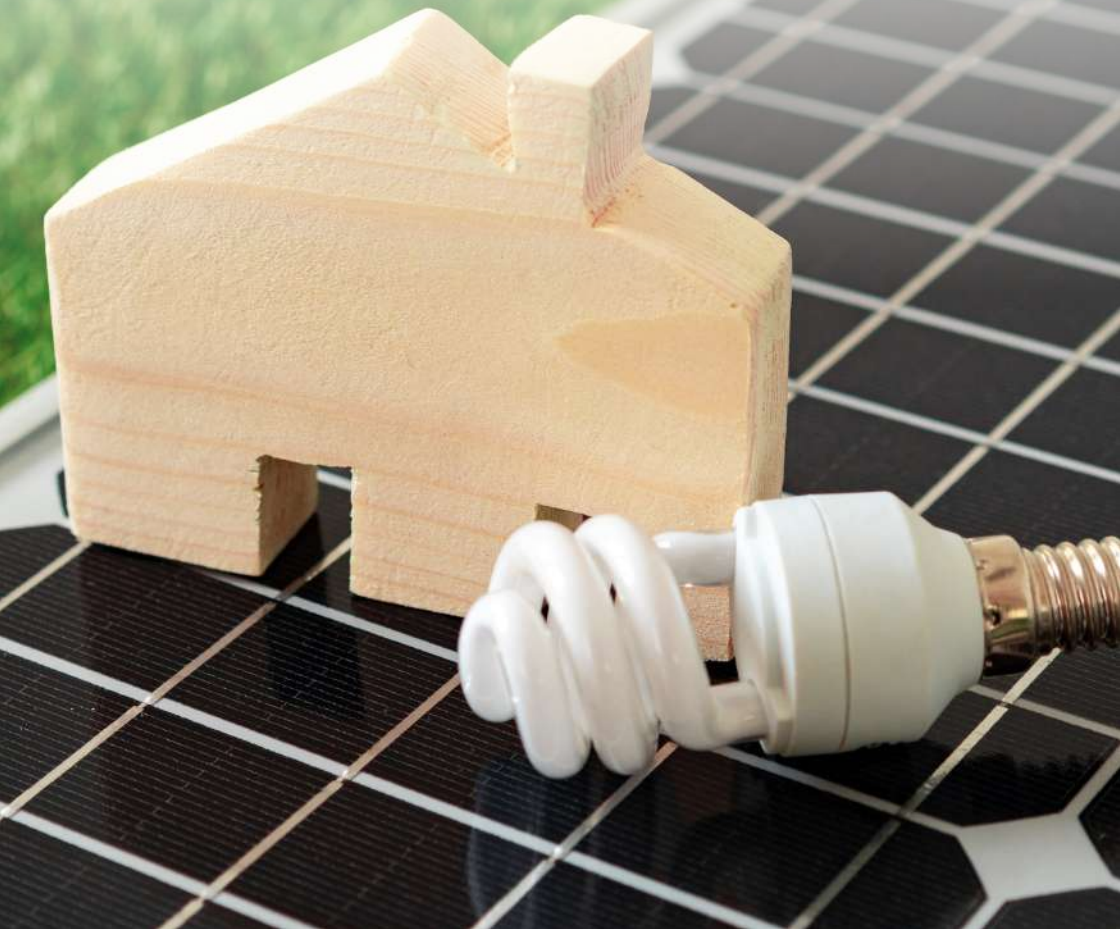
HOUSE RELOCATION
MARKETPLACE

From Wasteful To Resourceful

The case for relocating homes instead of building new ones



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From Wasteful To Resourceful

House Removal and Relocation

What is house removal and relocation? Put simply, it is the process of dismantling an existing dwelling, stripping the house of its roof, guttering, down pipes and other external fittings and fixtures, such as water, sewage, gas and electrical connections, cutting the house into sections, loading these sections onto the back of specialized trucks and transporting them to a new location.

At the new location, each section of the house is painstakingly and meticulously maneuvered into position and reconnected as it is lowered onto temporary frames or new footings.

