



**Ibstock**  
At the heart of building



# Delivering on Dematerialisation







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# Introduction

In 2022 we published our ESG Strategy to 2030. One of the many positive outcomes of having a well-articulated sustainability framework is that it provides a point of focus and clear prioritisation for the challenges we face as a business and as a society. For us, one of the most challenging of our priority areas is dematerialisation which falls under one of our three ESG strands, ‘Manufacturing Materials for Life’.

This paper, *Ibstock: Delivering on Dematerialisation* communicates the work we are doing to deliver on our commitment to dematerialisation. It aims to explain how our ESG Strategy has galvanised action and accelerated our activities and investment in this area within Ibstock. We also cover the contextual landscape for our decision to prioritise dematerialisation; and we explain the technical changes we are trialling and making in our bid to reduce the amount of raw material we use in the manufacture of our products.

## IDEAS TRANSFER: HOW TO LEARN FROM OUR EXPERIENCES

As any building products manufacturer will testify, dematerialisation is not a simple thing to deliver. It requires time and patience and an appetite for innovation. It also requires collaboration with partners, and investment in equipment and resources. This paper tells our dematerialisation story. Within it, we have tried to provide:

- An open, honest and truthful account of the work we have done to date
- An explanation of the challenges we have faced along the way
- An overview of the work we still need to do

Our intention is not to provide a ‘defacto blueprint’ for others to follow. More accurately, it is a good practice sharing guide that can be used by our customers, our partners and industry peers. We also hope that our wider stakeholders, including our investors, shareholders and colleagues, will find this to be a useful insight into the work we are doing in this area.

We do not consider ourselves to have all the answers to dematerialisation, but by sharing an overview of our work, as well as the learnings we have gleaned so far, we hope to demonstrate industry leadership that inspires others to follow similar paths.

*Dematerialisation is not simple. It requires time and patience and an appetite for innovation.*

*Emily Landsborough*

Emily Landsborough  
Ibstock plc, Group Sustainability Advisor

# Context

## WHAT DO WE MEAN BY DEMATERIALISATION?

### Dematerialisation means lessening our reliance on physical resources.

In our ESG Strategy to 2030, we committed to Manufacture Materials for Life. This means we want to evolve our products, processes and services by incorporating whole life cycle design, preserving raw materials and future proofing our offer to customers through an evolving and diversified portfolio.

### MANUFACTURE MATERIALS FOR LIFE: OUR 2030 AMBITIONS.



#### Product Innovation:

Achieve 20% sales turnover from new products and solutions that deliver customer value and improved sustainability.



#### Circular Economy:

Embed circular economy principles into the business, prioritising zero waste and driving demand for secondary materials markets.



#### Dematerialisation:

Reduce raw materials consumption with a focus on plastics, aggregate and cementitious replacements.



### WHY IS DEMATERIALISATION IMPORTANT TO IBSTOCK?

To answer this question, we need to explain a few basic facts about our business. Istock plc is a leading building products manufacturer committed to being a responsible business. With 36 factories across the UK, we make clay bricks (we are the largest clay brick manufacturer in the UK by volume), brick slip facades and walling systems. We also manufacture concrete roofing, walling and infrastructure products.

We are very aware that our industry, by its very nature, is carbon-intensive and our own decarbonisation journey is long and challenging – but it is a pathway we are firmly committed to.

However, managing our environmental impact is not just about reducing carbon. Being more efficient with what we extract and how we make it go further not only has a positive effect on how we manage our carbon but will also extend the lifespan of our resource. We are also extremely conscious that our business relies on taking finite natural resources from the earth. At present, our business relies on us having sufficient reserves of these finite resources. Therefore, innovation that focuses on alternative materials – or using less of our existing ‘ingredients’ is essential. This is a key driver for new product development and a core purpose of our business.

Therefore, it stands to reason that dematerialisation is a pressing concern at all levels in our business. Failure to address this has been identified as a material risk to our business. It is also a missed opportunity to improve our stewardship of part of earth’s finite natural resources, protecting biodiversity, and reduce our impact on climate change.

