



What Net Zero means in practice



GHG sources, accounting rules and standards

Who are JRP?



- Specialist energy, Net Zero and facility and asset management consultants and service providers.
- Six overlapping service lines
- Technology agnostic and 100% independent since we started in business in 1999.
- We use our passion, expertise and commercial understanding to make a real contribution to our clients' objectives and to reduce environmental impacts
- Carbon neutral by 2030 (B Corp, ISO 14068)



Energy

JRP offers a comprehensive range of services to help you understand, manage and reduce your energy consumption and costs and to make sure you are compliant.



Environmental and Social Governance (ESG)

ESG is a set of standards or principles for measuring a business's impact on society and the environment, and how transparent and accountable it is.



Net Zero and Climate Resilience

Wherever you are on your journey to Net Zero, JRP's experienced consultants can provide a complete service OR specialist help to complement your in-house expertise.



Facility and Asset Management

We are uniquely placed to use our expertise and knowledge to help you navigate the complexities and obstacles of supply chain management, facilities and asset management and to find the best commercial solutions.



Project Implementation

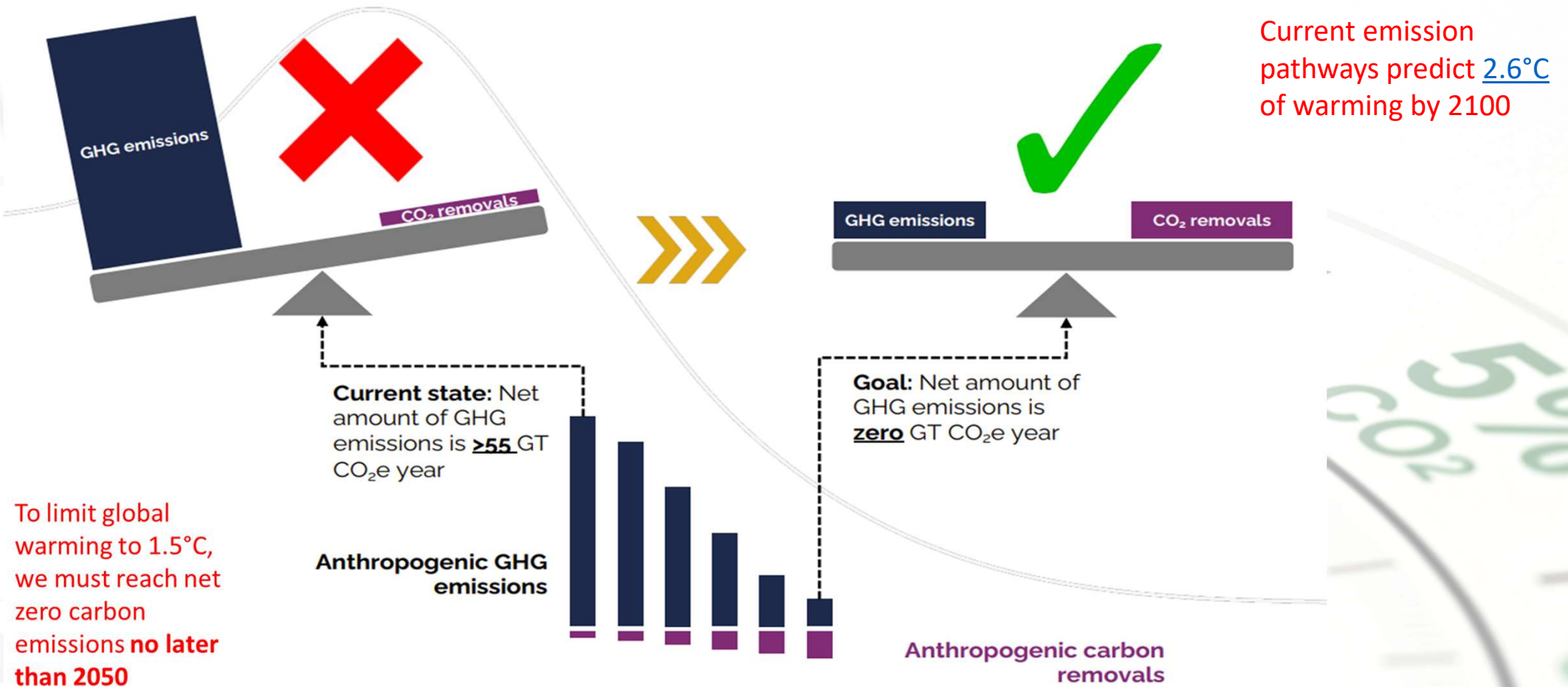
JRP's dedicated project management team has over 30 years' expertise in implementing energy conservation measures (ECM's) and Net Zero solutions in all sectors.



Data Solutions

There are 3 essential steps to controlling data that will measurably improve the ability to reduce emissions.

Bringing systems back into equilibrium





How things work.....



