Planet Positive:
Waste & Materials

Our plan for zero waste by 2030

mirvac

This
Changes
Everything

Fella, Tullamore, Melbourne

Foreword

Every year, an estimated 11.2 billion tonnes of waste is sent to landfill globally [1]. In addition to this, 92 billion tonnes of materials are extracted [2], with buildings responsible for around 50 per cent of global materials use [3]. In Australia, the built environment is responsible for approximately 60 per cent of waste, representing a staggering 41 million tonnes annually [4].

The environmental, social and economic impacts of this are considerable. Our reliance on natural resources and raw materials is placing an enormous burden on our planet, and the energy used to access and process these materials is significant. It's estimated that the carbon emissions associated with materials extraction alone contribute to almost half of global emissions. Biodiversity is being disrupted, and ecosystems, such as our oceans, are becoming increasingly contaminated through poor waste management. In addition to this, the options to reuse and recycle the products we create are often limited, and the costs associated with waste management and disposal continue to grow.

For both the planet and for our business, it's clear that we need to rethink the way that we choose materials, how we use them, and then look for ways to extend their life.

In 2014, Mirvac set an ambitious target to send zero waste to landfill by 2030. Initially, our focus was on diverting waste, predominantly through reuse and recycling. We have made significant gains in this effort, reducing both landfill waste and its associated emissions, as well as waste management costs. We now recognise that to have a meaningful impact, particularly in our industry, we need to consider the lifecycle of all materials and products we use from the outset. This means moving from a linear model that focuses on the waste we're diverting from landfill at our construction sites and operating assets, to a more circular model, which taps into the key choices we can make to avoid, reduce, reuse and recycle, as well as regenerate to repair harm from materials extraction.

To us, zero waste means being mindful of the impact of materials extraction, and rethinking how we design buildings to use less materials, how we procure, how we build, and finally, how we behave with the materials in our buildings.

We are also mindful of our capacity to influence waste outcomes at Mirvac and beyond, through advocacy in our supply chain, within our sector, on environmental policy, and through innovation. Our plan, Planet Positive: Waste & Materials, identifies the areas we can control and the areas that we need to influence in order to achieve zero waste to landfill at Mirvac.

The actions we take now will have lasting consequences for the planet we leave to future generations. Targeting zero waste, in addition to our goals to be net positive in carbon and water, is not just the right thing to do – it's vital. And while the changes we will make will take time to implement, we are committed to doing so in a way that is meaningful, transparent and commercially astute.

It is up to companies like ours to be a force for good and continue to affect positive change.

As always, we welcome any feedback or comments you may have as we progress in partnership to rethink and end waste.

Susan Lloyd-Hurwitz

Susan Lloyd-Hurwitz
CEO & Managing Director

1. UN Environment Programme: https://www.unenvironment.org/explore-topics/resource-efficiency/what-we-do/cities/solid-waste-management.
2. Global Resources Outlook 2019, page 7.
3. Circularity Gap Report 2019: https://www.legacy.circularity-gap.world/built-environment.
4. National Waste Report 2018, page x.

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3 UN Environment Programme: https://www.unenvironment.org/explore-topics/resource-efficiency/what-we-do/cities/solid-waste-management
4 Advisory System for Processing, Innovation & Resource Exchange: https://www.energyinnovation.net.au/article/the-csiros-waste-resources-arm-aspire-scales-up-and-out-to-take-place-in-national-circular-economy-ecosystem

Introduction

The property industry relies heavily on natural resources to construct and operate buildings, and the impact of the built environment sector is significant.

Mirvac is a leading Australian property group with an integrated business model, which means we have great scope to make positive choices at all stages of the development and operating cycles: from design and procurement, to construction, and all the way through to completion and asset management.

A critical step that we can take in our ambition to send zero waste to landfill is to adopt principles of circularity. In this model, we start with what's within our control and where our most notable impacts are, which includes:

- making choices to design out waste up front in the development process;
- focusing on the most environmentally harmful materials where we have purchasing power, like concrete, steel and paper products, to buy more recycled content;
- using innovation in construction to generate less waste;
- extending the life of the materials in our value chain; and
- repurposing in operation.

All of this we can track and measure through improved internal processes.

