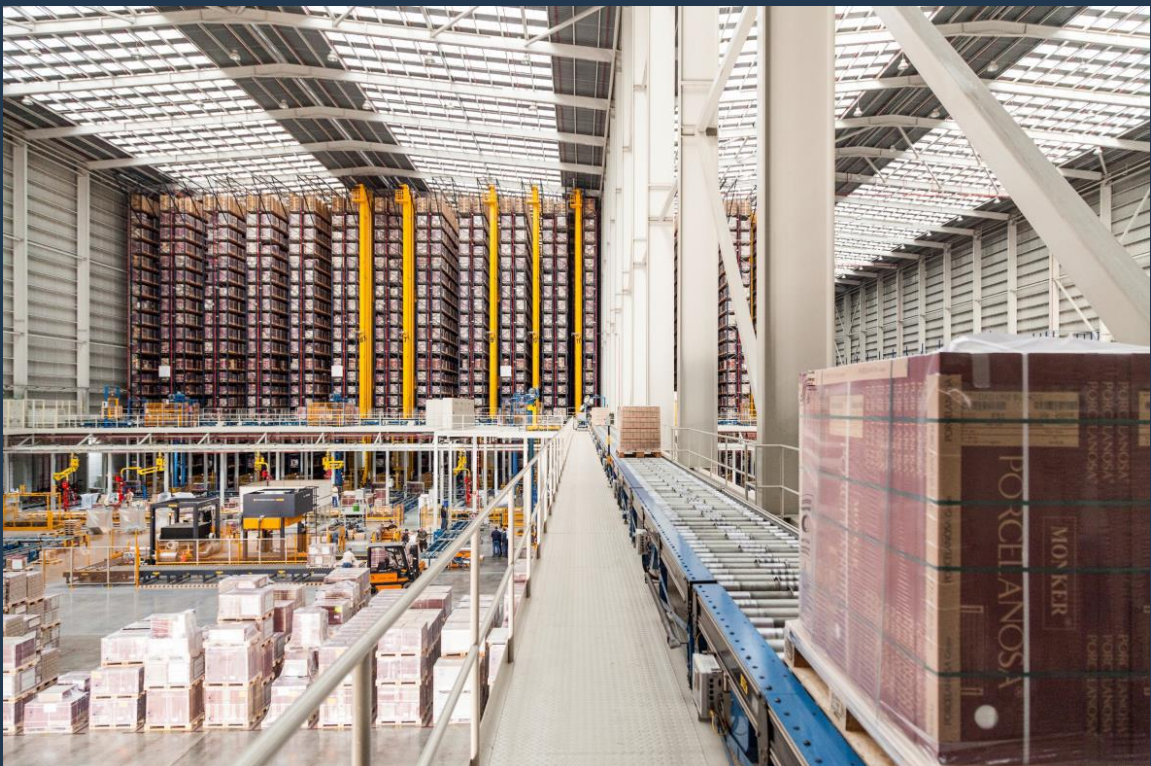


# Packaging Optimisation in the Housebuilding Sector

A report by the waste & resource use leadership group of the Supply Chain Sustainability School



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# Foreword

This report captures the learning from a major project of the Supply Chain Sustainability School involving ten partners from its waste and resource use leadership group.

Packaging is essential to how we do business nowadays - delivering protection, safe transportation, storage, product identification and a wide range of other benefits. However, it also generates huge ongoing costs and sustainability impacts. Significant legislative and policy changes are being introduced addressing packaging, with more on the horizon. It is therefore both a commercial and environmental imperative that every organisation should be developing strategies and practical actions to address these complex challenges.

Following initial research conducted way back during lockdown, four of the UK's biggest and most influential housebuilders – Bellway Homes, Crest Nicholson, Taylor Wimpey and Vistry Group, working in partnership with Waste Management experts Biffa and Reconomy, together with Ibstock, Stark Group, Saint Gobain and Zero Waste Scotland have co-funded this project, also donating their time and helping the project team to engage with 23 of their specialist suppliers, manufacturers and merchants. These organisations were selected to cover all the most



Image source: Ibstock

significant aspects and trade categories of the housebuilding process.

They have generously offered the practical expertise that provides the backbone of this report. Their innovations to optimise and reduce packaging are referenced throughout. Along with the support of the project partners this has acted as the catalyst for numerous joint projects for mutual benefit.

A final point. Though this report has been compiled using evidence purely from the housebuilding sector the content is without question relevant across the entire built environment. Supply priorities may change from one sector to another, but the principles are highly replicable. From construction to FM, via infrastructure and anything in between, we believe this report provides something for everyone.

## **Matt Nichols**

Divisional Director - Reconomy  
Chair – Supply Chain Sustainability  
School waste and resource use group

# Five tips for more sustainable packaging

## Question

if packaging is needed at all – especially plastic wrap



Image source: Vistry Group

## Optimise

wrap use by minimising thickness, specifying LDPE or LLDPE using at least 30 percent recycled content and avoiding excessive use of branding, inks and stickers



Image source: Bellway Homes

## Switch

from plastic and expanded polystyrene to cardboard or pulp for packaging elements which protect products



Image source: Taylor Wimpey

## Ensure

containers are sized appropriately to reduce the need for additional space packing



Image source: Crest Nicholson

## Engage

the whole supply chain to reduce or enable more circular use of packaging such as pallets

# Acting together

## Partner perspectives

### Housebuilders

*"Packaging represents a growing cost to our industry and a huge sustainability challenge. We must act now and the best way to do that is collectively."*

Adrian Hill  
Group Head of Procurement-  
Bellway Homes

Tobias Jones  
Group Sustainable Procurement  
Manager- Crest Nicholson

Anthony Lavers  
Sustainability Manager- Taylor  
Wimpey

Gerald Laxton  
Group Supply Chain Manager- Vistry  
Group

### Merchants and Distributors

*"Merchants and distributors can play a pivotal role here. Firstly, we can utilise our commercial relationships with manufacturers to drive change and set standards. Secondly, we can help share best practice and encourage collaboration between suppliers. Finally, we can play our own part by optimising additional packaging applied to customers' orders in our branches and distribution centres."*

Andy Boileau  
Sustainability Director-  
Stark Group

### Manufacturers and Suppliers

*"The manufacturers and suppliers' opportunity from optimising packaging is great. Most have plastics reduction targets; supportive stakeholders including staff and may achieve cost savings from reduction. Exploring different product designs, new and alternative materials and different ways to engage with customers are all value-add opportunities."*

Emily Landsborough  
Head of ESG - Ibstock

# Housebuilding by numbers

## Housebuilding in the UK

According to Government estimates 204,530 new homes were completed in the UK in the financial year ending March 2022\*.