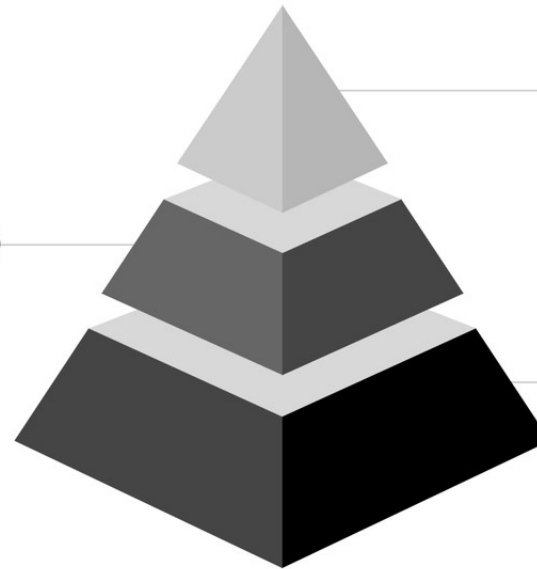


Everything comes from the earth...



Secondary/Manufacturing Sector- producing goods from natural resources

Energy Transformation: refining oil, producing electricity, creating more useful forms of energy



Tertiary/Service Sector

Provides services including banking, health services, retail stores, food services and education.



Primary Sector- uses natural resources directly

Energy Extraction: mining, agriculture, forestry, fishing





Our economic systems need fixing

NewScientist



There are growing fears of an alarming shift in Antarctic sea ice

Antarctic sea ice cover remains far below average levels for the third year in a row, but researchers are uncertain whether this is a permanent shift driven by climate change or part of natural fluctuations

By James Dinneen

11 March 2024



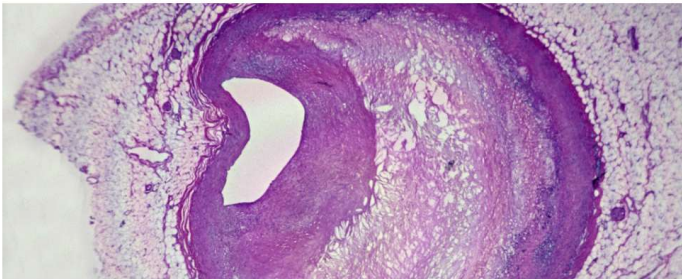
MethaneSAT's target areas as it circles the earth every 95 minutes. Credit: MethaneSAT

Plastics: an insidious and growing problem



Plastic Found Inside More Than 50% of Plaques From Clogged Arteries

HEALTH 07 March 2024 By CLARE WATSON



Cross section of a clogged coronary artery. (Ed Reschke/Getty Images)

Science of the Total

Environment journal 2024 reports potentially life-threatening class of micro-plastics contaminating placental, uterine and infant tissues, breastmilk, and infant formula.

THE CONVERSATION



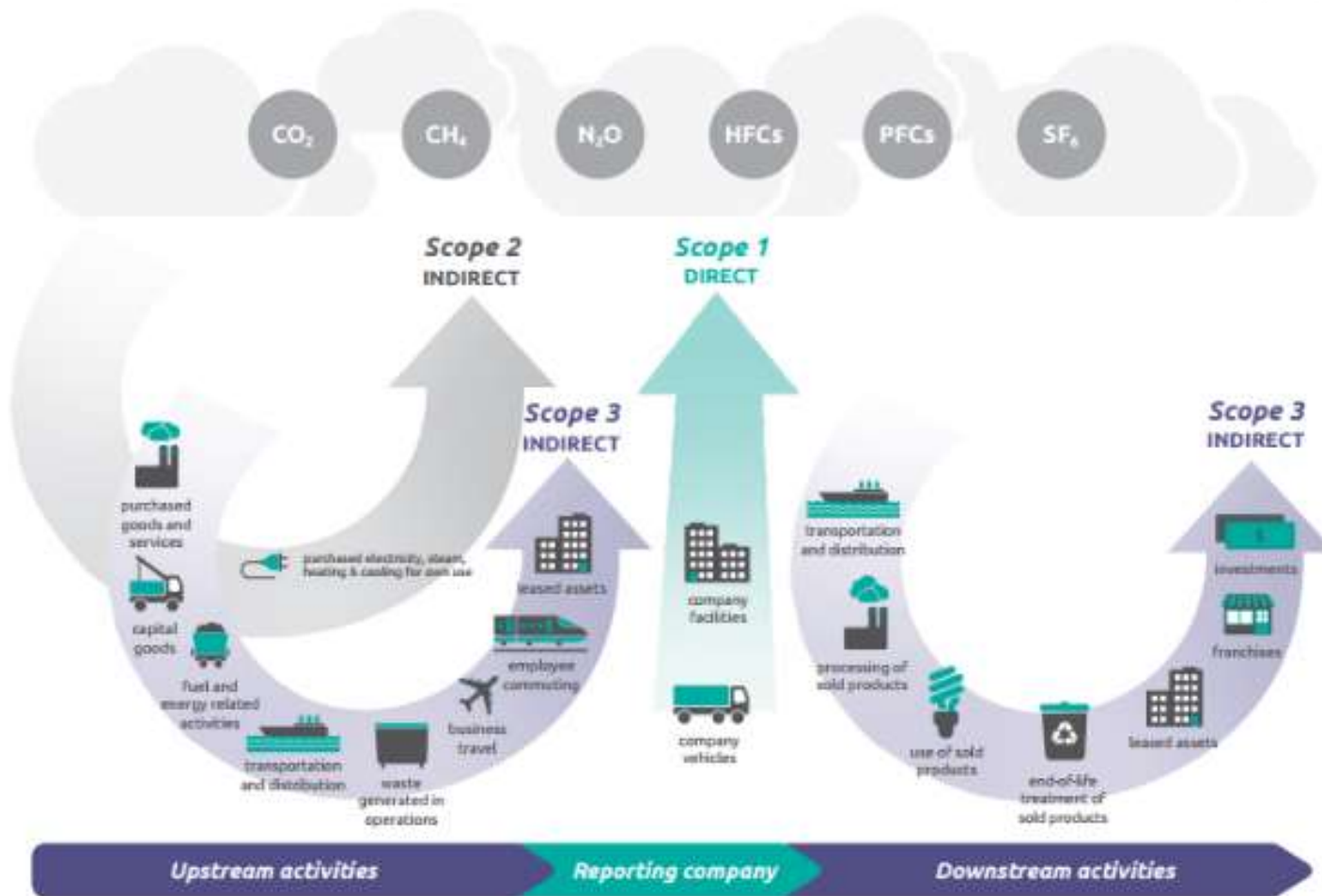
Oil companies are ploughing money into fossil-fuelled plastics production at a record rate – new research

