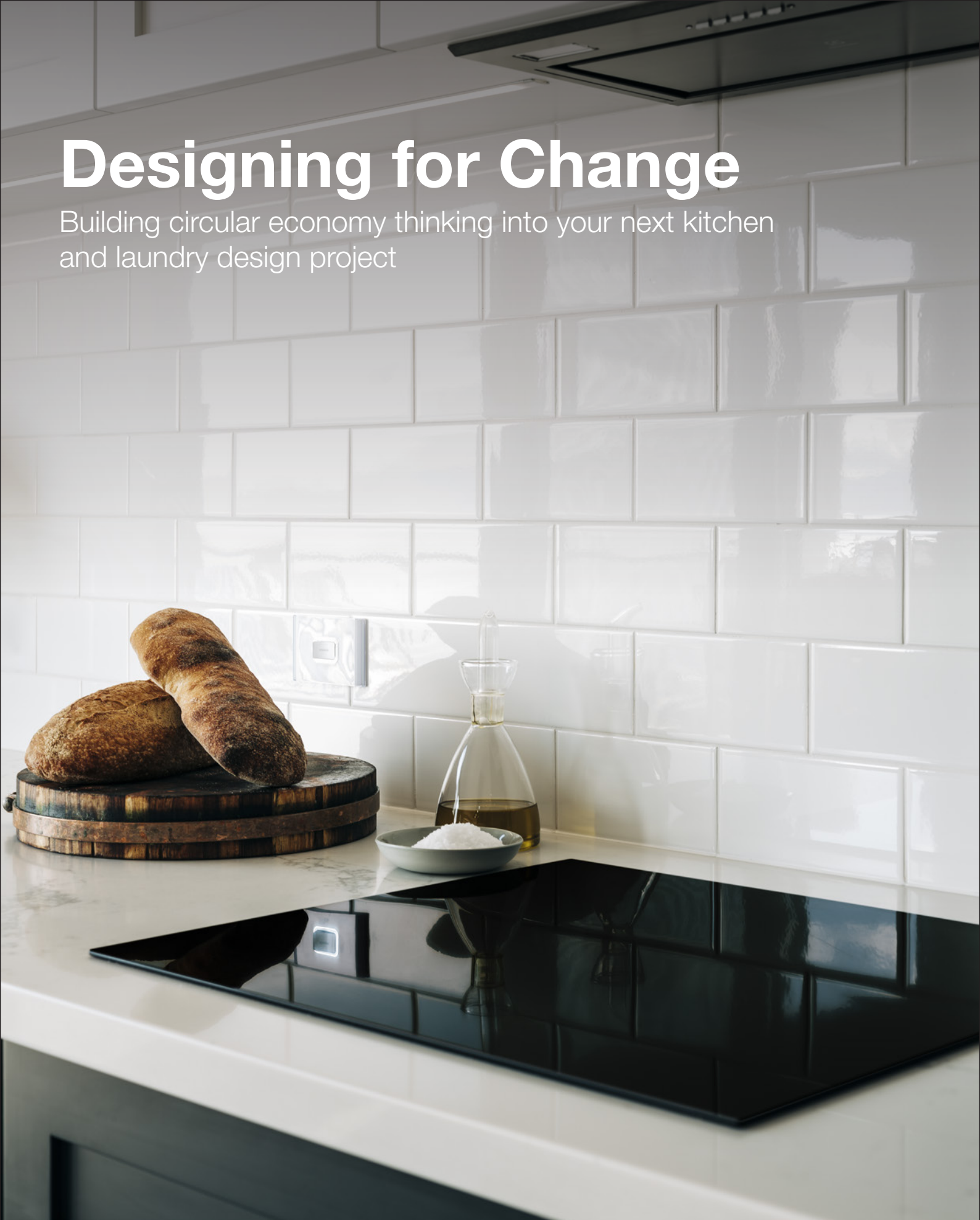


Designing for Change

Building circular economy thinking into your next kitchen and laundry design project



INTRODUCTION

The design and construction industry is responsible for staggering amounts of waste and emissions. The sector accounts for approximately 18.1% of Australia's carbon footprint.¹ Based on the National Waste Policy 2018 report, the industry generates over 20 megatonnes (MT) of waste from construction and demolition activities in a single year.²

It takes vast amounts of resources to build homes, offices and shopping malls, including what is required to manufacture the fixtures, appliances and accessories that go into our kitchens, bathrooms, and laundries. This level of production is taking a heavy toll on the environment.