The four housebuilding partners in this project completed over 35,000 of these properties.

### What does this mean for the UK in supply and packaging terms?

Basing estimates on just a two bedroomed house, this would account for approximately:

- 1.43 billion bricks in 114,537 individual loads
- 204,530 boilers, washing machines, cookers, fridge freezers, baths, showers and staircases
- 409,060 toilets
- 1,636,240 windows
- 409,060 external doors
- 1,227,180 internal doors
- Plus rooftiles, block paving, timber, flooring, kitchen and bathroom units, drylining, paint, silicon and mastic cartridges and other consumables.

**All the above products are contained in some form of packaging - mostly single use.**

\*Source:  
<https://www.ons.gov.uk/peoplepopulationandcommunity/housing/articles/ukhousebuildingdata/financialyearendingmarch2022>.



Image source: Ibstock



Image source: Zero Waste Scotland

# Project aims and rationale

## **verb: optimise**

*Make best or most effective use of (a situation or resource).*

*Oxford Languages*

## **Aims**

The agreed aims of this project were to “Use the collective influence and insights of the project partners to find practical collaborative ways to:

- Optimise volumes and types of packaging needed in housebuilding projects
- Improve the quality and consistency of recyclability and, ultimately, recycling for packaging that cannot be eliminated
- Influence and publicise examples of collaborative innovation between the project partners and manufacturers / suppliers and, over time, the gains made”

## **Why optimise?**

Readers may note the word “reduce” is missing from these aims. The rationale is that, though part of the challenge is indeed to reduce unnecessary packaging, it is also essential to understand and respect the realities of the challenging conditions encountered in construction and maintenance of our built environment. Weather exposure and damage on site are both common. Materials can easily become useless.

Appropriate packaging is now an essential aspect of securing, transporting, deploying and protecting an immense range of valuable construction products, components, fixtures, fittings and consumables. This reality is not just limited to housebuilding. Construction, infrastructure and facilities management all generate vast amounts of packaging and much of this also ends up as waste. Even the acutely resource conscious offsite sector generates its share.

Therefore, there is a pressing requirement to **optimise**.

## **Collaboration for success – a core principle**

Optimisation involves taking an ambitious but also pragmatic approach. It starts with acknowledging the role of packaging in providing safe, secure and adaptable transport, delivery, storage and use of a myriad of construction product and consumables. Packaging is not simply the enemy. However, all 23 of the manufacturers and suppliers interviewed as well as the 10 project partners stressed the vital importance of deploying packaging responsibly. Crucially, all were also committed to the principle of sharing any information that would not be considered commercially confidential for the benefit of sustainable development.

# Project methodology

Taking these principles as a starting point, the project focus turned to:

- Understanding and recording **actions** already taking place
- Examining opportunities for further innovation
- Uncovering current **barriers** and what could be done to resolve them
- Promoting potential for **trials and collaborative activity** between the project stakeholders.

The waste hierarchy - expressed in its simplest form as **Reduce, Reuse, Recycle** - was adopted as a reliable framework to collate content.

## Structured dialogue

The manufacturers and suppliers involved engaged in a process of structured dialogue with the project team. This revealed multiple opportunities for all concerned - housebuilders, merchants, distributors, waste and resource management contractors and policy experts alike.

The interview process examined the following core aspects:

- What packaging can be removed entirely? What changes would it take in working practices by site teams as well as sub-contractors, merchants and the manufacturers and product suppliers themselves to make this possibility a reality?

- If packaging cannot be removed, how can it be genuinely reused rather than this merely being a theoretical option? How can reuse work in practice?
- What measures are applied, where single use packaging is unavoidable or preferred, to use less carbon intensive, less heavy, lower volume and more readily recyclable materials? How does this affect the process required onsite and how can the right economies of scale be developed to ensure more recycling becomes a reality not a possibility?

## Understanding the packaging

The core of the report provides key facts about the composition, typical uses and purpose of each of the main packaging types:

- Wrap
- Corner and edge protectors
- Banding
- Pallets and bearers
- Sheets
- Bags
- Boxes
- Packing



# How to use this document

## First principles

This section is designed to prepare the reader via a short overview of some key information and principles. It is here to ensure that everyone from beginner to expert has some of the basic information needed to make progress. The material covered may also be helpful to users who wish to explain aspects of the packaging waste and resource efficiency challenge to colleagues and other stakeholders.

### Adopting the waste hierarchy and circular economy

This page illustrates how the project has focused attention to initiatives that address the three most resource efficient stages of the waste hierarchy. It also addresses the equally important principles of the circular economy.

### Policy shaping practice

Roger Wright from Biffa provides an overview on how significant changes in government policy towards taxing packaging will affect all parties.

### Barriers to change – who pays?

Emily Landsborough from Ibstock and Gerald Laxton from Vistry Group consider what is needed to make the cultural shift to sustainable packaging including how costs and responsibilities for change are met.

### The true cost of waste

It is increasingly understood that waste generates costs for the built environment far beyond the disposal bill. This section contains evidence for this and a link to an excellent resource to help the user calculate and begin to control those costs.

This page briefly explains the different kinds of polymers likely to be encountered in packaging. It also contains links to further content that will help the user in their drive to optimise packaging waste.

### Where packaging is used

A diagram illustrates where the main types of packaging are most frequently deployed, using simple graphics with colour coding to indicate the key packaging components and materials.

### Logos

Logos for product supply areas enable the user to quickly cross reference where each packaging type may be commonly encountered:

#### Bricks and blocks



#### Doors, windows, stairs etc



#### Drylining and insulation



#### Appliances



#### Consumable and small items

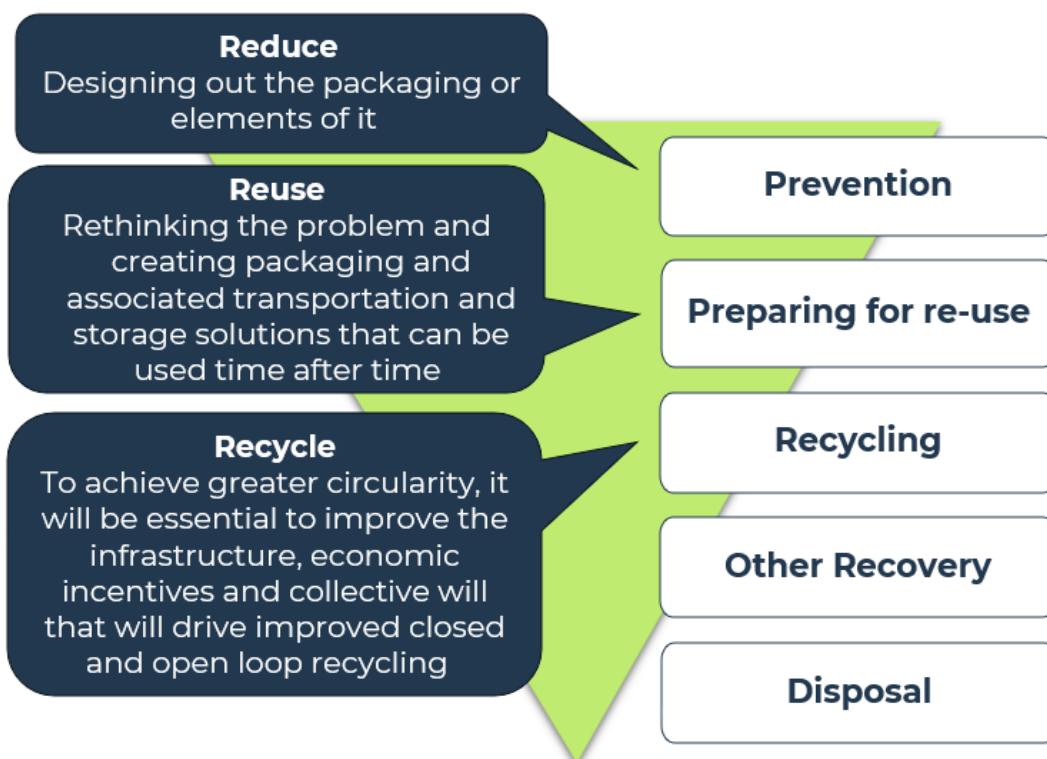


#### Kitchens and bathrooms



# Adopting the waste hierarchy and circular economy

## The waste hierarchy applied for packaging



### Use the waste hierarchy

The actions taken by suppliers and manufacturers to optimise and reduce packaging have been recorded in this report in the order expressed within the waste hierarchy, as illustrated above.

As well as being a requirement under Duty of Care the first three stages of the waste hierarchy provide the ideal structure for organisations seeking to optimise packaging.

### Look for circularity

Improving the way packaging is considered and treated also presents significant opportunity to contribute to the UK's circular economy. Here, society moves away from a "take, make, dispose" consumption-based model towards one where resources are kept in use at their highest utility for as long as possible, then repaired, refurbished and recycled into new products.

Several examples of circular business models were identified throughout this project.

# Policy shaping practice

## New schemes, new costs

Thousands of businesses including housebuilding are now learning about the impact of new Government packaging policies, with several significant changes introduced or due imminently. Whilst key decisions on a drinks containers deposit return scheme and separate collections of English business waste have been held over at least until the next parliament, there are still two very important parts of the policy jigsaw on which to focus.

### **The Plastic Packaging Tax\***

First policy element to mention is the Plastic Packaging Tax (PPT). This places a charge, currently £210.82 per tonne, on any organisation that does not include at least 30 percent recycled plastic in their manufactured or imported materials.

### **Extended Producer Responsibility\*\***

The likely reporting structure under Extended Producer Responsibility, more commonly referred to as EPR, is emerging as this report is published.

How businesses categorise their packaging will be vital in future from a reporting point of view within EPR. Whilst payment of any EPR fees have been delayed by up to a year (c.2025), the policy already introduced into law by the UK Government holds producers responsible for the packaging data collection as well as the eventual cost of physical collection, sorting, recycling, or disposal of their

product packaging. This means that even though in the short term there are no obligated fees associated with EPR, the obligated business must still accurately declare what packaging they are consuming.

UK businesses who handle packaging will still eventually need to fund the total cost of managing household and non-household packaging waste (from production to removal) in addition to their current liability. The new rules therefore aim to inspire a more transparent circular economy for packaging by creating accountability for those materials. EPR will by design, reward reduction and reuse of packaging materials, encouraging brands to think more sustainably about the lifecycle and fate of their packaging. EPR data collection also contains an additional category called “shipment” packaging, which refers to goods sent direct to households such as e-com packaging, also referred to as web retail packaging.

The most significant factor for the housebuilding sector is that EPR will also expect packaging to be classified and split in terms of data reporting into “household” or “non-household”. It will be essential to declare this, as higher fees could be applied to the “household” proportion. For clarity, under EPR all primary and shipment packaging should be declared as “household”, then all secondary and tertiary packaging as “non-household”.

With thanks to Roger Wright  
Waste Strategy and Packaging Manager - Biffa

# Barriers to change – who pays?

## The procurement challenge

*“This project has highlighted the progress our suppliers and manufacturers have made in reducing the use of plastic in the supply chain. Collectively we can make a difference.*

*It has also highlighted the need for procurers to consider standard packaging specifications as part of the order process.”*

Gerald Laxton  
Group Supply Chain Manager – Vistry Group

## Manufacturing and supply

*“Ongoing adjustments in government policy concerning producer responsibility, spiralling costs of materials and the collective need of all to drive down environmental impacts have combined to make the need for progress clearer than ever.*

*However, for supply chains, there are three big challenges to packaging optimisation:*

**Product quality** - poorly planned reduction can compromise efficiency on site, for example product could be wasted inadvertently where materials are moved multiple times in the build lifetime with less packaging and therefore less protection

**Site culture** - packaging has become considered essential by some contractors at site level. This can run counter to corporate expectations of housebuilders driving packaging optimisation programmes

**Cost** - equipment often varies across a manufacturing estate, making alterations and packaging specification changes expensive and resource intensive to implement. Costs can be high where alternative materials need R&D and where new approaches, such as reusable packaging, require high initial outlay and ongoing operational spend. The question then remains – who pays?”

Emily Landsborough  
Head of ESG - Ibstock

# The true cost of waste

*“Ordering a skip of this size at current rates from a reputable waste and resource management supplier would cost around £300 plus VAT.*

*We estimate the actual cost of procuring, handling, managing and ultimately, disposing of the material contained would actually be more like £2,400. Our research proves packaging is a major contributor.*

*Our Site Waste Reduction Protocol tool enables users to estimate costs for materials, labour, damages and errors, equipment, container hire and VAT. The example shown contains genuine data from a typical housebuilding site.”*

Stephen Boyle  
Manager: Built Environment  
Zero Waste Scotland

**School and project partner Zero Waste Scotland have researched the true cost of waste contained in a typical 8-yard construction skip.**

**Identifying waste by source enables engagement with people relevant to the processes concerned – site workers, designers, procurers and quantity surveyors.**



Image source: Zero Waste Scotland

Learn more [here](#)



Image source: Zero Waste Scotland

# Understanding plastics

## Polymer types







According to research the School and its partners conducted in 2021, plastics remain a highly challenging packaging stream. They represent around a third by tonnage and potentially, due to the space they take up in skips, a much higher proportionate volume of housebuilding packaging waste requiring recycling or disposal.