Published: November 2, 2021 2.13pm GMT

BAU trajectory = 1,606 Mt by 2050
1.7 Gt of CO₂e in 2015 to **6.5 GtCO₂e by 2050**,
resulting from 50% of the growth in oil demand by
2050 [*International Energy Agency*].



GHG Scopes 1 to 3



Scope 1: fuels, heat and steam burnt/used within your operations

Scope 2: power generated offsite and transmitted into your operations, i.e electricity

Scope 3: Everything else – these are your “**value chain**” emissions and related impacts in the value chain of your company, both upstream and downstream

Applying the GHG Protocol



Key:

 = Relevant

 = Not relevant

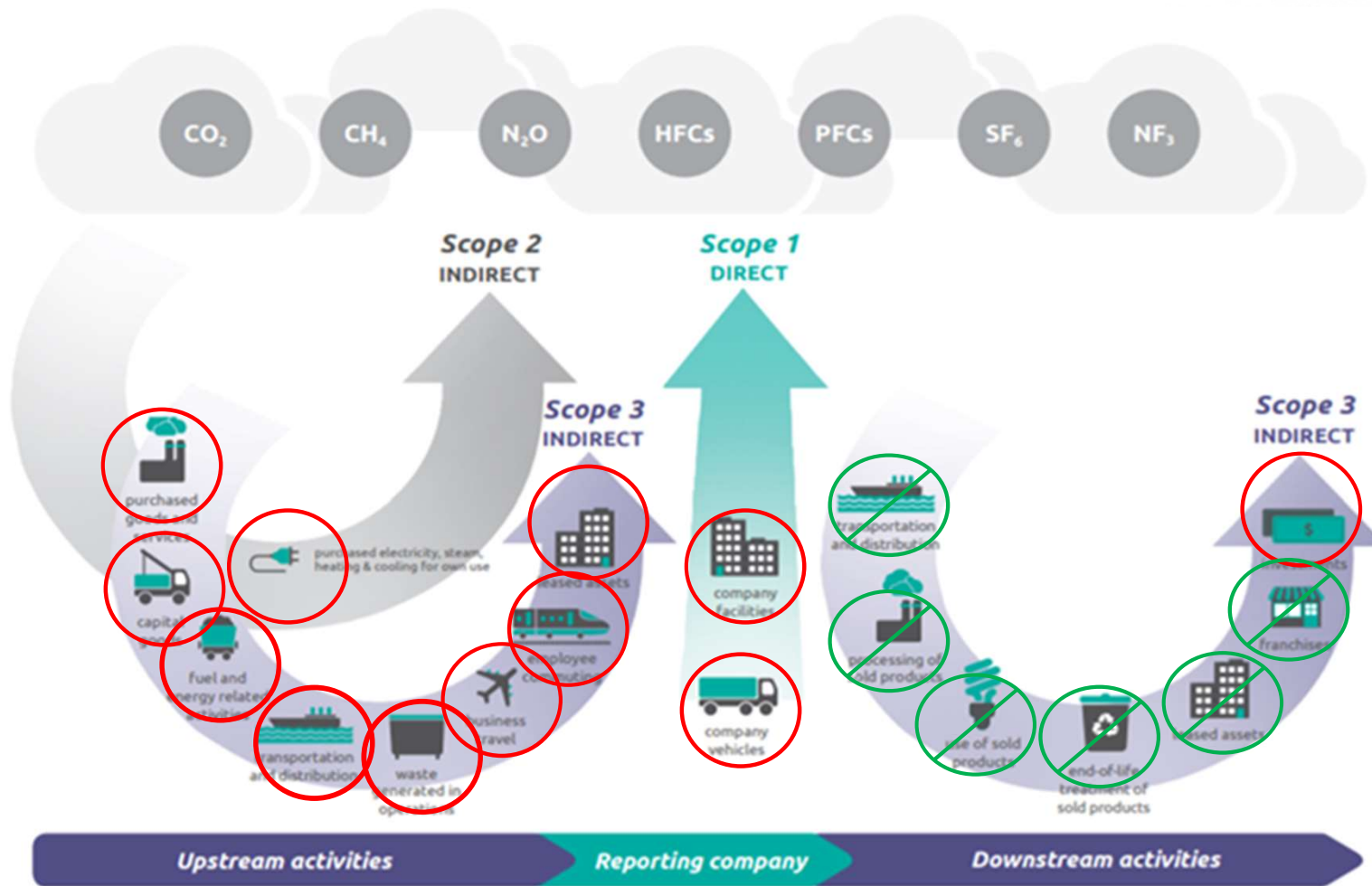
Scope 3 categories:

Upstream

- Cat 1 – Purchased goods & services
- Cat 2 - CAPEX
- Cat 3 – losses in trans & distribution
- Cat 4 – Logistics
- Cat 5 – Waste management
- Cat 6 – Business travel
- Cat 7 – Commuting & teleworking/home-working
- Cat 8 – Leased assets

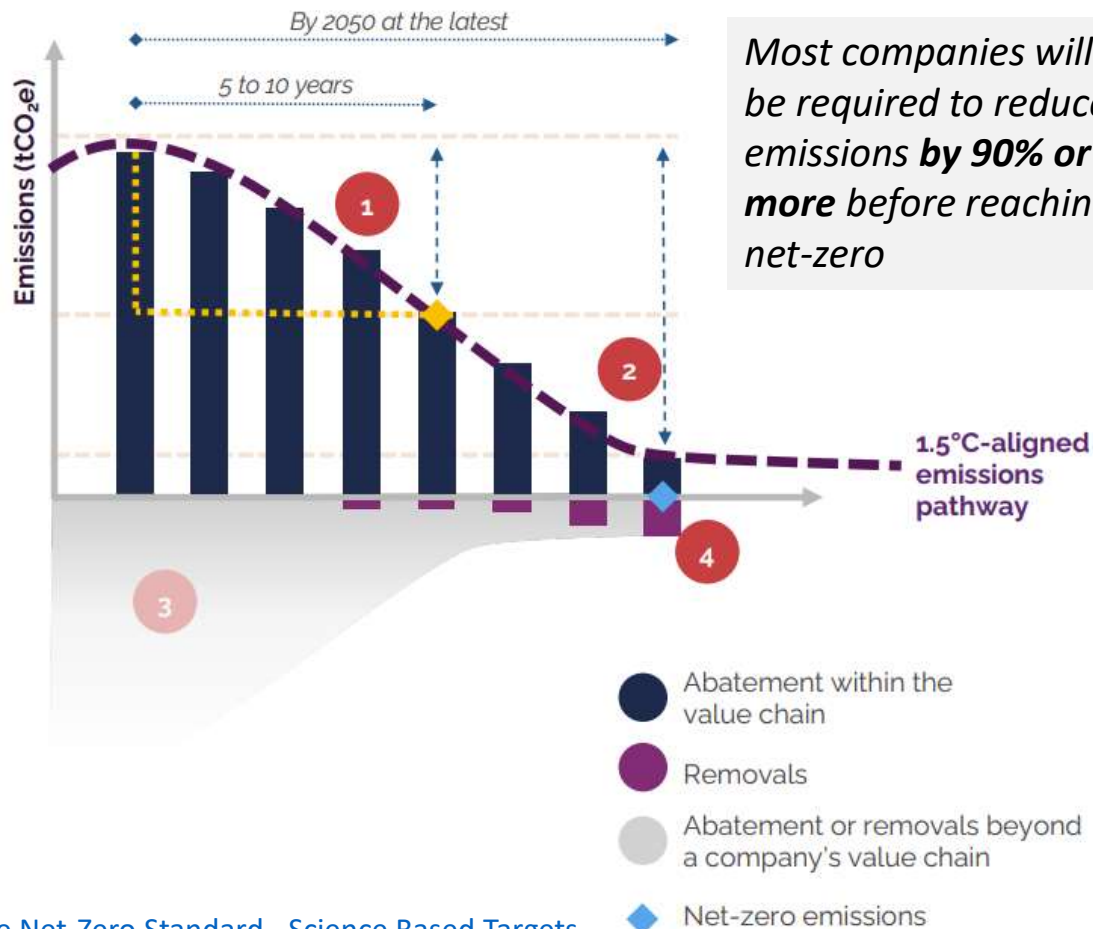
Downstream

- Cat 9 - customer logistics
- Cat 10 – processing of sold goods
- Cat 11 – (energy) use of sold products
- Cat 12 – End of life fate of sold products
- Cat 13 – assets leased out
- Cat 14 - Franchises
- Cat 15 – Investments, inc pension company scheme





Global NZ Standard: 4 Key Elements:



1 To set near-term science-based targets:
5-10 year emission reduction targets in line with 1.5°C pathways

2 To set long-term science-based targets:
Target to reduce emissions to a residual level in line with 1.5°C scenarios by no later than 2050

3 Beyond value chain mitigation:
In the transition to net-zero, companies should take action to mitigate emissions beyond their value chains. For example, purchasing high-quality, jurisdictional REDD+ credits or investing in direct air capture (DAC) and geologic storage

4 Neutralization of residual emissions:
GHGs released into the atmosphere when the company has achieved their long-term SBT must be counterbalanced through the permanent removal and storage of carbon from the atmosphere

Required Recommended

How standards work with regulations



For example: European Green Deal;