We are also mindful that contextual changes are required so that we, and others, can continue to evolve the way we do things. Australia, like many countries, has suffered from fractured materials markets, with stockpiles of plastics, glass and electronics equipment continuing to grow, while local councils and other governments struggle to find a solution. Valuable materials are sent to landfill. It's clear that a system which encourages recycling of both products and materials needs to improve.

In 2018, Australia committed to shifting away from a 'take, make, use, dispose' model to a more circular approach, noting that we all have a role to play in what we buy, and how we use and dispose of materials to ensure we maintain the value of resources for as long as possible. The National Waste Policy Action Plan focuses on ambitious targets, including an 80 per cent recovery of material across all waste streams, halving the amount of organic waste sent to landfill, and increasing government procurement of recycled waste streams.

In addition to this, the Australian Government's NABERS initiative, our national rating system that measures and benchmarks the environmental performance of buildings, is targeting a faster transition to a circular economy and better resource recovery through clean stream source separation.

Planet Positive: Waste & Materials sets out a range of new commitments that we're making around zero waste based on the current context.

We've developed seven strategies that focus on designing out our waste; identifying and better leveraging opportunities in our procurement processes; leveraging innovative ways to build; enhancing waste management at our assets; helping to protect biodiversity; collaborating with others; and making sure we're continuing to share our progress openly and honestly. These strategies are detailed on page 8.

We recognise that a circular economy achieves a sustainable use of materials and we look forward to it evolving as new technology, innovation, policy and community mindfulness progress.

Our current footprint

Mirvac purchases a substantial amount of materials to use in its developments and operations.

At EY Centre, 200 George Street in Sydney NSW, for example, we used 28,000 cubic metres of concrete, more than 4,300 tonnes of steel, over 48,700 square metres of glass, 32,000 square metres of mineral fibre ceiling tiles, 20,500 square metres of plasterboard walls, and approximately 360,000 metres of electrical cabling. Our materials buying power in FY19 alone was around $1 billion.

The waste we generate within our business is also costly. In FY19, we spent approximately $6 million to remove 28,000 tonnes of tenant-generated waste from the assets we manage, and another $8.5 million to remove waste from our construction sites[1].

However, we have made great progress on resource recovery. Of all the waste materials we collected in FY19, we sent just 9,280 tonnes of operational and construction waste to landfill.

Australian waste stats:

In conjunction with materials consumption, overall waste generation has continued to increase, up 6 per cent over the past 11 years, with construction and demolition waste the fastest growing segment, up 20 per cent[2].

Nationally, we generate 67,000,000 tonnes of waste per annum, which, at 2.7 tonnes per person per year, is slightly more than the global average[3].

Only 8.6 per cent of waste generated each year is recycled[4].

Our progress to date:

In the $22 billion of properties we co-own and manage across our office and retail portfolios, we are responsible for the collection and disposal of waste, and we have a long record of continuous improvement in how we manage this. In addition, we have taken a leading approach to increasing recycling rates at our construction sites.

Our long-term, concerted effort to reduce the volume of materials we send to landfill has seen us divert 96 per cent of construction waste and 69 per cent of operational waste from landfill as at FY19.

The strategies we've implemented to achieve this have varied, from collaborating with tenants to reduce and avoid creating waste and increasing the number of waste streams at our assets, through to training cleaners in source separation, providing bins for various waste and recycling streams, and negotiating with waste services companies to ensure effective materials recovery.

> From FY13 to FY19, we expanded our operational recycling streams from six to over 20 separate streams, which has resulted in better recovery outcomes, reduced contamination and increased diversion from landfill.

We have Building Waste Management Plans at our assets to ensure our operations teams understand their roles and responsibilities in regard to site-specific waste generation and waste management systems, and we've developed Building User Guides to enhance tenant engagement and education around waste.

We're also continuing to invest in creating better and more sustainable buildings, and support our tenants and customers to use fewer natural resources.

For instance, we work with our leading industry group, the Green Building Council of Australia, to adopt Green Star recommendations in the development of new office assets, and as a result, the buildings we create are more energy efficient, incorporate a greater volume of recycled materials and divert more waste from landfill.

Through the Green Star certification process, we've been encouraged to consider more sustainable construction materials in a number of our developments. This includes an extensive use of timber at EY Centre, 200 George Street, Sydney NSW, the use of steel over concrete in Building 2 at South Eveleigh, Sydney NSW and at 8 Chifley, Sydney NSW, the use of recycled concrete and steel with offsite fabrication, minimising waste and leading to a 40 per cent reduction in embodied energy.