To manage plastic packaging well, it is essential to become familiar with the main polymer types likely to be encountered. The most common ones are illustrated in the diagram opposite, kindly provided by the Alliance for Sustainable Building Products (ASBP), who conduct excellent work in this area.

## The Zap Toolkit

The project partners also recommend those interested in packaging optimisation to read and make use of ASBP's ZAP (Zero Avoidable Packaging Waste in Construction) Toolkit, from where this "which Polymer" key was derived.

Read more about ASBP and the ZAP Toolkit [here](#).

symbol		Full name
	PETE (PET)	Polyethylene Terephthalate
	PVC	Polyvinyl chloride
	PE -HD/ PE-MD	Medium/ high density polyethylene
	PE-LD/ PE-LDD	Low density polyethylene
	PP	Polypropylene
	PS	Polystyrene
	EPS	Expanded polystyrene



The UK construction sector produces **35,000 tonnes** of plastic packaging waste **EVERY YEAR**.

This is the equivalent of enough construction stretch wrap to go around the earth's circumference more than **170 TIMES\***.



\*Based on a 0.4x300m roll of 23mu construction film at 1.5kg per roll

# Where packaging is used



## LEGEND - packaging components and materials

### Wrap

aka bagging, stretch wrap, shrink wrap  
LDPE / LLDPE

### Corner and edge protectors

EPS, hard plastic, cardboard, pulp

### Banding

aka strapping  
PET, polyester, polypropylene, card

### Pallets

or bearers  
timber, chipboard

### Sheets or sleeves

cardboard or corrugated  
polypropylene

### Bags

flexible plastic or paper

### Boxes

cardboard

### Packing

polystyrene, paper

# Findings by packaging type

## How to use this section

This section is structured to focus one by one on each of the packaging elements most typically used:

- Wrap (by far the largest section)
- Corner and edge protectors
- Banding
- Pallets
- Sheets
- Bags
- Boxes
- Packing
- Anything else of note.

For each packaging element the analysis highlights measures taken by the 23 manufacturers and suppliers and the 10 partners involved in this project. A wealth of knowledge and experience is illustrated in the range of interventions taken.

### Key facts

For each core packaging element, a short explanation of the typical composition, uses and purpose is provided which is then examined using the following structure:

### Actions

The learnings from the project stakeholders are covered here, using only the three highest levels of the waste hierarchy – described in their simplest terms as “Reduce, Reuse, Recycle” – as a structure by which to track the actions taken.

### Barriers to implementation

The barriers and challenges encountered have been examined, along with ideas for overcoming them. Resistance to change remains a constant challenge.

### Possible trials

The best way to test a new initiative is often through a managed trial.

Practical examples and opportunities for conducting such exercises are covered for each packaging element.

### Case studies

Some of the best examples encountered throughout the project are referenced via short case studies, illustrating what is possible.



Image source: Staircraft



# Wrap



## Key facts

- **Includes:** Shrink wrap, stretch wrap, bags, pallet hoods
- **Typical composition:** LDPE or LLDPE, containing varying amounts of recycled content
- **Uses:** one of the most typical and abundant packaging elements. Multiple uses including primary, secondary and tertiary packaging
- **Purpose:** protection from elements and physical damage, securing products in place, bundling for use at plot level, can carry marketing content and stickers containing essential product information

## Actions

All interviewees utilise wrap and all are taking steps to reduce its impact, recognising that as a thin plastic it is likely to be placed in dry mixed recyclables (DMR) skips or containers.

### Reducing need

Removing wrap from products: some suppliers have found that wrap is unnecessary and removing it has caused no concerns or issues. In other cases, removal has caused teething problems. However, compromises have been found by, for instance only wrapping critical parts of the load such as the top layer to protect from the elements, or simply improving customer communications to explain why changes are being made. Some suppliers now only wrap on request.

Moving to stretch wrap from shrink wrap, can sometimes result in less overall material use.

Mechanising the process of wrap application can ensure only the exact amount needed is used.

Thinning the wrap as much as possible reduces tonnage. **Marshall's** reported that this results in carbon savings as the ovens which perform the shrink wrapping process can run at lower temperatures.

**Tarmac** reduced wrap thickness from 24 to 12 micron with 30 percent recycled content and have invested in optimisable stretch wrap machinery to reduce usage.

Maximising the amount of product sent in one load reduces the amount of wrap needed.

Providing guidelines and training for staff helps ensure manually applied wrap is used efficiently.

### Enabling reuse

Reusable alternatives are being employed where products still need protection from the elements. This works particularly well when suppliers have their own logistics operations.

Options include:

- Blankets which are washed and reused (appliances)
- Corrugated sleeves (doors)
- Reusable netting and velcro straps (consumables)
- Reusable plastic hoods (bricks, blocks etc).

# Wrap



## Recycling

Several suppliers are:

- using fully recyclable wrap
- increasing recycled content of the wrap to 30 percent or more - **Symphony** are introducing a new worktop protection solution (ProplexRe) which is made from 100 percent recycled corrugated polypropylene and is a closed loop system
- reducing ink coverage and moving from coloured to white inks on wrap to enhance recyclability.

Overcoming some of these would create huge opportunity for packaging optimisation.

Extra content is included in the following two pages linking the most challenging barriers to actual and theoretical trials currently in progress, or that could be undertaken.

## Case study: Insulation

Insulation can be a large generator of onsite wrap packaging waste.

**Knauf Insulation** have introduced several measures including optimising product amount per pack and number of packs per pallet, thinning wrap to the minimum and adjusting inks used to make wrap more readily recyclable.



Image source: Symphony/Protec

## Barriers to improvement

Wrap is virtually universally adopted as a packaging option. It is unsurprising that its continued extensive use generates a wide range of technical and behavioural challenges.



Image source: Knauf Insulation

# Wrap



## Barriers and Possible trials

### Barrier

### Possible trials

A common use of wrap is to aid actual or perceived safety levels for product transportation and use. Safety is essential and can be addressed in many cases by using strapping alone, but there are still sometimes safety concerns from customers and sub-contractors

Several suppliers are trialling under controlled conditions removing wrap previously provided as an extra safety layer. This is an area for continued collaboration between the manufacturer, merchants, sub-contractors and housebuilders

Communication and knowledge sharing is vital when considering removing wrap, with products offering varying transportation challenges and susceptibility to damage

Several suppliers were willing to trial reusable covers, including addressing logistics of ownership, return and possible deposit schemes. In some cases, merchants may be best placed to manage this flow.

