates very little difference to the total emissions, it helps to reinforce that it's how a house is designed and lived in, rather than building materials or construction methods used, which is the most important issue in the residential housing carbon debate.