House relocation is recycling at its finest, and that's important, especially in today's world, where every action we take impacts the planet.

Recycling, upcycling and sustainability are what this decade is all about. All three revolve around reducing waste and promoting the efficient use of resources, but each has different meanings and applications.

Upcycling is the process of transforming something that would otherwise be discarded or sent to landfill into new and useful products with a higher value or quality than the original item, such as turning old clothing into new fashion accessories or creating furniture from reclaimed wood.

Recycling is the process of converting waste materials into new products by breaking down the original material into its component parts, which can then be used to create new products. For example, plastic bottles can be recycled into new plastic products. Recycling is an important strategy for reducing waste and conserving resources, but it requires a significant amount of energy and resources to collect, sort, and process the materials.

Sustainability involves taking a long-term perspective and considering the environmental, social, and economic impacts of our actions. It involves meeting the needs of the present generation without compromising the capability of future generations to meet their needs. This requires balancing the use of natural resources with their preservation for future use and fostering economic growth and stability in a way that does not deplete resources or harm the environment. In the context of waste reduction, sustainability means promoting a circular economy.

The Circular Economy

The circular economy is an economic model that aims to minimize waste and maximize the use of resources by keeping products, materials, and resources in use for as long as possible. The goal is to create a regenerative system that benefits the environment and the economy.

The circular economy is based on the principles of the 3Rs: **Reduce, Reuse, and Recycle.** These principles are applied throughout the entire lifecycle of a product, from design and production to consumption and disposal. The circular economy employs a waste hierarchy framework (see image below) that prioritizes waste reduction and management strategies in order of environmental impact. By applying these principles, the circular economy aims to create a closed-loop system where resources are continually reused and waste is minimized.

Source:
https://closedloop.com.au/what-is-the-circular-economy/

Another key aspect of the circular economy is the use of renewable energy sources, such as solar and wind power. By using renewable energy, the circular economy aims to reduce greenhouse gas emissions and mitigate the impact of climate change.

The circular economy has several benefits, including:

- **Reduced waste:** keeping products and materials in use for as long as possible, reducing the amount of waste that ends up in landfills and preserving natural resources.
- **Increased resource efficiency:** by reusing and recycling materials, the need for new resource extraction is reduced.
- **Economic growth:** new business opportunities and jobs are created in areas such as recycling, remanufacturing, and renewable energy.
- **Reduced greenhouse gas emissions:** reducing waste helps to mitigate the impact of climate change.
- **Improved resilience:** resilience grows through reducing reliance on limited resources and promoting the use of renewable resources.

Australia's National Waste Recovery Plan aims to achieve an 80% average recovery rate from all waste streams by 2030.
Relocating a house fit perfectly into the notion of a circular economy and the waste hierarchy framework because you are:

- Reusing an existing product
- Recycling an existing product
- Reducing waste
- Avoiding demolition and new construction

Where do demolition and new construction sit in the circular economy and waste hierarchy?

According to figures from the Australian Bureau of Statistics, there were 107,294 residential buildings approved for demolition in Australia in the five years leading up to and including 2021. Of those, 95.1% were houses, with Victoria and NSW recording the highest figures. The figures further indicate a steady rise in demolition over that 5-year period, with the highest number of dwelling demolition approvals in the March 2021 quarter.

Why is this important? Because demolishing a house (or any sort of building) creates more waste, landfill, and carbon emissions. It is the opposite of what the circular economy is trying to achieve.

Construction and demolition waste

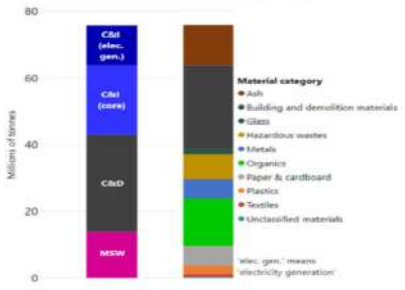
According to the 2022 National Waste Report during the 2020-2021 financial year, Australia generated 75.8 Mt (million tonnes) of waste. Of that waste, 25.2 Mt were building and demolition materials. This is a 25% increase on the figures for 2016-2017, where the building and demolition materials accounted for 20.2Mt.