Housebuilders can assist by supporting trial provision of reusable covers and by providing covered areas at least for priority products to reduce residual risk of rain or soiling damage

Wrap is often used to carry essential product information or marketing content, either via stickers or use of inks, both of which reduce recycling value.

**Marshalls** are investigating placing essential product and branding information directly onto areas of the product which are not visible once the build is complete

Some suppliers reported resistance from marketing departments on removal of logos from wrap

Standards for initial appearance at handover can be high, even for products that will spend their lifetime outdoors. This is especially the case with concrete products which are susceptible to efflorescence

**Marshalls** have added hydrophobic additives to their concrete block paving to ensure even greater quality in terms of strength, UV fade and weather resistance whilst enabling removal of plastic wrap

# Wrap



## Barriers and Possible trials

### Barrier

### Possible trials

**Stormking** provide a wide range of GRP products that can sit on site for a long time before use. They reported challenges with potential for damage in transportation from trialling a reusable blanket system in place of durable shrink wrap and foam. The housebuilder was also understandably keen to retain the protective blanket until the products were used, creating logistical challenges for packaging return

There is a requirement for project specific training, buy in and allocation of responsibilities in any trials. This is particularly true for trials involving complex logistics

Reclaiming reusable protective layers can generally be challenging in practice, especially if housebuilders and subcontractors wish to continue to use packaging material informally on site

Trialling just in time delivery for appropriate products could provide a solution to this issue, also reducing risk of damage

Increased product breakages can become a problem when the recycled content of wrap is increased

The true impact of this area is not currently well understood. Suppliers and housebuilders to monitor

Although biodegradable wraps are available there is little current incentive to use these in the UK. The additional costs and supply chain environmental impacts associated with these more novel products need to be better understood.

Biodegradable material is still counted as virgin plastic for the Plastic Packaging Tax. Infrastructure for its treatment at scale is lacking in the UK and there is a significant risk of cross contamination with conventional plastics during recycling

Utilisation of "green PE", such as wraps made from sugar cane-based polymers, is being considered by some suppliers. This area will be difficult to trial but should be borne in mind as incentives and infrastructure for use of such materials improve. Any locations using a proportion of biodegradable packaging should include very clear communications addressing segregation

# Wrap



## Case studies: Bricks and blocks

**Ibstock** are working towards removing all non-essential shrink wrap, saving 200t tonnes of plastic, in an 18-month project period prior to 2023, purely by reducing thickness.. They plan to remove wrap entirely for some products, keeping banding only for safety. By removing the wrap “bag” they estimate to have already saved c.55T plastic in 2023. This work is being trialled carefully and only where safety and quality of the product is not impacted.

**Wienerberger** have carried out trials to remove plastic hoods for bricks and keeping a wrap ‘skirt’ around the middle of the brick load. Bricks remained stable during transportation and so this method has been adopted at their Denton site. There was a substantial decrease in plastic use as a result. Varying brick configurations during transport of some products precludes immediate mass adoption but research continues into the possibilities.

**Forterra** have been shipping bricks from one of their plants without wrap for many years and there have been very few problems with this method. Customers can request bags at an additional cost, but take-up is low.

Wrap has recently been removed completely at another of their production facilities, resulting in a plastic reduction on the brick pack of over 80 percent. In testing, pack integrity has been maintained, and there are no concerns around water damage as customers are conditioned to use protective tarpaulins onsite.

Wrapping bricks is generally a relatively new thing. Historically, bricks were routinely delivered unwrapped. Returning to acceptance of unwrapped product can be challenging with stakeholders citing safe handling of packs on site against instances of splitting and other issues. Communication is essential with customers and subcontractors on site, so all involved understand the properties and limitations of the packaging and reasons for the intervention.



Image source: Ibstock



Image source: Ibstock



Image source: Ibstock

# Corner and edge protectors



## Key facts

- **Includes:** any element which connects to the product and protects against damage, including top and bottom trays and edge strips
- **Typical composition:** hard plastic, EPS, pulp, cardboard
- **Uses:** high value products such as white goods, kitchens and bathrooms, doors, stairs and dormers
- **Purpose:** primarily for protection, these elements can also carry product information, help to secure the product in place, or facilitate stacking

## Actions

Corner and edge protectors vary significantly in design and can be bespoke to the product in question. They are amongst the most common elements to be targeted for optimisation but are challenging to remove without risking damage to high value products. Therefore, most interventions focus on changing the material used from plastics to card and pulp, increasing recycled content and recyclability.

## Reducing need

Tailoring design to minimise mass: **Ibstock** have calculated moving from generic edge strips to product specific optimised designs across their full range would save 16T of plastic a year.

Several suppliers have optimised use of expanded polystyrene. More work is needed to fully remove it.

## Recycling

Suppliers including **Baxi/BDR Thermea, IG Doors, JELD-WEN, Masonite, Roca, Symphony** and **Whirlpool**, are in the process of replacing EPS or other plastics with cardboard or pulp to enable recycling and biodegradation. **Whirlpool** are actively seeking to collect cardboard protectors and trays, though complex third-party logistics make collection challenging.

## Barriers to improvement

- Biodegradable EPS is not currently readily recyclable
- Finding cardboard or pulp solutions capable of withstanding of stacking, transport and movement impacts. Some trials have resulted in increased damage
- Cardboard or pulp elements must be waterproofed for products left outside for extended periods
- Where EPS use is unavoidable the options are currently limited
- Sourcing recycled EPS is difficult with material in high demand.



Image source: Symphony

# Corner and edge protectors



## Possible trials

**Whirlpool** are in the early stages of looking into opportunities to recycle used EPS into thermal blocks.

Housebuilders were interested in setting up trials for re-use of hard plastic corners on a project of sufficient size.

**Purmo** are actively investigating recyclable alternatives including changing from black to white plastic.

**Stormking** currently use plastic-based protection for their large GRP products. There is good reason for this, as they can spend large periods onsite where they are at risk of damage before installation.

Changes would in practice require just in time delivery arrangements with housebuilders to maintain optimum appearance of the product at installation.



Image source: Baxi

## Case study

**Symphony** switched from plastic corner protectors on doors to 100 percent recycled pulp corner protectors. This has saved 13 million plastic corner protectors from being used over a three-year period.



Image source: Symphony

**Baxi/BDR Thermea** have replaced a polystyrene top and bottom tray with cardboard pulp alternatives on one of their products. This solution performed comparably in transit, drop testing and crush testing.

A challenge to overcome was maintaining the effectiveness of the protection when exposed to water. This was achieved, applying a coating that also did not impact recyclability.

In lifecycle assessment, it was found that cardboard reduced toxicity and resource depletion but had a higher water use than EPS. This was mitigated through responsible supplier selection. If this solution is applied across all products, it is estimated to eliminate 110T of EPS per annum.