1. Demolition waste has not been measured.
2. National Waste Report 2018, page 10.
3. National Waste Report 2018, page x.
4. The Circularity Gap Report 2020, page 19.

Since 2017, we've been working with social enterprise, Mates on The Move, to recycle coffee cups and paper towels – two of our most challenging waste streams – at our office assets in NSW. As well as diverting waste from landfill, we're reducing contamination in recycling streams while providing employment for former prison inmates at the same time. Over the past three years, we've worked with Mates on the Move to divert approximately 290 tonnes of paper towels and disposable coffee cup waste from landfill.

At our shopping centres, we're collaborating with retailers on reusable containers, promoting reusable coffee cups and researching alternatives to other single use items. We participate in National Recycling Week every year to encourage our retail tenants and customers to avoid the use of single use plastics, with positive results. In FY19, for example, we invited customers at our Birkenhead Point centre in Sydney to trade 10 plastic shopping bags in return for a designed reusable bag. In just one week the team collected 3,700 plastic bags to be sent to recycling, which is equivalent to over 20 kilograms of plastic.

We're also looking at how we can continue to minimise waste through our construction activities. At South Eveleigh, our construction team set themselves a goal to deliver an exceptional building, while using construction methods that enabled efficiencies in time, labour, materials and waste reduction. The team used Design for Manufacture and Assembly (DFMA) for the complex wave roof, allowing them to order the exact materials they needed, manufacture offsite where possible, and assemble components onsite. The steel structure reduced concrete formwork, meaning significantly less concrete and formwork waste. Practices like these have a significant impact on project waste volumes, as well as costs, reducing total project costs by as much as 0.3 per cent.

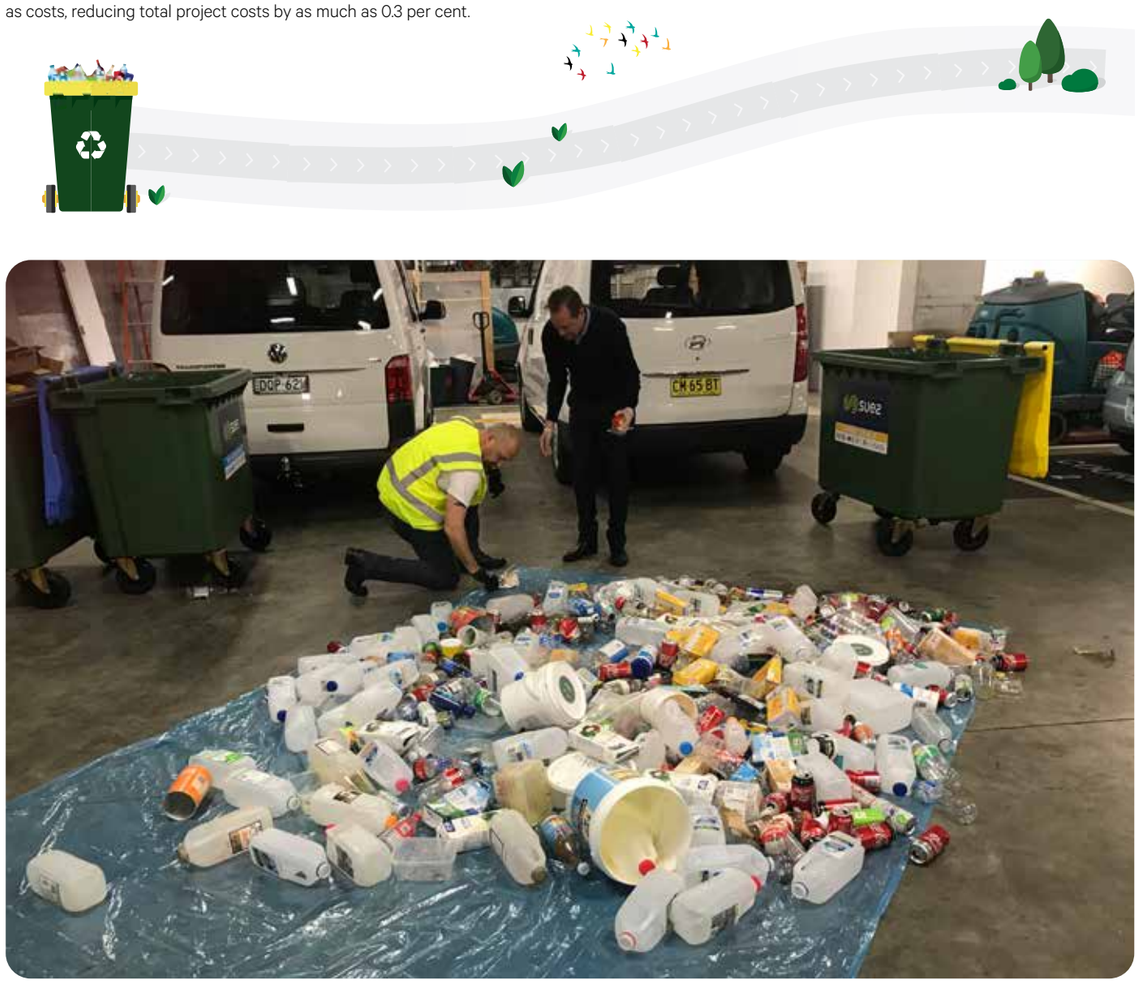
And at our Pavilions project in Sydney Olympic Park, NSW, we're running a pilot to categorise waste by using artificial intelligence (AI) and cameras above waste bins. The AI has been designed to alert the team when the incorrect materials are placed in our bins, and to quantify the amount of different materials that are in there. As well as raising awareness of the waste on our construction sites, it's helped us to focus on obtaining quality data to better manage our waste, and avoid problem waste in our bins. We're now directly comparing project team innovations to see what is working best so that we can select and apply the lessons to be learned.