Building and demolition materials waste include asphalt; bricks, concrete and pavers; ceramics, tiles and pottery; plasterboard and cement sheeting; uncontaminated soil, sand and rock; rubble. (Note - Contaminated soil waste generated by the construction and demolition industry is not included in these figures, as it is accounted for separately in the hazardous waste category.)

In 2020–21 about 5.71 Mt of metals waste was generated in Australia. The commercial and industrial (C&I) stream generated about 50% of that, with approximately 25% being generated by Municipal Solid Waste (MSW – waste generated by households or collected on behalf of a municipal council) and C&D (Construction and Demolition). That equates to about 222kg per person.

The total amount of waste produced from the C&D industry stream during the 2020-21 financial year adds up to a total of 29.2 million tonnes, which is approximately 38% of the total amount of waste produced from all types of waste. (See table below for a breakdown by waste category.)

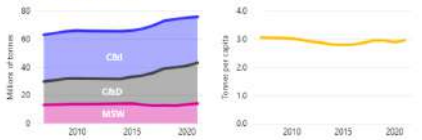
Figure 1 *Waste generation by material category and stream, Australia 2020–21 (core waste plus ash)*



Source:
https://www.dcceew.gov.au/environment/protection/waste/national-waste-reports/2022

The report also looked at how waste generation had increased and decreased over a 15-year period. Overall, waste increased by 12.8 Mt or 20%. When that figure was broken down to per capita (per person) and types of waste, while MSW fell by 13% per capita and even C&I waste fell by 21% per capita, construction and demolition waste grew by 39% per capita. (See graph below.)

Figure 2 Trends in the generation of waste by stream in total (left) and per capita (right), Australia 2006–07 to 2020–21



Source:
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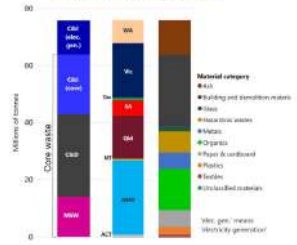
Figure 10 Waste generation by material category and stream, Australia 2020–21 (core waste plus ash)



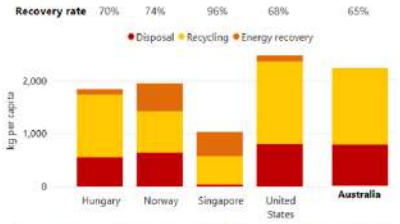
Source:
https://www.dcceew.gov.au/environment/protection/waste/national-waste-reports/2022

While there has been a strong effort to recover and recycle building materials, this has largely been recovered from commercial and government building projects and not from smaller projects such as housing where mixed material loads are habitually sent straight to landfill. It's estimated that close to a third of all building materials delivered to a construction site can end up as waste.

The National Waste Report 2022 states that between the 2006-07 and 2020-21 financial years, waste generation rose by about 74%. Most of that growth occurred after 2013-14. This is attributed to high levels of urban development, especially in Victoria, NSW and SA.

When comparing Australia's 2018-20 waste per capita to Hungary, Norway, Singapore, and the USA, the National Waste Report 2022 found that while the US generated the highest waste per capita (2480kg), Australia was a very close second, generating 2280kg. While some of this waste is recycled, a very large amount still ends up being disposed of in landfill. (See chart below.)

Figure 36 Comparison of annual waste generation and fate per capita, Australia and selected countries



Values are indicative only. Data is compiled for different years (2018 to 2020) due to limited availability. Sources are – Australia: this project; Hungary: Hungarian Central Statistical Office (2022); Norway: Statistics Norway (2021); Singapore: Ministry of Sustainability and Environment Singapore (2021); United States – US EPA (2022).