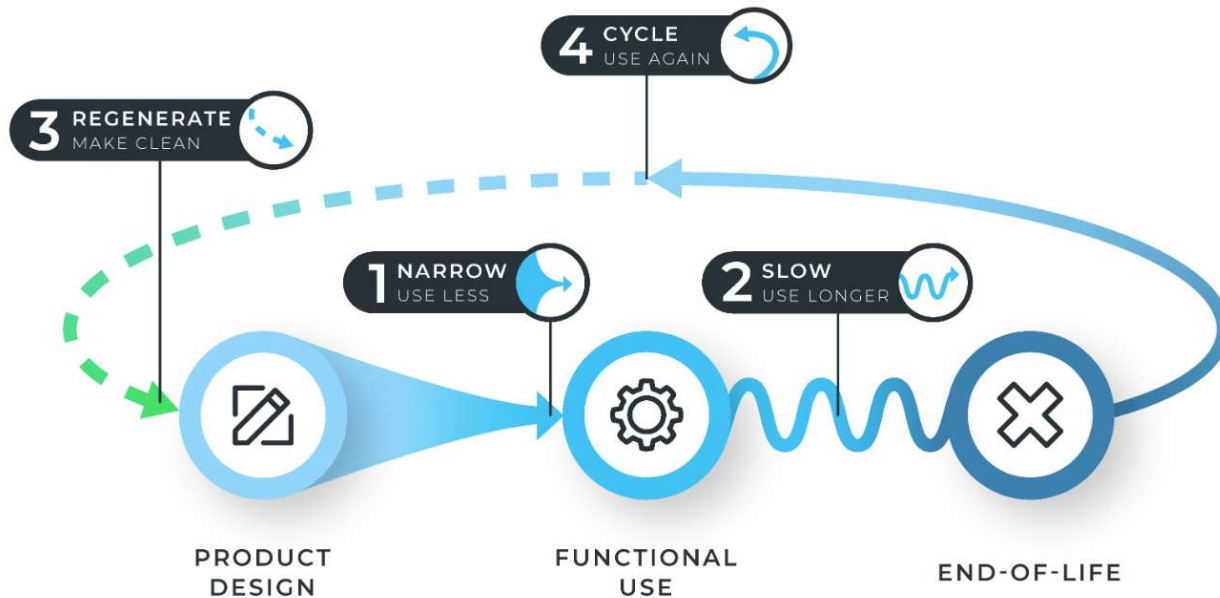
Ambition is for Europe to be the **first climate-neutral continent by 2050**

Achieving the 2015 Paris Agreement targets.

Includes the Action package 'Fit for 55' working towards the first step: **Reducing net emissions by at least 55% by 2030.**



Resource efficiency really matters



[CGR 2023 \(circularity-gap.world\)](https://circularity-gap.world/)

- Rising extraction shrinking global circularity: from 9.1% in 2018, to 7.2% in 2023
- A huge Circularity Gap: we're almost exclusively relying on new (virgin) materials!
- Over 90% of materials are either wasted, lost or remain unavailable for reuse

A global circular economy will meet everyone's needs with only 70% of materials currently extract and use, back within safe planetary limits.



[The big food redesign, making nature-positive food the norm \(ellenmacarthurfoundation.org\)](https://ellenmacarthurfoundation.org/)

Creating a circular supply chain

- Establish what your top 20% of suppliers are doing to become Net Zero
- Are they able to share their GHG inventory, have they undertaken life cycle assessments?
- Can they supply carbon intensity data for each product or service, i.e. **kgs CO₂e per unit of product or service?**
- Role of **Lifecycle Assessment (LCA)**