# Banding



## Key facts

- **Includes:** banding, straps
- **Typical composition:** polypropylene, polyester, PET, card
- **Uses:** bricks and blocks, as well as some doors, cabinetry, timber products and plumbing products
- **Purpose:** securing products to each other and/or pallets or bearers. Sometimes carrying product information

## Actions

### Recycling

**Porcelanosa** and **Staircraft** have been able to source banding with 90 percent plus recycled content.

**Lee Bros** trialled the use of hemp strapping in place of plastics.

### Barriers to improvement

- This area would benefit from further collaboration. Banding is a staple item in product packaging and a familiar sight in skips

- Dialogue with clients is essential, as strapping plays a vital role in keeping products secured and any perceptions that adjustments affect safety will result in project failure.

## Possible trials

Moving towards paper or other bio-based materials.

Conducting research to understand the fate of banding, particularly whether it is recycled or not.

## Case study

**Lee Bros**, a consumables supplier, are trialling a card-based, heat-sealed strapping alternative which is working well in testing.

Some vehicle drivers and customers have reported initial unease due to perception that the strapping may be less robust. They are trialling this with more customers to develop confidence.



Image source: Baxi



Image source: Istock



# Pallets



## Key facts

- **Encompasses:** Pallets, europallets, bearers
- **Typical composition:** timber, occasionally plastic
- **Used on:** All product categories except some white goods, plumbing/heating products
- **Purpose:** securely and efficiently carry products in transit, allowing lift of multiple products in one go

## Addressing the impact

Use of pallets or bearers to transport multiple products is very common amongst suppliers to housebuilding. Although there is some evidence of return and reuse of pallets, especially when they are standard sizes, most suppliers still treat pallets as single use. This is typical behaviour across the entire built environment.

### Reducing need

Engineering pallets to use as little timber as possible. **Knauf Plasterboard** switched to more lightweight bearers from traditional pallets with no reported issues such as forklift damage.

Giving customers the option of not using pallets if they are not needed.

Redesigning products to be palletless, including designing in holes for forklifts between lower layers, and banding products together.

### Enabling reuse

Many pallets are standard sizes, robust and can be used to carry a

wide variety of products. Due to this, encouraging reuse is a common intervention being adopted or trialled. This reduces waste and pallet collection can reduce occurrence of lorries returning empty to supplier facilities, therefore increasing carbon efficiency.



Image source: Ibstock

## Case studies

**Marshalls** offer alternative SKUs whereby customers can choose a palletted or palletless delivery for certain products.

**Knauf Insulation** have introduced a free pallet collection scheme through Scott pallets. Pallets are collected from customers, checked and repaired if needed and returned into the system for reuse. They will increase the collection rate further through identifying what the main current challenges are and overcoming these.

**JELD-WEN** are trialling returns of pallets via a joinery supplier/distributor. This improves circularity, making use of backhaul via returning vehicles.

# Pallets



## Barriers to improvement

- A common barrier to reuse is making sure enough are returned. This is more difficult when logistics are outsourced and/or the product goes through a distributor stage. Return is largely impractical for overseas manufacture. Successful repatriation can be achieved where pallet providers manage collection and repair, and through working with other supply chain organisations
- Lack of storage space at sites or merchant facilities before collection was cited as a significant challenge. Housebuilders indicated they should generally have sufficient site storage, but this is a site practice and waste management planning issue
- Where customers can choose to not use pallets, care must be taken that this is under circumstances that will not result in unsafe practices
- Lack of standardisation affects more widespread recirculation amongst multiple suppliers and housebuilders. Standardisation makes collection and reuse easier
- Pallets can become damaged by informal use on site which means they will usually be disposed of before their reuse capabilities have been fully realised.

## Possible trials

Housebuilders indicated willingness to trial improved storage for pallets. Dialogue and liaison is required with merchants and other intermediaries.

Packaging recovery, repair and reuse service schemes offered by some pallet providers and pallet pooling schemes such as **the PalletLoop** offer service-oriented models that contribute to the circular economy.

Trialling more standardisation and branding of pallets so they can be identified and returned more easily would be beneficial.

Where reuse loops for pallets or bearers are not viable it may be beneficial to explore non-timber recyclable materials. One possible option is **Stormboard**, a material made from “hard to recycle” plastics.

**Lee Bros** trialled reusable pallet netting, reusable pallet straps and paper strapping. These nets come in multiple sizes to fit a range of pallet heights, can be secured to the pallet at the bottom via four straps, and have a draw-string top to close.

## Case study

**Symphony** partners with a local pallet supplier who provides, takes back and repairs where necessary the used pallets. The supplier follows a hierarchy-based approach and achieves zero waste to landfill.

**Tarmac** work with partner organisations to collect pallets and achieve an increasing repatriation rate, currently achieving around 80 percent.

# Sheets



## Key facts

- **Includes:** sleeves
- **Typical composition:** cardboard
- **Uses:** primarily doors, and kitchens and bathroom cabinetry
- **Purpose:** protects flat items being damaged from contact with each other

## Actions

This was an area of investigation where not much activity was reported. There are opportunities for organisations to do more.

## Recycling

Introducing recyclable corrugated sheets for product protection.

## Case study

**IG Doors** utilise the Proguard recycling scheme, deploying a recyclable corrugated polythene protective sheet which reduces need for shrink wrap. Added at the manufacturing stage and remaining on the door until handover, this provides welcome protection from bumps and scratches. The packaging is then collected by **Beck Group**, a third-party company and recycled with certification for production of new sheets.

This closed loop circular solution works particularly well as **IG Doors** are increasingly installing as well as supplying doors and are thus alert to the proscribed recycling process.

## Barriers to improvement

- This and other potential initiatives require commitment for set up and increased operational costs. Requirements include need for site access and space for storage of sheets before collecting
- If progress is to be made, housebuilders and their supply chain may need to collaborate further on sharing cost as well as risk.

## Possible trials

**Bellway Homes** have expressed interest in collaborating further on adopting the **IG Doors Proguard** system.



Image source: IG Doors

# Bags



## Key facts

- **Includes:** primary or secondary packaging that contains small items, consumables, and loose material.  
N.B. Some brick manufacturers refer to the outer thin plastic layer that protects the products as the 'bag' however initiatives regarding this are detailed in the wrap section.
- **Typical composition:** thin plastic (LDPE, LLDPE), paper
- **Uses:** consumables, ironmongery, installation kits, aggregates
- **Purpose:** contains loose items or materials, carries product information, enables product to be viewed without opening

## Actions

Thin plastic commonly finds its way into unsegregated dry mixed recyclable waste. Suppliers are therefore making efforts to switch towards paper and card where possible and improve recyclability.