Our opportunity

As stewards of the materials we use in the assets we construct, and managers of the waste our office tenants and retail customers generate, we have an opportunity to influence the materials we procure, how they're used, and how they're disposed of.

We see an opportunity to leverage our integrated model to significantly reduce waste, increase the recycled content in the materials we buy, prioritise suppliers who are mindful of their extraction impact, experiment with innovative construction technology, and extend the use of the materials in our operations.

Less waste can mean less cost, time, labour, and risk, fewer carbon emissions, and better outcomes for our customers. We see our zero waste plan as being positive for both business and the planet.



Mirvac undertakes regular waste audits at its assets to measure contamination in its waste streams.

Applying principles of DFMA at Tullamore, VIC

Since 2013, we've been experimenting with how we can use methods of DFMA across our masterplanned communities (MPC), apartment and commercial projects. DFMA essentially means that building components are designed and digitally engineered using 3D models, and then manufactured and assembled offsite.

It's a method that's being increasingly employed in the property industry, which is not surprising given it has a multitude of benefits. As well as reducing waste, DFMA in construction reduces programme schedules, because projects are less impacted by weather events and other external factors (leading to faster project completions and greater cost savings). There's also a reduced reliance on trades onsite, which means less risk, fewer safety incidences and lower labour costs. And because the components are manufactured offsite, there is consistent quality and reliability in what's being delivered.

At our MPC project, Tullamore, in Doncaster VIC, we recently conducted a trial to demonstrate the value of DFMA in terms of time, safety, quality, cost savings and waste avoidance. While the townhouses had already been designed, the team took the opportunity to construct four of them in the traditional way, and four with key parts (walls and floors) being manufactured offsite. All eight homes were designed to the same specifications.

The results of this small-scale trial were compelling. The traditional build took close to 29 weeks, compared to the DFMA build which was 22 weeks, a 23 per cent reduction in build time. Time spent on high-risk work reduced by 42 per cent, improving safety on site, and waste generated was reduced by 50 per cent. Importantly, the higher degree of accuracy provided by DFMA meant the amount of the unused materials you might see on a traditional construction site reduced too.

The trial has shown that there is clear value in DFMA in our construction industry, and we're really excited by the opportunities it presents.

At our Woodlea MPC development in Victoria this year, we applied DFMA methods to install 36 bathroom pods in Stage 37 of the project. In a conventional build, this would have taken up to 17 weeks. Using DFMA, however, the design and manufacturing offsite required just a few weeks, and once delivered to site, each pod averaged an install time of 15 minutes.


Tullamore


Marrick & Co

Extending the life of materials in our value chain at Marrick & Co.

In 2017, Mirvac's Marrick & Co. apartment project in Sydney became the first development in NSW to be certified as a One Planet Living community.