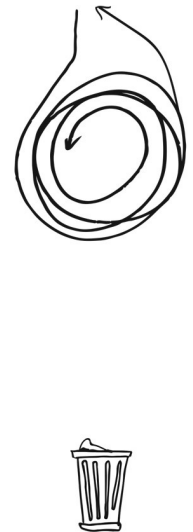
LINEAR ECONOMY



RECYCLING ECONOMY



CIRCULAR ECONOMY

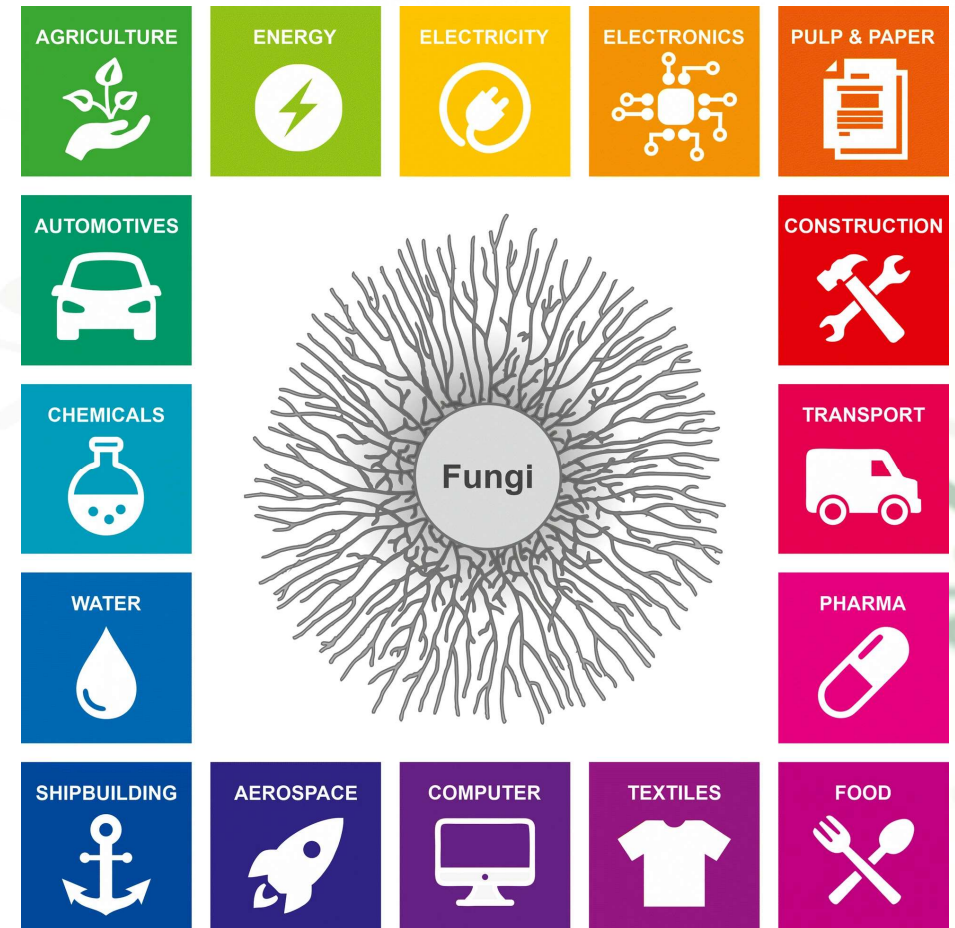


CC by Circular Flanders

Clean biotech: the Future is Fungi



- Plant polysaccharide-degrading enzymes predicted gene set in filamentous fungi is 100-250
- Success of bacteria (*S. cerevisiae* & *Escherichia coli*) as platform organisms to produce biofuel (ethanol), jet fuel (terpenoids)
- Commodity chemicals production **only guaranteed** by using filamentous fungal “cell factories”
- **Standardisation is key:** methods, measures, substrates and materials ensure reliable production characteristic of advanced global industries, such for semiconductors, forest products, etc
- **Biofoundries** for constructing filamentous fungal organisms the way forward....



[Growing a circular economy with fungal biotechnology: a white paper](#) | Fungal Biology and Biotechnology | Full Text (biomedcentral.com)



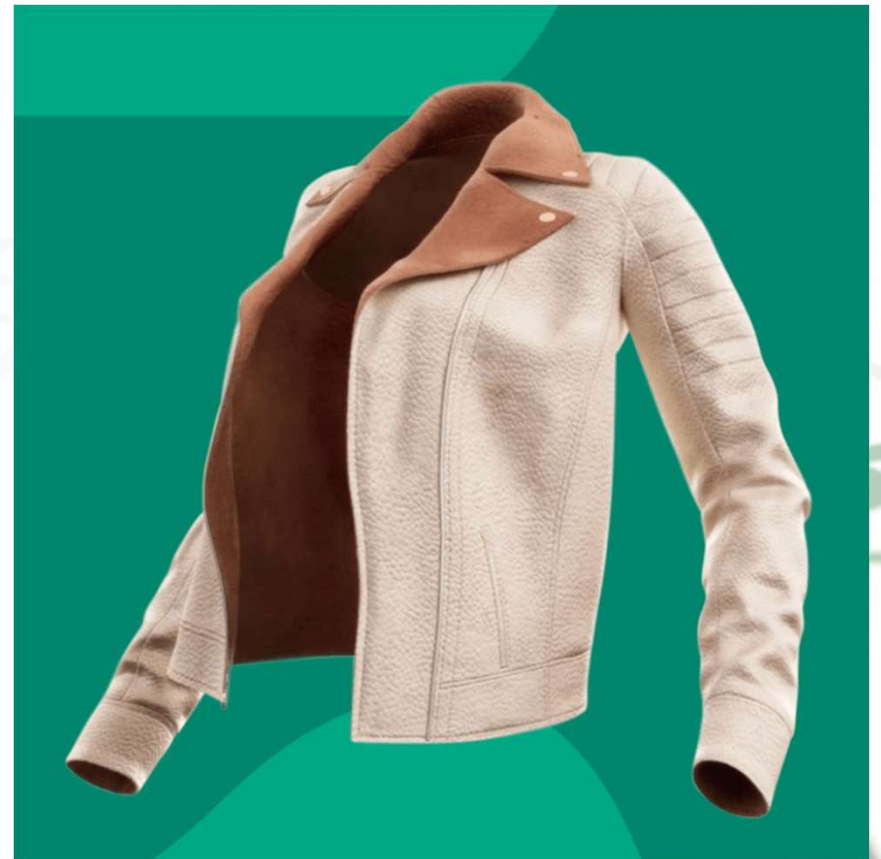
Companies driving sustainable change



Forager™ hides can be grown up to 60 metres in length by four metres in width.

‘Ecovative’ mycelial leather material produces consistently in vertical farms, yielding far less scrap and waste than other methods.