### Historic approach

*Historically, we have included recycled content in our clay products from other industrial waste streams reducing, sometimes significantly, the amount of virgin clay used. These have ranged from glass waste to sewage sludge to fire clays. However, by taking a more co-ordinated approach to reducing virgin material use, we are able to look across our estate to find and - then roll out - new solutions and measure the impact as we go.*



*Embodied carbon is the emissions associated with a product's complete life cycle, from manufacture to disposal.*

## WHAT PROBLEMS DOES DEMATERIALISATION SOLVE?

Throughout our supply chain, stakeholders are well aware of the challenges associated with carbon and the use of natural resources. Meanwhile, manufacturers such as Ibstock need to meet the growing demand for products and materials to serve larger and increasingly urbanised populations.

We think dematerialisation solves - or contributes to resolving - some of the biggest challenges faced by the construction sector:

- **Economic use of natural materials** – by driving a circular economy that prioritises avoidance of raw material extraction and enables reuse and recycling of secondary materials and products.
- **Consideration of life-cycle costs** – by reducing raw material extraction the life cycle of existing materials and products can be extended reducing their impact over their useful life.
- **Reducing supply-chain carbon** – a significant benefit to the supply chain's carbon use is the more we get from our materials through dematerialisation (more for less) this delivers a positive impact in terms of a reduction in carbon per product for every mile travelled.
- **Reducing embodied carbon** – using secondary materials or alternatives to raw materials doesn't always provide an obvious carbon saving. Carbon related to the extraction of raw materials can be comparable to carbon resulting from recycling (grinding/transporting) secondary materials.
- **Reducing supply-chain waste** – by optimising our raw materials, we can reduce the overall amount used to meet our needs – and keep waste to a minimum.

## EMBODIED CARBON – TAKING A HOLISTIC VIEW

Thanks to the development of targets like the LETI Design Standards, the RIBA 2030 Challenge and the proposed Part Z amendment to the building regulations that would cap embodied carbon emissions during building work, there is a growing urgency to account for the embodied carbon of buildings (and not simply operational phase emissions).

In our brick business, the majority of those embodied carbon emissions come in the early life-cycle stages – the raw material sourcing (clay) and the product manufacture (use of gas and process emissions from firing the clay). The same is true in our concrete business. It is clear we need to take a more holistic view of embodied carbon.

For example, the relatively carbon intensive beginning to the brick's life can be balanced out over the 150+ years product lifetime of the average brick. We also need to remember there is zero in-use carbon emitted over that period. Our view is that this makes a brick a sustainable choice for architects and specifiers. However, Ibstock's responsibility lies in reducing the carbon associated with the manufacturing process and we are totally committed to reducing those emissions by evolving our products and processes.

# Beyond Energy Consumption

## OUR APPROACH TO DEMATERIALISATION.

**When you're doing everything possible to reduce carbon from gas and electricity consumption - what you're left with is the raw materials. That isn't an easy area for a manufacturer like us to tackle – but, as this paper explains, it is a major area of focus for our business.**

Right now, we have several transformational projects currently underway that are designed to test, trial and ultimately scale-up our ability to reduce the amount of raw (virgin) materials we use in the manufacture of our products. These are:

- **Clay bricks: increasing void size**
- **Reducing plastics in packaging**
- **Concrete products: reducing cementitious content**

What follows is a case study of each of these projects. Within each case study, we have included useful learning points and project outcomes too.



