


CASE STUDY

# Circular economy: reducing carbon emissions in plasterboard

## The challenge

Around 15% of Aotearoa New Zealand's domestic long-lived carbon emissions relate to our buildings. As the country's only manufacturer of gypsum plasterboard, under the GIB® brand, Winstone Wallboards has a responsibility to reduce carbon emissions in the built environment.

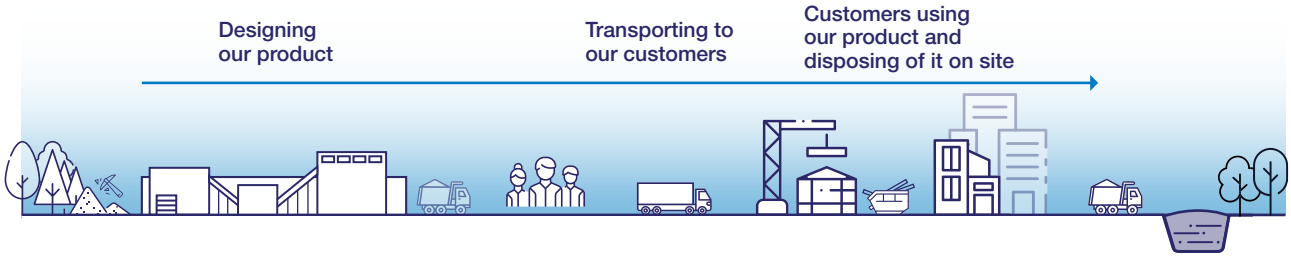
Reducing our carbon emissions cuts down emissions in thousands of residential, commercial and industrial buildings across the country too. Circular economy thinking is helping us reduce this source of emissions: **construction waste**.[1]

**COLLABORATION:**
Winstone Wallboards
thinkstep-anz

**SUSTAINBILITY AREAS:**
Circular economy
Carbon footprinting

### CIRCULAR ECONOMY

The circular economy changes how we produce and consume goods. It designs out waste and pollution, keeps products and materials in use, and regenerates natural systems.




## Our Designing out Waste programme

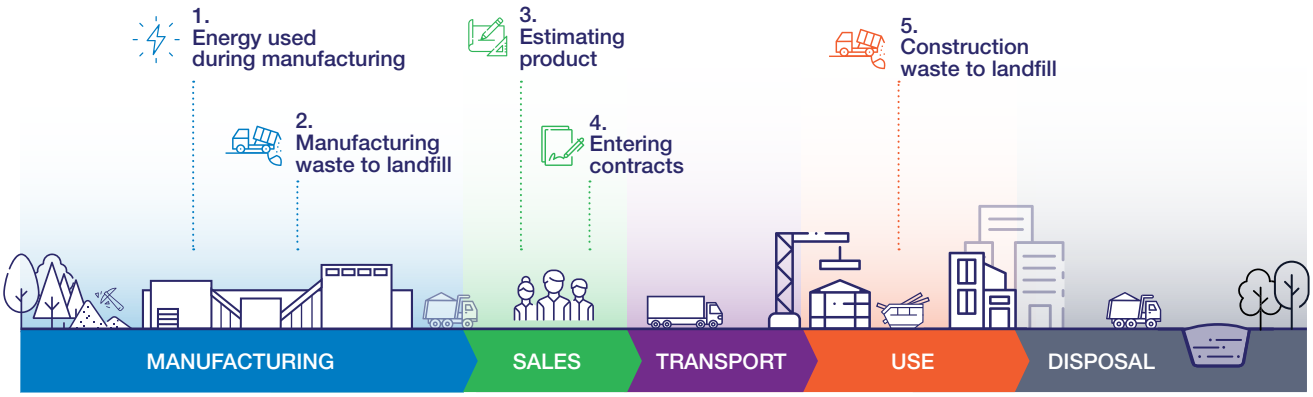
Our Designing out Waste programme[2] looks at how we design our product and transport it to our customers, and how our customers use and dispose of it on site.

1. Demolition waste at the end of a building's life is a source of emissions too. This case study focuses on construction waste only.

2. Supported by Ministry for the Environment, Canterbury Joint Waste Committee, Auckland Council, WasteMINZ, AUT and BRANZ

# Identifying carbon ‘hotspots’ in our plasterboard

We identified five ‘hotspots’ of greenhouse gas emissions (GHGs) for construction waste:




## MANUFACTURING

1. Making our plasterboard
2. Disposing of manufacturing waste

## SALES

3. Specifiers estimating the amount of plasterboard needed for a build
4. Customers signing contracts to build

## USE AND DISPOSAL

5. Customers using our plasterboard and disposing of construction waste to landfill.

The emissions these activities release are examples of **‘embodied carbon’** in building products. Embodied carbon includes emissions from sourcing materials, making and distributing products, and using and disposing of them.

One factor links these five carbon hotspots: **waste.**

So we set ourselves a challenge. We wanted to reduce plasterboard wasted in construction across New Zealand by 30% without changing the design of our product.






# Three ways we used circular economy to tackle our carbon hotspots

1

## Using and disposing of the plasterboard

### THE ISSUE: PLASTERBOARD CONSTRUCTION WASTE

On an average residential building site, around 23% of all materials including 700kg of plasterboard waste end up in a skip bound for landfill.[3]

Much of this waste is created when builders cut down sheets of plasterboard. Even when things go to plan, this results in waste: they cannot typically reuse the offcuts. Add in mistakes such as cutting a board to the wrong size or damaging it during storage and the waste ratchets up fast.