100% plastic-free



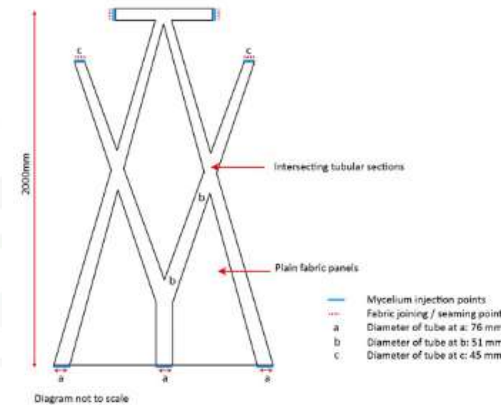
“Myocrete will change construction”



WORLD
ECONOMIC
FORUM

Aug 23, 2023

- ‘Myocrete’ - made from mycelium and knitted merino yarn.
- Fungal nutrition sources are millet, rye, etc for mixing with a substrate material such as sawdust or straw, i.e. ideally waste materials
- Myocrete stronger and more versatile than previous bio-based building materials.
- Still in early stages of development but has the potential to revolutionize the construction industry.
- Goal is improving mechanical performance, enabling complex shapes to be fabricated for lightweight construction.



BioKnit prototype
(dome) of slender
biohybrid knit-
mycelium tubes



[Frontiers | BioKnit: development of mycelium paste for use with permanent textile formwork \(frontiersin.org\)](https://www.frontiersin.org/journal/10.3389/fbio.2023.1154441)



jrpsolutions.com
info@jrpsolutions.com
0800 6127 567



WELLS & CO
EST A 1876

Making a success of
your pitch –
communicating
biotech to the
business world

Andrew Fleming, Head Brewer

Ed Robinson, Sustainability Manager

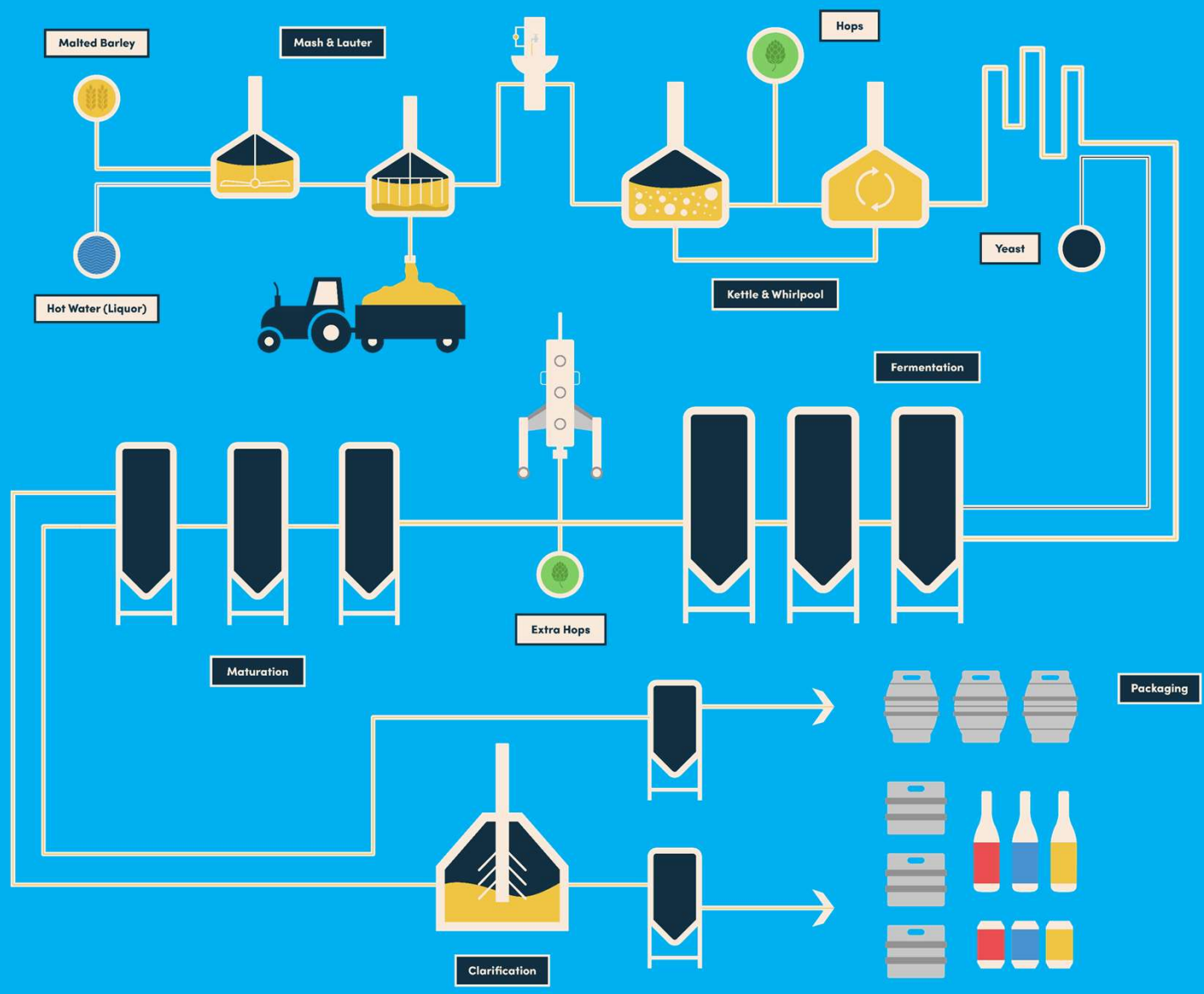
Wells & Co. – who are we?