### Reducing need

**Carlisle Brass** have removed the plastic from a wide range of their ironmongery products.

**Roca** have successfully removed the plastic bags from a variety of their products such as taps and hinges.

**Toolstation** have implemented a process switching from individual bags to supplying multiple products in cardboard boxes. As well as reducing packaging this makes product access much simpler for installation teams.

## Enabling reuse

**Travis Perkins** are exploring a potential take-back scheme for customers to return used bulk bags for reuse, or if that is not practicable, recycling.

## Recycling

Multiple suppliers have unsurprisingly increased the recycled content of bags to above 30 percent in line with the current Plastic Packaging Tax threshold. This demonstrates that the tax is beginning to have its desired effect.

Switching from plastic bags to readily recyclable cardboard boxes for suitable products has reportedly been well received by customers.

Some use of biodegradable bags or bags made from biopolymers are also being used by suppliers.

**Travis Perkins** are planning for distribution centres to install stations where incoming packaging will be removed and reused or deposited into separate waste streams. This allows material to be processed and sent for recycling more efficiently.



Image source: Travis Perkins

# Bags



## Barriers to improvement

- **Travis Perkins'** initial exploration of a take-back scheme for used bulk bags has identified operational challenges due to the legal requirement for a waste transfer note on the return of each bag. This requirement for customers to complete documentation for each bag is time consuming, complicated and challenging to implement
- There are reports of shortages and higher than normal costs where sourcing 30 percent recycled content plastic bags
- Many bags are sourced from specialist packaging suppliers. Though some good examples were identified, more collaboration is needed to switch to new materials or increase recycled content
- There is substantial risk of cross-contamination through biodegradable material becoming unwittingly mixed in with conventional LDPE
- It is often considered important in retail environments that the product is visible through the bag. This limits the amount and grade of recycled content plastic that can be used
- Some bags are sometimes not considered suitable for recycling due to containing construction material residues.

## Possible trials

Improving application of waste legislation.

The **Travis Perkins** takeback scheme mentioned under the barriers section shows a typical example of an initiative that might benefit through a pragmatic approach from regulatory agencies.

Switching from plastic to paper bags. It was indicated by one supplier that this would increase costs as it would reduce the amount of packaging that could be carried out by a machine.

Sending products out loose within a larger "plot box".

Applying cheaper, opaque recycled plastic bags to products where visibility is unnecessary. This requires acceptance from retail customers.

## Case study

**Tarmac** offer 'net zero' bags which use biopolymers, including some recycled content, with the manufacturing process powered by renewables. These carry a cost premium for customers wishing to specify them.

# Boxes



## Key facts

- **Includes:** boxes, trays
- **Typical composition:** cardboard, hard plastic
- **Uses:** appliances, tiles, consumables and small items, bathroom fittings
- **Purpose:** contains products, also sometimes carries product information

## Actions

### Reducing need

Reducing the size of packaging to better fit the products has been carried out by a number of suppliers. **Carlisle Brass** found that this resulted in them being able to place 720 levers per pallet compared to, originally, 360.

In France, **BDR Thermea/Baxi** are trialling use of hexagonal and rounded boxes to achieve greater packing efficiency.

**Toolstation**, as mentioned previously, have developed a process for fitting multiple products into a single box. This results in less boxes being used and has reduced the need for plastic and labels.

### Reuse

**Travis Perkins/Toolstation** also keep and reuse boxes that originate from upstream suppliers, to reduce the number of new boxes required.

### Recycling

Methods to improve product recyclability include the following examples:

**Carlisle Brass, Porcelanosa, Purmo and Roca** all use natural-coloured boxes rather than bleached white materials on key products. Minimising ink coverage on boxes, reducing marketing coverage and digitalising product information rather than applying stickers also all contributed to increased recyclability.

**Travis Perkins** have moved from hard plastic boxes for screws and nails to cardboard boxes with a clear plastic window to allow the customer to see the product. Generally, using recycled cardboard and ensuring it is fully recyclable was a priority.

## Barriers to improvement

- When making the transition from individual to bulk boxing it is important to communicate this internally to avoid boxes being inadvertently broken down and individual products removed to be distributed.

## Possible trials

**Carlisle Brass** trialled moving from plastic boxes with display hooks to a combined cardboard box with reusable plastic hooks. In practice the hooks are treated as single use, so further trials will be needed to address this obstacle.

# Packing



## Key facts

- **Includes:** air pillows, void strips, bubble wrap
- **Typical composition:** polystyrene, paper, thin plastic
- **Used on:** a variety of products
- **Purpose:** reduces movement of products within outer packaging

## Addressing the impact

### Reducing need

**Ibstock** is removing the void strip between blocks which when completed should save about 33T of plastic a year.

**Toolstation** have expanded the range of box sizes they provide to allow a better fit to products and have also provided training to staff on how to optimise packing. This has reduced waste and excess packing.

**Toolstation** have reported reducing the need for air pillows, reducing cost and the amount of packaging used.

**Symphony** have removed EPR infill from their packing, other than from some appliance suppliers who presently remain reluctant to change.

These actions reduce cost due to decrease in packaging used. They also reduce cost and environmental impact of transportation.

### Recycling

Suppliers have increased the recycled content of their plastic packing such as bubble wrap to 30 percent.

## Case study

**Porcelanosa**, have worked over the past few years to improve the sustainability of their packaging for tiles. The boxes have been optimised to use the minimum amount of cardboard possible to keep products stable during transportation and storage. Thus, the need for additional packing is eliminated.

The cardboard used is 100 percent recycled and fully recyclable despite still maintaining some printing on the box. The smallest box size now has about 50 percent printed surface and other boxes less.



Image source: Porcelanosa



Image source: Stark Group

# What else can be done?

## The current state of play

Based on the project findings, every organisation interviewed is doing something to respond to the packaging optimisation challenge. Below are examples of additional offers that are available right now, as well as some thoughts on ideas that could be trialled. What these examples have in common is that they do not quite fit neatly under the packaging headings used to structure this report, but they are all highly relevant to the change in mindset needed to revolutionise the approach needed for packaging.

## Signs of the times

Site signage is typically a single use process, with thousands of signs being consigned to skips as projects are completed.

**Lee Bros** offer a closed-loop recyclable site signage range. They collect the signs once used and return them to the manufacturer with a waste transfer note. The manufacturer then utilises a closed loop system to recycle the material. Circular initiatives like this reduce the impact of materials which are commonly disposed of after use.

## More on pallets

**Saint Gobain** are investigating ways to improve pallet recycling via third parties, finding ways to increase repatriation levels by collecting pallets from hubs and retail groups, inspecting and then repairing them so they can be reused.