Source:
https://www.dcceew.gov.au/environment/protection/waste/national-waste-reports/2022

Table 18 Producing countries' descriptions of the wastes included in Figure 36

Country	Description of wastes included
Australia	MSW, C&I and C&D. Excludes ash from coal fired power generation, hazardous waste, and energy recovery from landfill gas recovery.
Hungary	MSW, C&D and industrial wastes from agricultural, food and economic waste. Excludes hazardous waste.
Norway	Organic waste, park and garden waste, wood waste, paper and cardboard, glass, metals, e-waste, concrete and bricks, cinders, dust, bottom ash and fly ash, plastic, rubber, textiles, discarded vehicles, mixed waste, and other waste. Excludes hazardous waste, radioactive waste, sludge, and slightly polluted soil.
Singapore	Ferrous metal, paper, cardboard, C&D, plastics, food, horticultural, wood, textiles and leather, non-ferrous metal, glass, scrap tyres and other including stones and ceramics. It excludes used slag, ash and sludge.
USA	C&D waste and household, commercial, business and institutional wastes.

Source:
https://www.dcceew.gov.au/environment/protection/waste/national-waste-reports/2022

The financial cost of waste

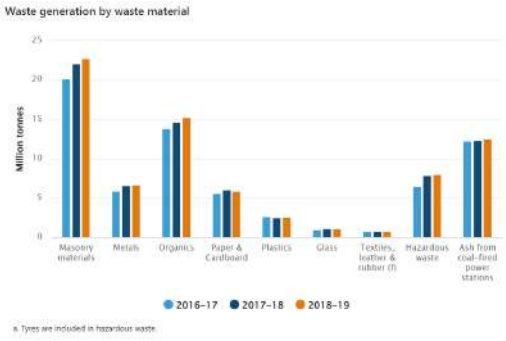
Aside from the amount of waste sent to landfill and harming the environment, it also comes with a financial cost.

According to the 2018-19 figures from the ABS, Australia generated 75.8 million tonnes of solid waste and spent 17 billion on waste services. The Construction industry was the biggest spender on waste services, spending approximately $2 billion. That's a lot of money, and these costs are being passed on to the consumer when they pay for construction of a new house.

While about 38.5 million tonnes were sent for recycling, more than a quarter of it was sent to landfill for disposal (20.5 Mt). That's a lot of environmental damage.

When hazardous waste is calculated, the statistics are worse, with only 24% sent for recycling and 58% sent to landfill. While the manufacturing industry is the biggest contributor to hazardous waste (24%), the construction industry is a very close second (21%). Hazardous waste has also increased by 23% since 2016-17 (Source: ABS).

Waste generation by waste material



Source:
https://www.abs.gov.au/statistics/environment/environmental-management/waste-account-australia-experimental-estimates/latest-release

Breakdown of Waste

It can take anywhere from a few years to several decades for waste materials to fully decompose.

Wood

Depending on the type of wood and the conditions it is exposed to; it can take between 1-20 years for wood to decompose. In Australia, it is estimated that around 5% of landfill space is taken up by wood waste. It takes 30-40 years to grow a tree to produce high quality timber. Forest fires regularly impact state forests, making wood a precious resource that should not be wasted.

Concrete

Concrete can take up to 100 years to fully decompose. Thankfully concrete waste from large developments is often recycled and reused as aggregate for new construction, but it is rarely a priority for new house builds.

Metals

Steel takes 50 years to decompose while aluminum can take up to 200 years. Some metals remain in landfill indefinitely. Metals can corrode and rust over time, but this is not the same as decomposing. Corrosion and rusting are chemical processes that break down the metal's structure, but the metal still remains in the form of rust or corrosion products. In other words, the metal does not disappear or decompose into other substances.

Some metals can be salvaged and recycled, reducing the need for new mining and production. Again, this is more likely to occur in large developments rather than new house builds.

Plastics

Some plastics can take up to 500 years to decompose, while others may never fully decompose. In Australia, it is estimated that construction and demolition waste accounts for around 10% of all plastic waste generated.