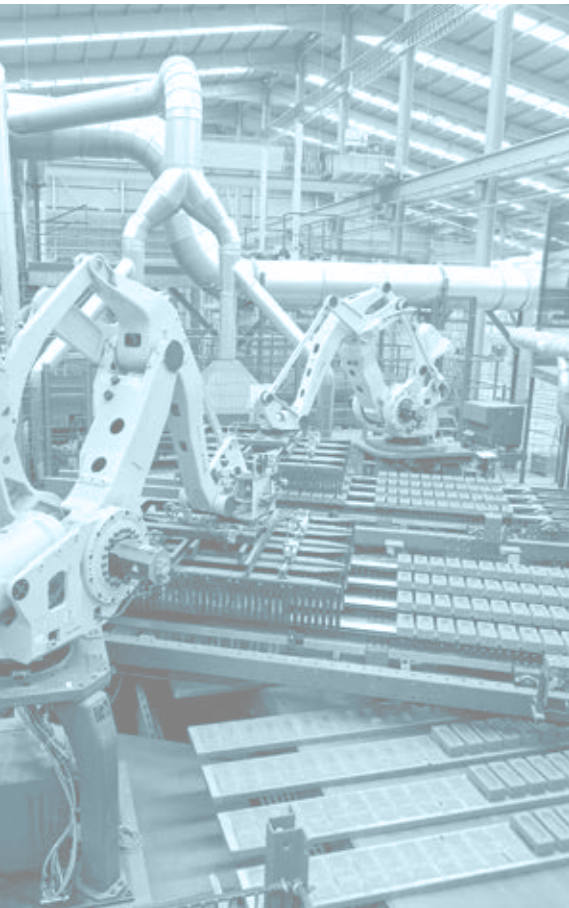
# Case Study

## REAL-WORLD DEMATERIALISATION: CLAY BRICKS: VOIDS.

WE

CAN

Use less raw material to make a brick.



### MARKET NEED & CONTEXT

There is increased awareness around embodied carbon. This has resulted in some architects and specifiers asking questions about brick building products – and questioning whether there are lower carbon options available. For Ibstock’s products to remain the go to products – and firmly on specification – we know we need to address these questions.

### PROJECT OBJECTIVE:

#### REDUCE THE EMBODIED CARBON OF OUR BRICKS

This project is ongoing – and, at its earliest stages, was designed to answer two questions:

1. Is it possible to use less raw material to make each brick?
2. If we **can** use less raw material, how can we be sure that there is no compromise to the physical performance and aesthetic characteristics of the bricks?

### PROJECT OVERVIEW

This project can be summarised as ‘changing the size, shape and pattern of the holes’. That is true for the frogs in soft mud bricks, and the holes (known as ‘voids’ or ‘perforations’) in extruded, wire-cut bricks. This summary, however, vastly underestimates the scale of the technical challenge.

### THE PROCESS

Looking at areas for improvement in embodied carbon began with understanding the constraints, and what couldn’t be changed – for example the technical properties of any brick made with less raw material had to remain the same. The fact of the bricks being kiln-fired couldn’t be changed, and nor could the atmosphere in the kiln be altered. Our next steps were:

1. **First, we looked at areas for improvement by understanding the constraints, and what couldn’t be changed** – for example, the kiln-firing process itself.
2. **Next, we considered using different clay** – but each clay type produces bricks with different characteristics, and each requires a factory that is set up in a unique way compared to its counterparts.
3. **We then tried using less material** – but it is was not as simple as ‘make the holes bigger’! A change in void size means major changes to the process, and our factories can’t be expected to run the same as they have previously.

### PROJECT OUTCOMES

- **We have reduced the embodied carbon of the clay in each brick** – in some cases by up to 8% (the exact reduction varies by factory).
- **Using less clay extends the life of the quarry** from which our clay is sourced. This is good for the environment, the communities around us - and our business asset resilience.
- **Less clay and a different void pattern mean less water is used** and there is less overall mass to dry. Less energy is therefore used in the drying stage.
- **Less natural gas is required to heat the kiln** – because there is less mass to fire, and the bigger voids create more airflow through each brick.
- **With less mass, bricks can be run through the kiln more quickly and efficiently** – which delivers additional operational efficiencies such as reduced time and cost of changing wear parts.
- **Quality tests show that there will be no aesthetic change in the useable faces of the bricks** – this means architects and housebuilders can still achieve the finish they are looking for.