Every year, the earth exhausts its annual natural resource allotment and is effectively operating on an ecological deficit. On 29 July 2021, it was estimated that all humans on Earth had collectively used up more natural resources than can be reproduced in a year – a day dubbed “Earth Overshoot Day”.³ Almost every year, the date for this day is pushed forward, representing the quickening pace of global resource depletion.

It is clear that the current system is not working. Calls are growing within the construction industry to transform the elements of the “take-make-waste” system and adopt a new economic model designed for sustainability: the Circular Economy (CE). The CE model focuses on designing out waste and pollution, keeping products and materials in use to reduce ecological impact, and regenerating natural systems.⁴

Designers and specifiers can make informed choices to help further circular goals and deliver better outcomes for people, the economy and the environment. But what does this mean in practice?

In this whitepaper, we take a closer look at how shifting from linear to circular thinking in design and construction can achieve better, more sustainable outcomes. We also consider how designers and specifiers can incorporate circular thinking when choosing products and suppliers in the context of kitchen and laundry builds.





THE CIRCULAR ECONOMY AND THE BUILT ENVIRONMENT

For centuries, the modern economy has followed a linear approach to the consumption and use of resources – goods are manufactured from raw materials, sold, used, and then discarded to landfills. Under this model, products and materials have a finite life, and then are disposed of rather than reused. Large quantities of cheap and easily accessible materials and energy are needed to keep production going and meet demand. To ensure the cycle of consumption continues, products are designed to have a limited lifespan thus encouraging consumers to keep buying products again and again.

The linear model also applies to construction. Vast amounts of water, electricity, steel and concrete go into the built environment. Population growth has led to the need for extensive property development, which in turn has contributed to a substantial increase in waste produced by construction and demolition. Globally, 90 billion tonnes of primary materials are extracted, only 9% of which is recycled.⁵ In Australia alone, 6.7MT of waste from construction and demolition went into landfills at great social, economic and environmental cost.⁶

Given its social and environmental impact, it is little surprise that construction features prominently in CE strategies. The CE can be explained simply as an economical model that closes the resource loop. Instead of letting products and materials go to waste, the aim is to maximise the utility of the existing infrastructure across the

product value-chain – waste from one system is reused as input into another.⁷ The three core CE principles are as follows:⁸

- **Design out waste and pollution.** The CE designs out the negative environmental impacts of economic activity, so waste and pollution is not created in the first place.
- **Keep products and materials in use.** The CE focuses on durability, reuse, remanufacturing, and recycling to keep products, components, and materials in circulation.
- **Regenerate natural systems.** The CE avoids the use of non-renewable resources and preserves or enhances renewable ones, or promotes the use of renewable energy as opposed to relying on fossil fuels.

In the context of the built environment, this means reducing the amount of input required from the extraction of natural resources to construct buildings; an emphasis on materials recycling, component reuse and repairs and refurbishment to extend a building's lifecycle; and reducing waste and energy consumption over the life of the building (including energy and materials recovery during building deconstruction). In circular buildings, renewable energy utilisation and sustainable operations underpin recycling efforts to minimise the building's overall environmental.



WHY WE SHOULD GO CIRCULAR

The CE model is primarily concerned with reducing the ecological impact of human activity. A shift away from the linear economic model to a circular one will therefore result in a reduction in total waste and greenhouse gas emissions. For example, in South Australia alone, analysis suggests moving to a circular model would reduce the state's greenhouse gas emissions by 27% or 7.7MT of CO₂ equivalent.⁹ By minimising our dependence on raw materials and using only renewable sources of energy, we are reducing pressure on the environment and fostering sustainable economic growth.