The time it takes for other materials such as glass, bricks and ceramics and bricks to decompose can vary widely depending on the conditions they are exposed to.

Waste intensity and the circular economy

Waste intensity is a measure of the amount of waste generated per unit of activity, such as production or revenue. In other words, it measures the waste generated per million dollars of value added to the economy.

Formula:

$$\frac{\textbf{Total waste generated}\ (\text{tonnes})}{\textbf{Gross value added}\ (\$\text{m})} \quad \text{OR} \quad \frac{\textbf{Total waste generated}\ (\text{tonnes})}{\textbf{Final consumption expenditure}\ (\$\text{m})\ \textbf{for households.}}$$

Higher waste intensity indicates a greater amount of waste generated for each unit of activity. Conversely, a low waste intensity is generally seen as a positive indicator, as it suggests that an organisation or industry is operating more efficiently and sustainably, with reduced waste and environmental impacts.

When compared to all industries, **the construction industry was third highest on the list for waste intensity.** (Source: ABS)

The large amounts of waste generated by the C&D industry has a significant environmental impact and contributes to greenhouse gas emissions. As such, there is growing interest in sustainable alternatives to demolition. One of those alternatives is relocation, one of the most sustainable options available to help to reduce waste and preserve valuable building materials. But more on that later.

Carbon footprint of the construction industry

Embodied carbon emissions: According to a report by the Australian Sustainable Built Environment Council, the construction industry was directly and indirectly responsible for 18% of global greenhouse gas (GHG) emissions in 2010 and 18.1% of Australia's total Carbon Footprint in 2013, with further increases in emissions likely in the coming years

The Clean Energy Finance Corporation reports 28% of all global emissions come from the building and construction sector and up to 10 per cent of Australian greenhouse gas emissions come from embodied carbon.

It is estimated that building a new house generates between 30 million and 50 million tonnes of carbon dioxide per year, with embodied carbon in the C&D industry set to double by 2050.

To translate that into something fathomable, 30 million Mt of carbon dioxide is the equivalent amount of emissions produced from driving a car for over 6 years. (Based on a car producing roughly 4.6Mt of emissions a year.) And this is building just from one house!

The annual carbon footprint of the average Australian household is around 15 tonnes of CO2-e, according to the Australian Government's Department of Industry, Science, Energy, and Resources. This means that the emissions from construction materials used in Australia are equivalent to the yearly carbon footprint of between 2 million and 3.3 million households or between 6.5 million and 10.8 million cars.

**Note- these are approximate comparisons; emissions from different sources can vary widely depending on a range of factors.*

Towards more affordable and sustainable homes

Given the large amounts of waste involved in the demolition and construction of houses, significant environmental impacts and greenhouse gas emissions are created. This has given rise to a renewed interest in sustainable alternatives to demolition, such as relocation of existing houses.

Relocating an existing house rather than building new has enormous environmental, financial and cultural advantages. Moreover, it is one of the best ways to become part of the circular economy.

When you choose to relocate a house, you are reusing, reducing, recycling and preserving.

When a house is relocated, you save the valuable materials used to construct the house from ending up in a landfill. Additionally, since we know the construction of a new home generates a significant amount of waste, you are also helping to avoid waste from new builds ending up in landfill.

Preserving resources

According to Dr Robert Crawford, an associate professor in construction at The University of Melbourne, raw materials, energy, and water are some of the resources embedded within existing houses. Relocating a house means these resources are conserved, and the environmental impact of new construction is reduced.

By choosing to relocate a house instead of building new, fewer raw materials need to be mined, which helps conserve precious resources and protect the environment for future generations. It is a sustainable and environmentally responsible option.

Preserving the environment

It is usually necessary to clear the land and remove trees and vegetation when building new. Post-pandemic, it takes between 10 and 23 months to build a house. This lengthy period means the heavy machinery used and the earthworks required for the size and scope of a new build can result in compacted earth, soil erosion and/or water pollution, all of which significantly impact delicate ecosystems and the environment.