One Planet Living's rating system takes a holistic view on the planet's capacity to support life, and encourages people to lead happy, healthy lives using only their fair share of the Earth's resources. To receive this accreditation, developments must be designed in accordance with 10 principles across carbon, waste, transport, materials, food, water, wildlife, community, economy and happiness.

This year, with a focus on no waste going to waste, we invited Professor Veena Sahajwalla, Director of UNSW SMaRT Centre and NSW Circular, and renowned designer and stylist, Emma Elizabeth, to create a living space with One Planet Living principles in mind.

The experiment brought together art, design and revolutionary engineering technology to underscore the huge potential to reduce waste and create new products for the housing and design industries. The stunning blue-hued dining table in the apartment, for example, is made up of glass, textiles, and a treasured dress belonging to Emma Elizabeth, while black-and-white-flecked occasional tables are composed of old corflute posters used to promote university events that would have otherwise ended up in landfill.

Professor Sahajwalla said the collaboration was a chance to show that beautiful products, with brilliant properties, could be made from recycled materials.

She added that the collaboration with Marrick & Co demonstrated how a circular economy that aims at eliminating waste and promoting the continual use and re-use of resources could deliver economic, social and environmental benefits.

And for Mirvac, it gave us a real insight into the value of partnering with real innovators to extend the life of materials we use.

Our plan to reach zero waste by 2030

This Changes Everything

by mirvac

Target: Procure 25% recycled content

Target: Halve development waste

Target: Pursue a net gain in natural habitat

Target: Zero waste to landfill

Our principles

1. Extend our focus from waste diversion and recycling to whole of life material use.
2. Identify key points of influence in our cycle where we can have the biggest impact.
3. Set clear, measurable milestones towards success.
4. Leverage our existing processes, progress and influence to inspire wider action.

Our strategies

We will leverage the advantages of our integrated business model by incorporating these strategies and targets into projects in the earliest stages of development. Additionally, we will increasingly incorporate accountability to deliver on these actions over the coming years, through Mirvac's well-established annual sustainability scorecards for each division.

Strategy 1: Materials-focused design

OUR TARGET: Halve development waste

ACTIONS:

1. Continue to invest in DFMA opportunities in residential and commercial development.
2. Pilot projects in both Sydney and Melbourne which challenge our residential development, construction and design teams to find innovative opportunities to halve waste generation[1] while maintaining high quality outcomes for customers.
3. Develop an internal materials guidance list.
4. Improve data capture and tracking with a simple, clear focus on measuring what matters.

Mirvac is an integrated business with the ability to influence the lifecycle of a project from the outset. Through creative and innovative design, we can reduce or avoid the waste we create in the first place and administer greater control over our waste outcomes. Choosing construction techniques and opting for high-quality offsite manufacturing and prefabrication (see DFMA case study on page 5), will also help us significantly reduce the waste we generate on site. In addition to this, Mirvac will benefit through reduced construction programmes, reduced resources on site, improved safety and reduced costs.

Strategy 3: Innovative construction

OUR TARGET: Zero landfill waste on site by 2030

ACTIONS:

1. Employ offsite assembly and efficient construction to help halve waste generated.
2. Increase waste separation to maximise recycling.
3. Engage with supply chain for efficient materials supply.
4. Improve data capture, including demolition waste, for informed decision making.

1. Using comparable Mirvac projects as a baseline.

Strategy 2: Procure reused, recycled, and rapidly renewable materials

OUR TARGET: Procure 25% recycled content

ACTIONS:

1. Focus on high influence, high impact products such as concrete and steel in development (25 per cent by volume), and paper/sanitary products in operations (25 per cent by cost).
2. Incorporate requests for quantifying percentages of recycled content into contract templates.
3. Preference suppliers with responsible materials extraction capability by requesting environmental product disclosure (EPD) for major procurement investments and factor into tender evaluations.
4. Develop effective data tracking and capture.

In FY19, Mirvac's procurement spend on construction materials was more than $900 million, with a further $2 million spent on goods used for operations. This buying power provides us with a substantial opportunity to stimulate the market for reused, recycled and rapidly renewable products. The more recycled and recyclable materials we use in our developments, the less reliant we are on virgin materials, reducing our impact on the planet.