### LESSONS LEARNT & NEXT STEPS

- **Hard work pays off.** At the time of publication, some of Ibstock’s factories have increased their brick voids to lower the embodied carbon of its bricks with several currently undertaking trials.
- **Set realistic expectations.** We now know that the diversity of raw materials and product ranges means we cannot achieve the same uplift with the voids at every factory.
- **Be realistic - but stay ambitious.** Our aim is now to achieve the best embodied carbon improvement possible at each site. That is likely to mean bricks with voids of 30 to 40% of the brick volume, and an average reduction in embodied carbon of 8% at some factories – with ambitions to go further as Ibstock learns more.
- **Progress is rewarding, but, slower than planned.** We promised this paper would be honest, and it is. This project is certainly delivering encouraging outcomes – but it was longer and more complex than we imagined or planned for.
- **Looking beyond voids.** Changes to the traditional brick can make a big difference but we can’t stop there – thinner bricks, brick slips and alternative systems are all in our pipeline of new and more sustainable products.

*Our intention is to achieve even more ambitious goals as we implement the lessons learnt in the initial phase of this project.*

### OTHER USEFUL BENEFITS

*The reduced mass means each brick is lighter – this results in efficiencies in transport & handling:*

- *Forklifts can move more bricks at once.*
- *Lorries restricted to a certain tonnage can carry more bricks in a load and therefore reduce transport miles overall.*
- *Bricks are easier to lay – which speeds up the construction.*

# Case Study

## REAL-WORLD DEMATERIALISATION: REDUCING PREVENTABLE PLASTICS

WE

CAN

Reduce preventable plastics by 40% - by 2025.

### MARKET NEED & CONTEXT

Our customers and consumers want to see less plastic in use as part of wider shifts in attitudes and awareness to protect our planet. They want to do the right thing, and those personal values are shared by people within Ibstock and our dematerialisation plans.

There is also an economic aspect. Buyers are looking to reduce costs as inflation goes up, so less plastic can help do that. And a significant driver has been the introduction of a plastic tax in 2021, where any plastic that doesn't comprise at least 30% recycled content is subject to a £200 per tonne surcharge. The responsibility for that tax can extend to anyone in the supply chain.

*Our customers want to do the right thing - and these values are shared by people within Ibstock.*

### DEFINITION OF PREVENTABLE PLASTIC PACKAGING:

*Packaging that by removal has no detriment to product quality, pack integrity or health and safety relating to the handling of the product.*

### PROJECT OBJECTIVE:

#### REDUCE PREVENTABLE PLASTICS BY 40% - BY 2025

- Ibstock is implementing a plan that will see its use of 'preventable plastic' cut by 40% by 2025.
- In the 18 months to December 2021, we eliminated over 200 tonnes or the equivalent to nine million plastic bottles.
- This target is not an end goal. By continuously reviewing packaging needs and learning lessons, as a result of the improvements made, ongoing reductions will be made.

### PROJECT OVERVIEW

Our plastic reduction strategy has the following three key elements:

- Removing plastic where possible
- Reducing the amount of plastic used where it's not possible to remove it
- Looking at alternative materials that could replace the remaining plastic