Compared to a new build, relocating is substantially quicker and less harmful to the environment. Heavy machinery is required on-site for a much shorter period, resulting in less vegetation, soil and water damage. When you relocate a house, there is also less chance that soil contamination by industrial products will occur, as is often the case when building new. The result is that relocation means a better opportunity to preserve ecosystems, protect wildlife and sustain biodiversity.

Reducing carbon footprint

Building a new house requires a significant amount of energy and resources, including the extraction of raw materials, transportation, and construction. All these processes contribute to greenhouse gas emissions, which can significantly impact the environment. By relocating a house, these emissions are reduced considerably, as the majority of the house is already built, and transportation requirements are minimal.

Preserving heritage

Dr Dominique Hes, the principal researcher for Beyond Zero Emissions, says there is a prevailing tendency in Australia to demolish homes and buildings and construct new ones from scratch. She believes this stems from perceiving a house as an asset without considering the entire life cycle and historical significance of older buildings or the complete environmental impact of new construction materials.

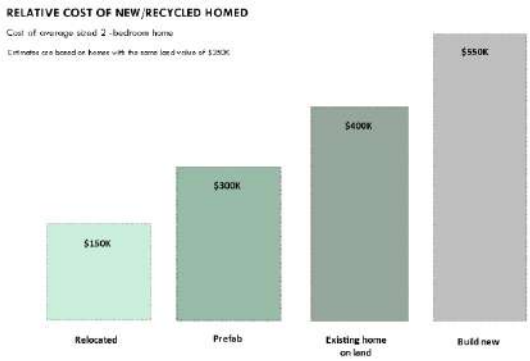
Many relocatable homes have significant cultural and historical value. Many feature stunning architectural elements or features worth preserving, such as teak panelling, ornate cornices and architraves, original timber doors, polished timber floorboards, grand entranceways, ornate fireplaces, wrap-around bullnose verandas with intricate iron fretwork detailing, leadlight windows, ceiling roses and more.

But it's not just their features that have value. Many also feature stunning period detailing and craftsmanship that is very expensive to replicate and rarely found in the houses being built today. They have significant value due to the quality of construction techniques and materials used. All relocatable homes must be of sturdy construction or they cannot be transported, so you are guaranteed a solidly built home if you purchase a relocatable house.

Relocating these structures to a new location can provide a way to protect them from demolition while also preserving their priceless original character and heritage value, all of which contributes to the preservation of local history and identity.

Economic advantage

In addition to the environmental benefits, relocating a house comes with significant financial benefits. Costs are substantially lower than buying a pre-existing house on a block of land or building new. (See price comparison table below).



Sustainability

Let's return for a moment to our earlier definition of sustainability:

"Sustainability requires balancing the use of natural resources with their preservation for future use and fostering economic growth and stability in a way that does not deplete resources or harm the environment. In the context of waste reduction, sustainability means promoting a circular economy."

How much more sustainable can you get than to relocate a beautiful home? Every box is ticked.

Retrofitting to reduce emissions and ensure sustainability

According to Dr Robert Crawford, associate professor in construction at The University of Melbourne, while there are legitimate arguments for both retrofitting and new construction, it is almost always better from an environmental perspective to retrofit existing buildings. He says that retrofits can save over 50% of the embedded resource demands and construction-related environmental impacts, which is especially critical given the depleting global natural resources and increasing greenhouse gas emissions and waste production.

Energy savings

Relocating an older house to a new location and retrofitting it with energy-efficient features, such as insulation and solar panels, can help to reduce energy consumption and greenhouse gas emissions.

Energy efficiency

According to research by the University of Sydney, retrofitting an existing house to improve energy efficiency can be up to 10 times more effective at reducing emissions than building a new, energy-efficient house. This is because retrofitting avoids the emissions associated with new construction and can reduce emissions from the energy used in the house's operation.

Sustainability, relocation and the benefit of reducing carbon emissions

Lower bills

Any home that incorporates energy efficient systems is going to result in lower energy bills and more benefit to the environment, so it's a win-win situation.