However, the benefits of a circular approach go beyond the ecological. There are social and economic gains associated with transitioning to a CE model. Economic modelling suggests moving to a CE will increase competitiveness, boost economic growth, and create jobs.¹⁰ According to top professional services firm KPMG, a future CE in food, transport and the built environment

together represents a potential economic benefit of \$23 billion in present value GDP by 2025, rising to \$210 billion in GDP and an additional 17,000 full-time equivalent jobs by 2047-48 for Australia.¹¹

The benefits of the CE model also reach clients and consumers. In the CE, products are designed for longevity and performance, rather than obsolescence, meaning customers get better value for money and longer product lifespans. Increased quality and service life of products leads to reduce costs for maintenance, repair and replacement. The move towards long-term, "circular" service models such as subscription services for building assets, integrated maintenance and refurbishment programs, and product take-back schemes will also likely result in greater communication and service throughout the life of the product between the supplier and the customer.

"In the Circular Economy, products are designed for longevity and performance, rather than obsolescence, meaning customers getting better value for money and longer product lifespans."

APPLYING CIRCULAR THINKING

Circular thinking encourages designers and specifiers to adopt a medium to long-term focus on the design life of major building elements, including maintenance and replacement cycles. The goal is to extend the service life of the building as a whole by facilitating continuous use, anticipating future changes in use and planning for reuse. This means selecting building products that can be refurbished, recycled or reused in a closed loop.

Circular buildings encompass green and sustainability strategies. The environmental footprint of the building should be minimised through the promotion of renewable energy utilisation in new builds and retrofits. The overall energy consumption of buildings can be attributed to building operations and embodied energy. The use of energy-intensive materials and products increases the building's embodied energy, and therefore, also raises its lifecycle energy consumption. Similarly, products and services with high energy usage, will increase the energy consumed by the building during its operation.

Materials with low embodied energy and energy-efficient products are needed to provide comfort and services,

while reducing overall energy use. Building design and layouts need to consider how to maximise natural light, ventilation and thermal insulation to reduce dependencies on mechanical heating and cooling. On-site energy production and other sources of renewable energy should also be considered. Similar to energy, overall water consumption can be minimised through the specification of materials with low embodied water materials, water-saving appliances, or through the harvesting and reuse of rainwater and greywater.

Adopting a CE model demands a collective effort across the entire supply chain. It starts with collaborating with stakeholders to develop circular projects that explicitly commit to producing zero emissions, using clean materials and implementing resource-conserving design. To ensure circular principles are incorporated at all levels, architects, designers and specifiers need to partner with like-minded suppliers, builders and contractors.



SPECIFYING FOR CIRCULARITY

Below are some considerations when specifying circular products for your next build or renovation:

- Energy efficiency.** Reducing energy consumption and emissions is a central tenet of the CE approach. Appliances, such as white goods and cooking equipment can together account for 30% of home energy use,¹² so it is important to choose energy-efficient solutions to minimise our impact on the environment. The Energy Rating Label, which is part of the Australian Government's Equipment Energy Efficiency (E3) Program, provides customers with energy efficiency information for a range of appliances. The more stars, the more energy efficient the appliance is compared to similar products.
- Ease of repairs and assembly.** The product's capacity to be repaired and reused is dependent on access to product components. This can and should be facilitated by the manufacturer. Other relevant considerations include ease of assembly and disassembly, product modularity, upgradability and compatibility, all of which increase the feasibility of extending the lifetime of the product.
- Quality manufacturing.** Innovation and quality are foundations of circular thinking. Choose products that are built using high quality materials, strict quality controls and with advanced manufacturing methods that contribute to longer product lifespans.
- Raw materials.** Consider products that consume fewer resources, or rely on renewable resources. Companies should be transparent about raw material use, the provenance of those materials and how they are working towards reducing raw material usage.
- Technology and automation.** Manufacturers can adopt new technology and automation to improve manufacturing processes and product quality. Doing so can reduce human error thus reducing waste. A company committed to circular principles will be actively working towards reducing waste and increasing internal resource efficiency.
- Eliminating harmful materials.** Circular thinking also involves reducing activity that is harmful to human health. Building products can contain and emit volatile organic compounds, which can have negative health impacts on occupants after prolonged exposure. It is important to choose products that are made of healthy, non-toxic materials that pose no risks to humans or the environment.
- Ethical supply chains.** Customers are increasingly concerned about the wider impact of supply chains associated with the products they buy. When assessing products, it is advisable to seek assurances that the products have been sourced ethically and sustainably produced. Ethical trading implies socially responsible sourcing, which focuses on worker welfare, natural resource conservation, sustainability and working only with suppliers who follow responsible working practices.
- Transportation.** Transporting materials and products can increase emissions across the supply chain. For this reason, effective urban freight and logistics are key, as well as choosing local suppliers to minimise long-distance transportation requirements.
- Green certification.** Sustainable product certification provides further assurance that the product is ethically and efficiently made, reduces impact of environment, and uses healthy materials. For example, Global GreenTag is a third party, green building product rating and certification system, underpinned by rigorous scientific and Life Cycle Assessment processes, that makes it simple for the market to see how ecological, safe and socially responsible a product is. Green products are also required to meet sustainable building standards, such as the WELL Building Standard,¹³ which is a performance-based system for measuring, certifying, and monitoring features of the built environment that impact human health and wellbeing.
- Product recycling.** Circular thinking requires you to consider what happens to products and materials after their initial service life. Manufacturers and suppliers can play a role in encouraging product reuse and recycling through product take-back schemes and alternative models of product ownership that create a shift towards products that can be extended and reused rather than designed for replacement. For example, some companies offer product subscription models wherein they, rather than the customer, are responsible for the installation, maintenance and the ongoing life of the product as well as reclaiming the product after its initial use.

TOWARD MORE CIRCULAR PRODUCTS AND SERVICES

Electrolux

Electrolux is a leading global appliance company that has shaped living for the better for more than 100 years. The company, under its brands including Electrolux, AEG and Frigidaire, sells approximately 60 million household products in approximately 120 markets every year.

A sustainability leader in the appliance industry, Electrolux is proactively contributing toward the circular economy by integrating a circular approach into its products and solutions. This includes integrating recycled or renewable materials into their product platforms, promoting recyclability, using more sustainable packaging solutions, increasing the availability of spare parts, and developing circular business solutions. Electrolux is also looking at ways to improve product recycling, especially in regions with no legally mandated product take-back, and by designing products that are more easily repaired and recycled.

In reflection of Electrolux's commitment to become climate neutral across the supply chain by 2050, and its increasingly holistic approach to sustainability, the company reported a 75% reduction in CO2 emissions from its operations since 2005. In 2020, the company's most energy and water efficient products accounted for 26% of total units sold and 36% of gross profit in 2020, and over 6,800 metric tons of recycled plastic were used in Electrolux products.

Electrolux is committed to climate neutral operations by 2030 through their sustainability framework of better products, better operations and better living. The company's cooking manufacturing plant in Dudley Park, South Australia is 80% powered by over 8,000 solar panels, and the rest of their warehouses will be moved to a similar position with solar installed on their roofs.

In 2020, Electrolux was recognised as an Industry Leader in the Household Durables category in the prestigious Dow Jones Sustainability Index and is one of few companies to be recognised for its sustainability leadership with a prestigious double "A" score by the global non-profit CDP for its efforts to tackle climate change and acting to protect water security.

“Circular thinking encourages designers and specifiers to adopt a medium to long-term focus on the design life of major building elements, including maintenance and replacement cycles.”



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All information provided correct as of September 2021