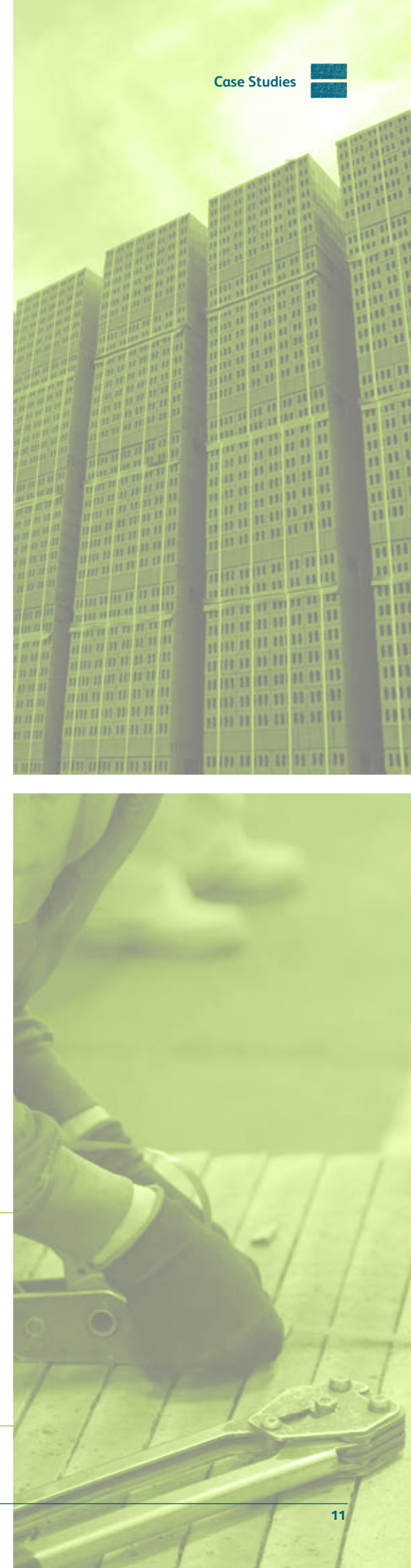
### PROJECT OUTCOMES

- **The biggest immediate reductions in plastic have been at the factories whose products are more regularly shaped, and therefore can be packed uniformly.** In some cases, it has been possible to remove the plastic used for bagging entirely, with only straps remaining to secure the product for transportation.
- **A successful initiative has been to find better quality films with reduced thickness and 30% PCR content.** This project has reduced virgin plastic consumption at some sites by over 30%.
- **Working with suppliers** engaging our plastic packaging suppliers in the plastic thickness reduction initiative enabled greater discussions around recycled content which is now being trialled at many of our factories.
- **We have not simply 'moved the problem'.** Current alternative plastics (such as bioplastics) are not free of environmental impact. By undertaking moves to reduce overall plastics use and increase recycled content, we can have far greater confidence in the long-term environmental benefits.

### LESSONS LEARNT & NEXT STEPS

- **Reducing plastics isn't as easy as it sounds.** There are competing factors: We need to ensure our products are safe to move and handle and we have to protect our customer's investment. Any change in our process can't compromise health and safety or compromise the aesthetic qualities of the bricks.
- **We can't solve everything.** Some plastics are unavoidable, so our goal has been to reduce as much as possible, in order to use material more efficiently.
- **Sharing responsibility drives innovation.** Challenges of plastic packaging are shared across the housebuilding and wider construction sector. By working with peers and organisations, like the Building Alliance, we can share experiences we are able to learn more quickly and tackle these issues together.
- **Collaboration is key.** Many of our customers are looking at their own solutions to receive plastic-free deliveries. We are collaborating with them wherever possible to make process changes that deliver long-term results.

*An example of this in action is moving from plastic that completely surrounds a pallet, to the use of 'cap bags', which cover the top and edges and result in a saving in plastic of around 25%.*





# Case Study

## REAL-WORLD DEMATERIALISATION: REDUCING CEMENT CONTENT AND MAKING LOWER CARBON PRODUCTS

**WE  
CAN**

Reduce cement content.



### MARKET NEED & CONTEXT

Making lower carbon concrete and using less cement is a major part of our commitment to dematerialisation. The production of Portland cement alone is responsible for some 8% of global carbon emissions\*. Reducing reliance on traditional cement is therefore essential – whether to help clients meet their own carbon reduction targets, or to prepare for future legislation.

Embodied carbon is not currently part of building regulations, but there is industry-wide expectation that legislation will happen sooner rather than later. When it does, that will drive further change across the concrete industry.

### PROJECT OBJECTIVE: REDUCE CEMENT CONTENT IN OUR MANUFACTURING PROCESS

- The overall objective is to reduce cement use in the manufacture of our products.
- We also want to use this opportunity to develop exciting new innovations in low carbon concrete.

### PROJECT OVERVIEW

Within Ibstock's 14 concrete batching factories, hundreds of hours of research and development have been spent exploring new processes and concrete specifications. Not only is this resulting in products with lower embodied carbon, but it is also making more efficient use of materials. The wide-ranging work features the following elements:

- Using lower carbon cement or cement replacements as part of concrete products.
- Replacing steel reinforcement with a basalt alternative.
- Shifting to off-site manufacture of products.