By making the choice to employ materials-focused design upstream in the development process, we will significantly reduce the waste generated on our construction sites. In addition, we are investing in technologies to ensure efficiencies of time, personnel, and waste costs. For example, at Pavilions in Sydney Olympic Park, NSW, we have actively sought opportunities to reduce waste by partnering with suppliers to deliver prefabricated components, such as bathroom pods, air conditioning components, steel columns and steel fire stairs. Having them prefabricated offsite means these components can be lifted into place and installed in significantly less time. The team has also looked at more efficient construction methods on site, such as using factory cut bricks, as well as pre-formed structural decking systems and slab set downs, to reduce both labour and waste volumes.

Strategy 4: Efficient and responsible operation

OUR TARGET: Remove red bins from our operations by 2030

ACTIONS:

1. Engage and educate to reduce contamination.
2. Increase accountability through better data capture and reporting.
3. Engage proactively with partners to remove red bins.

Mirvac has adopted the Australian National Colour coding standards, with red being the landfill bin. Through tenant engagement and education, Mirvac can influence waste management in office buildings and retail shopping centres under its operational control. To do this with integrity, we need to practise and embed the high standards we expect of others, and stand accountable for the waste and material we are generating as a business. Mirvac will continue to work with service providers, tenants, cleaners and all partners to trial new technologies and processes, and continually enhance the accuracy and transparency of our data and reporting.

Strategy 6: Collaborate to enable the circular economy

OUR TARGET: Active & enthusiastic contribution to circular thinking

ACTIONS:

1. Continue to engage through our industry groups.
2. Participate in wider dialogues on circularity.

The shift to a circular economy cannot happen in isolation. It requires a societal shift, and structural changes need to occur to successfully transition from the typical, linear waste cycle that we've become accustomed to, towards a circular economy. Mirvac is committed to being part of the solution, but we cannot affect change on our own. We need to work collaboratively with our peers, partners and suppliers to transform the current waste cycle.

Strategy 5: Restoration and regeneration

OUR TARGET: Pursue a net gain in natural habitat

ACTIONS:

1. Update our biodiversity policy.
2. Support conservation in developments.
3. Explore a biodiversity preservation initiative in conjunction with Mirvac's carbon offsets work.

We recognise that the process of extracting raw materials that are eventually used in our developments impacts our natural environment, both through loss of biodiversity and carbon emissions. While we do not intend to quantify this impact, we will work towards a net gain in natural habitat by leveraging our existing policies and processes, and making an investment in an initiative to enhance positive biodiversity outcomes.

Strategy 7: Transparent reporting

OUR TARGET: Continuous improvement in transparency

ACTIONS:

1. Review reporting boundaries and definitions.
2. Develop new systems to measure and manage waste and materials.

We can only manage what we measure, and we intend to improve the quality of data that we're capturing so we can report on our progress openly and honestly. Transparent reporting is already underway, and we expect the quality of data to improve as we refine our methodology and systems.

Conclusion

As a leader in the property industry, our integrated business model gives us scope to make positive choices in how we use natural resources across the full property cycle: from acquisition, to design, procurement, construction, and finally, asset management.

Delivering on our purpose to reimagine urban life includes reimagining the ways in which we operate. We want to be better at considering the materials we use in our business activities to extend their life and avoid sending waste to landfill. This is good for us and it's good for the planet.

While we depend on materials for our business activities, we can reduce and improve our environmental footprint by: sourcing our materials sustainably; taking greater responsibility for extending the use of the materials we buy; recycling waste generated through our business activities; and, focusing on how we restore biodiversity at our residential developments.

As well as helping us to achieve our target of sending zero waste to landfill by 2030, reusing, repurposing and disposing of materials responsibly can help us to reduce operating costs, reduce risk, increase our value and facilitate positive environmental effects (such as reducing the amount of resources we extract, the amount of waste we generate and dispose of, and the impact we have on biodiversity). We can likewise reduce scope 3 carbon emissions and foster better relationships with our stakeholders.

We want to work with like-minded partners and suppliers who support our vision for zero waste, such as those who are evolving high-volume construction materials into innovative recycled products.

We have a responsibility to be a force for good in society by exercising the key choices available to us, and by advocating for wider change to enable more wholesale transition towards a circular economy.

Moving to a significantly different, circular model ensures that we take responsibility for our materials use and disposal, while providing us with an opportunity to both improve our business and reduce our impact on the planet.

The Eastbourne, Melbourne VIC