Sustainability Victoria has run some modelling comparing a new 6-star NatHERS (National Home Energy Rating System) with a home that meets the Zero Net Carbon Homes P standard. They found that the Zero Net Carbon Home reduced the energy bill by between 60 and 70%.

That's a considerable bill reduction, and it's something you can aim for if you decide to retrofit your relocatable home with more energy-efficient systems.

Increased comfort and quality

Houses that aim for zero net carbon typically have more stable and comfortable internal temperatures. According to the WHO, consistent and comfortable temperatures can mean improved health outcomes.

So how can you ensure your relocatable home has as low a carbon footprint as possible while providing as comfortable a living space as possible?

Insulation

Correctly installed, high-quality insulation provides better draught proofing, ensuring the home is less likely to lose or gain heat through ceilings and walls. This means the amount of energy required to maintain a comfortable temperature is significantly reduced.

Double glazed windows

Double glazing consists of two panes of glass separated by a layer of air or gas. This creates an insulating barrier that reduces the transfer of heat between the inside and outside of the house. As a result, homes with double glazing are better insulated and can retain heat during winter and keep out the heat during summer, making them more comfortable to live in all year round.

Because heating and cooling systems don't have to work so hard, energy bills are lowered and greenhouse gas emissions are reduced. Double glazing also reduces noise pollution.

Energy-efficient fixed appliances

Using energy-efficient heating, cooling, cooking and water-heating appliances will also ensure your house is more energy efficient, so consider investing in induction cooktops and solar hot water pumps.

Physical orientation

Buying a relocatable home often means you have more freedom to orientate the house to take maximum advantage of your surroundings.

The orientation of a house can play a significant role in its energy efficiency. Orienting a home to face north can take advantage of the sun's warmth and light during the winter months while reducing direct sun exposure during the summer, leading to reduced heating and cooling costs. Proper orientation can also help maximise natural light and ventilation, reducing the need for artificial cooling and lighting while improving indoor air quality.

Solar panels

Solar panels harness energy from the sun to produce electricity, which can help to reduce reliance on traditional fossil fuels and decrease carbon emissions. By generating renewable energy, solar panels can help to lower energy costs and reduce the carbon footprint of homes and businesses. Solare panels are very easy to fit to a house you have relocated.

Draught proofing

Draught proofing helps make a home airtight, resulting in a more consistent temperature and reducing the need for artificial heating and cooling options. If you have relocated a Queenslander or a Colonial-style home, this is a great option to help reduce your energy use. Pay particular attention to gaps around windows and between walls, floors, skirting boards and floorboards. *Note - seek professional advice if you are draught-proofing and have internal gas appliances as some of these require a certain amount of fresh air to operate safely.

The final word

The financial and ecological cost of building a new home is significant, and I hope this book has opened your eyes to the full extent of the environmental impact of the construction and demolition industry.

By embracing the principles of the circular economy, we can be part of a more sustainable and responsible way of living that balances economic growth, environmental protection, and social well-being. As environmentally conscious beings, if we are to align ourselves with the principles of sustainable development, we need to look for alternatives to building new houses.

Relocating and retrofitting an existing house is an environmentally conscious and financially sound decision that can lead to a more sustainable future for ourselves and our planet.

Not only is relocating an existing house a sustainable and financially savvy choice, but it also helps help reduce waste, carbon emissions, and energy costs. By choosing to relocate and retrofit an existing home with energy-efficient systems, we become part of the circular economy, significantly reducing our environmental impact and contributing to a more sustainable future. We can reduce our carbon footprint while improving our quality of life.

This approach also allows us to preserve the unique architectural features and history of older homes, adding character and charm to our neighbourhoods while reducing waste and avoiding the high costs of new construction.

Relocating an existing house is a smart, sustainable, and financially sound decision that benefits us and the planet we call home. It's a choice that we can feel good about, knowing that we are doing our part to protect the environment, conserve resources, and build a better future for generations to come.

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