## Reducing paperwork

**IG Doors** have adopted a QR code system to provide essential product and installation information for their doors. This removes the need for paper or sticky labels, saving time and money. The principle is highly replicable.



Image source: IG Doors

## Sausage technology

**Lee Bros** work with an upstream supplier to supply silicon “sausages” to be used as refills for cartridges, allowing these normally single-use containers to be reused multiple times.

Around 200,000 single use cartridges are currently used per year by the four housebuilding partners involved in this study alone. The diversion potential is huge. Single-use cartridges are hazardous waste, typically disposed of in drums carrying a unit cost of c.£150. With each containing space for c.745 cartridges, this equates to 268 drums. Making the switch could generate potential annual baseline cost savings of up to £40,000.



# Solving common challenges

The often complex and circuitous route by which materials move from their manufacturing locations to housing plots presents challenges for all concerned.

It is unlikely that these methods of product distribution will change much. If they do it is possible that more rather than less product could in future be received, transported and delivered via intermediaries - including manufacturers' regional distribution hubs, merchants, and sub-contractors responsible for direct delivery of work packages.

The best solution is therefore to maintain dialogue between the concerned parties and find ways to optimise packaging content throughout. In essence, keep talking and keep doing.



Image source: Stark Group

This report results from dialogue between organisations who recognise they can achieve more together than individually. In the cut and thrust world of procurement and cost management, this kind of dialogue is best conducted either before tenders are issued to properly explore the art of the possible, or midstream as part of supplier relationship management with trusted supply partners.

Packaging optimisation is challenging. By adopting an open and honest approach there is considerably more likelihood that all concerned will not only agree what can be done, they will also actually see it through and be happy with the outcome.



Image source: Staircraft



Image source: Stark Group

# A final message

## Remember the five tips

**Question** if packaging is needed at all – especially plastic wrap.

**Optimise** wrap use by minimising thickness, specifying LDPE or LLDPE using at least 30 percent recycled content and avoiding excessive use of branding, inks and stickers.

**Switch** from plastic and expanded polystyrene to cardboard or pulp for packaging elements which protect products.

**Ensure** containers are sized appropriately to reduce the need for additional space packing.

**Engage** the whole supply chain to reduce or enable more circular use of pallets.

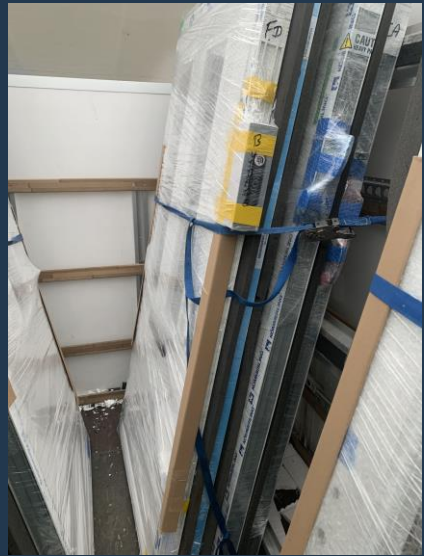


Image source: Masonite

## Three closing thoughts

Finally, a threefold message to anyone or any organisation looking to make headway in this area – remember to **Classify, Optimise, & Harmonise**.

**Classify** packaging in a much more detailed way than before. The effort is worth it because of the insights and improvements it could reveal. This will also become essential knowledge as EPR takes hold.

**Optimise** as much packaging as possible using the examples from this report for inspiration. This will immediately mitigate risk and help to save money.

**Harmonise** still further. Challenge the norms of the role of packaging. Over time this will make any organisation more circular and sustainable.



Image source: Stark Group

# Further Reading

Some of the partners and suppliers involved in this project have provided links to further content. This material may be of use to any organisation that is ambitious to become more sustainable and circular:

## **ASBP**

Website - <https://asbp.org.uk/>

## **Biffa**

Extended Producer Responsibility - A Practical Guide - <https://www.biffa.co.uk/biffa-insights/practical-guide-to-epr>

## **Marshalls**

Sustainability page - [www.marshalls.co.uk/sustainability](http://www.marshalls.co.uk/sustainability)  
EPD library - [www.marshalls.co.uk/commercial/epd-library](http://www.marshalls.co.uk/commercial/epd-library)

## **Porcelanosa**

The Green Issue - <https://www.porcelanosa.com/recursos/catalogos/PG-The-Green-Issue-n3.pdf>

## **Symphony Group**

Sustainability page - <https://www.symphony-group.co.uk/sustainability/>  
Sustainability brochure - <https://symphony-group.co.uk/brochures/sustainability/>

## **Tarmac**

Sustainability strategy - <https://tarmac.com/sustainability/sustainability-strategy/>  
Net zero roadmap - <https://tarmac.com/net-zero-roadmap/>

## **The Pallet Loop**

Website - <https://www.thepalletloop.com/>

## **Whirlpool**

Sustainability page - <https://www.whirlpoolcorp.com/environmental-sustainability/>

## Further policy information

### **\*Plastic Packaging Tax**

A tax on manufactured or imported plastic packaging components containing less than 30 percent recycled plastic.

<https://www.gov.uk/guidance/check-if-you-need-to-register-for-plastic-packaging-tax>

### **\*\*Extended Producer Responsibility (EPR)**

A policy being introduced by the UK government holding producers responsible for the collection, sorting, recycling, or disposal of their product packaging. UK businesses who handle packaging will in future need to fund the total cost of managing all the packaging waste they put on the market, including the packaging that ultimately needs to be dealt with by homeowners. The new rules aim to inspire a more circular economy for packaging by creating accountability for materials. EPR will reward reduction and reuse of packaging materials, encouraging brands to think more sustainably about the post-purchase lifecycle of their packaging.

<https://www.gov.uk/guidance/extended-producer-responsibility-for-packaging-who-is-affected-and-what-to-do#check-if-you-need-to-take-action>

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[Baxi](#), [Carlisle Brass](#), [Forterra](#), [Ibstock](#), [IG Doors](#), [Indesit/Whirlpool](#), [JELD-WEN](#), [Lee Bros/Bunzl](#), [Knauf Insulation](#), [Knauf Plasterboard](#), [Marshalls](#), [Masonite/Premdor](#), [Porcelanosa](#), [Purmo Group/Myson](#), [Roca](#), [Stark Group](#), [Staircraft](#), [Stormking](#), [Symphony Group](#), [Tarmac](#), [Travis Perkins](#), [Wienerberger](#)

Thank you also to the Association for Sustainable Business Products for access to content from the ZAP - Zero Avoidable Packaging Waste in Construction project

Find it [here](#).

# SUPPLY CHAIN SUSTAINABILITY SCHOOL

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