### CIRCULAR ECONOMY STRATEGY: PRODUCT APPLICATION, SALES AND LOGISTICS PROCESSES

In a circular economy, sending waste to landfill is a 'leakage' from the product's 'system' (the processes involved in converting inputs to outputs). To reduce this leakage we offer a wide range of plasterboard lengths and widths. Our customers can order custom sizes if they buy 100 boards or more. This means they can use a size that is most efficient for their project and reduce or eliminate offcuts.

We are also pushing for changes across the industry. These include:

- → clauses in construction contracts to focus project teams on minimising waste
- → encouraging modular design based on material sizes
- → supporting 'materials logistics plans' so that builders receive the right amount of materials at the right time. This reduces the risk of mislaying product, over-ordering, and damaging plasterboard stored on site.

### THE RESULT

- → Fewer plasterboard offcuts, fewer mistakes, less damage
- → Less plasterboard construction waste going to landfill
- → Fewer greenhouse gas emissions. While the gypsum in plasterboard is inert in landfill (it does not release greenhouse gases), paper and starch do.

3. Wastage Rate Report (Construction Resources and Waste Platform), REBRI – BRANZ

## 2 Reducing average emissions

(manufacturing)

### THE ISSUE

High rates of construction waste mean building projects often use more plasterboard than they need to.

### CIRCULAR ECONOMY STRATEGY: RECOVERING VALUE

There is a virtuous circle at play. As the industry reduces the amount of plasterboard it wastes, our business reduces the volume of plasterboard we need to make and transport to create the same buildings. This allows Aotearoa New Zealand to construct more buildings from the same amount of plasterboard.

For example, if 100 boards are needed to build the average house and 20% end up in landfill, a customer needs to order 125 boards to complete their build. If the waste rate falls from 20% to 10%, the customer can complete the project with 112 boards, saving 13.

### THE RESULT

→ Fewer carbon emissions generated to support the same amount of building activity.

→ We adapt our production processes and offer customers value with 'make to order' plasterboard. These activities help us maintain our market position and reduce our waste (below).

## 3 Disposing of plasterboard waste

(manufacturing)

### THE ISSUE

Our manufacturing process creates waste, including gypsum.

### CIRCULAR ECONOMY STRATEGY: RECOVERING VALUE

Gypsum releases sulphur and calcium. This improves soil structure and helps the soil retain air and moisture.

With these benefits in mind, we wanted to give our waste gypsum a 'second life'. We are now working with partners in Auckland, Bay of Plenty, Waikato, Nelson, Canterbury and Central Otago to recycle manufacturing and plasterboard site waste for agricultural and horticultural uses. We want to make this service as widely available as possible.

### THE RESULT

→ We are contributing to a circular, biological system. Instead of going to landfill, the gypsum supports New Zealand's land-based industries.



# How our business is benefitting

## REDUCING OUR CARBON EMISSIONS

Circular economy thinking is reducing these emissions:

### SCOPE 1

- The natural gas we use to dry plasterboard
- The LPG we use to operate forklifts

### SCOPE 2

- The electricty we buy

### SCOPE 3

- The raw materials we buy, such as paper and gypsum
- The plasterboard customers buy to construct their buildings

## OTHER BENEFITS

Circular economy is helping us:

### REDUCE OUR COSTS.

We pay less to dispose of our waste.

### REDUCE OUR RISKS.

We are anticipating changes in government policy and acting now to reduce our waste.

### BUILD BRAND VALUE AND LOYALTY.

Our customers can make their plasterboard go further, spend less to dispose of their waste and 'buy more responsibly'.

### BUILD RESILIENCE IN THE INDUSTRY.

Reducing waste increases our capacity to meet our customers' demand.

### KEEP OUR INVESTORS HAPPY.

This programme is helping us meet our ESG (environmental, social and governance) targets.

### ATTRACT AND RETAIN OUR EMPLOYEES.

Our team want to be part of a business that is working to 'do the right thing'.

# Looking ahead - extending our circular economy

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**Reducing waste plasterboard** (manufacturing)

### THE ISSUE

Our manufacturing process creates waste.

### CIRCULAR ECONOMY STRATEGY: RECOVERING VALUE

We will open our new plant in Tauriko, Tauranga in 2023. Once this plant is operating, we will be able to recycle waste plasterboard into new plasterboard. This is an example of a circular technical system.

## ABOUT WINSTONE WALLBOARDS

Our company has been in business since 1927. We manufacture plasterboard systems under the GIB® brand at factories in Auckland and Christchurch.

We are part of the Building Products Division of Fletcher Building, a New Zealand-based international company.

www.gib.co.nz

## ABOUT THINKSTEP-ANZ

We are an independent sustainability firm with offices across Australia and New Zealand. We have been helping businesses succeed sustainably for more than 15 years.

Our services span sustainability strategy and technical solutions to make products, businesses and the built environment more sustainable. We also offer sustainability reporting and plain English communications. We are a certified B Corp with a science-based target for reducing our greenhouse gas emissions.

www.thinkstep-anz.com