### PROJECT HIGHLIGHTS

Using less cement means engaging with suppliers to look at blended cements or replacement cements. The following highlights offer a snapshot of some of the projects Ibstock has undertaken to deliver on its dematerialisation ambitions.

### SUSTAINACEM

SustainaCem is a cement developed in partnership between Ibstock and LaFarge Cement. One-fifth of its content is ground limestone, which is much less energy intensive to produce than the clinker it replaces. Our Technical Team has been able to utilise SustainaCem to produce concrete products in which the strength and the durability of our products are maintained and enhanced.

### EARTH FRIENDLY CONCRETE (EFC)

Ibstock has formed a partnership with Earth Friendly Concrete (EFC). Thanks to using a binder made from industrial waste products, rather than Portland cement, EFC has around 70% less embodied carbon than traditional concrete.

Many low carbon cement replacements have been developed for low-grade concrete use, where extended curing times and lower strengths are acceptable. The really exciting thing about working with EFC UK is that we've been able to make fast cure, high strength, durable concrete, which opens up so many possibilities for our concrete products.

### SHIFTING TO BASALT REINFORCEMENT

Another area of research has focussed on alternatives to steel reinforcement in concrete products. Because basalt is inert, shifting to basalt reinforcement has the potential to reduce the cover to concrete required and so maintain product durability while ensuring no loss of performance.

### NETWORK RAIL COLLABORATION

As a sole supplier of concrete cable troughs to Network Rail we have been working together to significantly reduce both the weight and embodied CO<sup>2</sup> of the product. The troughs run alongside the railway and carry cabling, while their lids also serve as paths for maintenance workers.

Combining low carbon concrete with a redesigned unit has led to a reduction in weight of the troughs from 38kg to 25kg. They use less material, are easier to install, and are equally as capable of withstanding the substantial stresses that the units are exposed to throughout our railway network.

### LESSONS LEARNT & NEXT STEPS:

- **Work collaboratively for the best outcomes.** To use less cement in our process means engaging with suppliers to look at blended cements or replacement cements.
- **Invest for the future.** Making lower carbon concrete requires investment to update well-established manufacturing facilities to accommodate new technology. For that reason, Ibstock has commissioned a number of new concrete batching plants and upgrades.
- **Create the right conditions.** At Ibstock, every product starts in a batching plant, so by developing our concrete technology through in-house capability and wider collaboration, it gives us the ability to do exciting things across the business and industry.
- **Don't fear challenges.** Decarbonisation in precast has been a big challenge for our concrete division whilst maintaining the same quality, speed of cure and product durability. However, it is a concrete technology challenge we are up for and has helped to significantly reduce waste and material use. There is a demonstrable saving between traditional on-site shuttering and casting concrete on site, versus casting products in our factories using our latest technological advances.

*Changing the composition of products to feature SustainaCem or EFC does not impact on how concrete products can be processed at the end of their life.*

\*Source: <https://www.istructe.org/resources/guidance/beyond-portland-cement-low-carbon-alternatives/>

# Transferable Learnings & Conclusions

**The purpose of this paper was to offer an overview of our approach to dematerialisation; give an honest account of our progress on this work; and to inspire others in similar industries to follow in our footsteps and learn from our experience.**

Dematerialisation is not simple. It requires time and patience and an appetite for innovation. However, we have also tried to show that wide-scale, long-term change is possible if you have the right people on your team, and a commitment to test, trial and refine new ways to do things.

To conclude this paper, we have summarised some of the most valuable lessons we have learnt – and continue to learn – on our path to dematerialisation.

- **Work collaboratively** – partners, customer and suppliers are vital to success.
- **Invest for the future** – big scale change will need investment.
- **Accept that this isn't easy** – dematerialisation can't happen without major technical change and investment in trialling and testing new and different approaches.
- **Be realistic** – but stay ambitious – you may not be able to make change everywhere, so do what you can.
- **Don't fear failure** – getting the wrong result still provides learning and often leads to the right one.
- **Stay focused and optimistic** – the world needs us to dematerialise, to protect our resources within our planetary boundaries, we will keep up the pace and our commitment and encourage others to do the same.



We believe that our next phase of dematerialisation will be even more ambitious.



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