- A fifth-generation Bedfordshire family business, established in 1876
- Two hundred pubs (give or take) and a modern craft brewery
- Our 'Triple Bottom Line' philosophy inspires us to balance people, planet and profit concerns



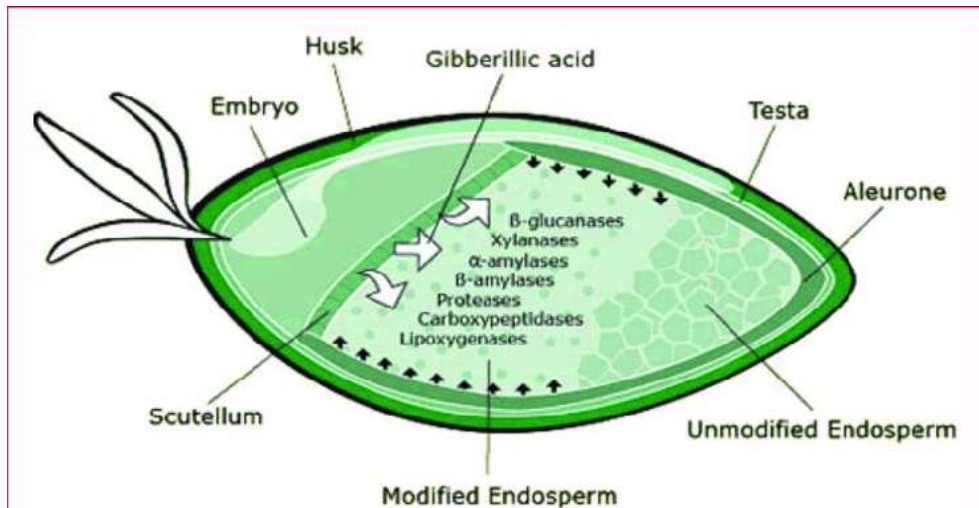


Brewing co-products: Brewers Spent Grains



Raw materials – Barley kernel

- Brewing uses Barley and other adjunct cereal grains (maize, oats, wheat, rye) as main carbohydrate source to fuel yeast metabolism
- We use both modified (i.e, malted) and unmodified grains, degree of modification refers to the extent the endosperm is 'broken down'



Fraction	% Kernel (by weight)	Key nutrients
Hulls (husks)	9 – 14	Cellulose, lignin, silica, pentosan, phenolic compounds
Seed coat	5.5 – 6.5	Cellulose, lipid
Aleurone layer	11 – 13	Lipid, protein, β -glucan, arabinoxylan, minerals, vitamins
Embryo	2.5 – 4.0	Lipid, storage protein, cellulose, sugars, minerals, vitamins
Endosperm	65 – 68	Starch, protein, β -glucan, arabinoxylan

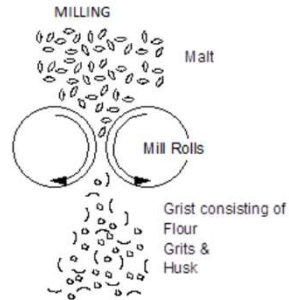
Source: compiled from Briggs, 1978; Palmer, 1989

Process step 1: Goods in



- Barley is receipted into the brewery via bulk trailers blown into silos or delivered on lorries in 25kg or 500Kg bags.
- Bulk silo: base malts, 100% barley
- Bagged malts: specialty roasted, unmalted products, other cereal 'adjunct' grains - rye, oats or wheat

Process step 2: Milling



Milling is the physical crushing of malt kernels into smaller particles in preparation for mashing and lautering; this process exposes the starch so hydrolytic enzymes can be activated more readily whilst maintaining the integrity of the husk



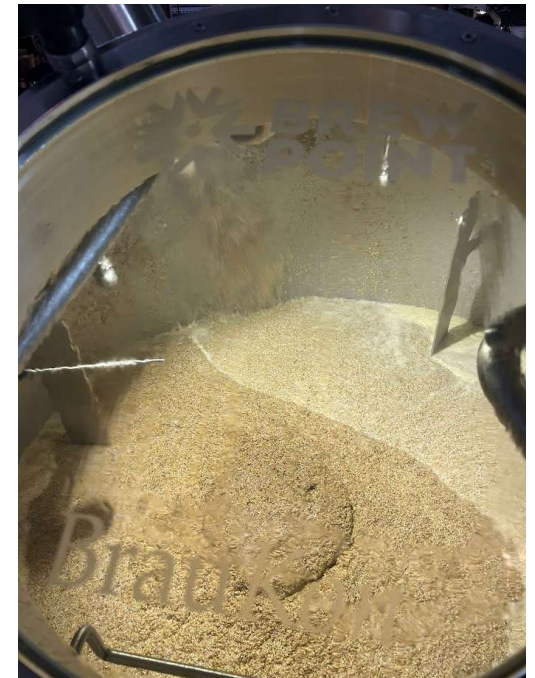
Four-Roller Mill:

- Two pairs of fluted rollers stacked one on top of the other. Malt passes through the first set of rollers and is directed to a sieve that lets finer grist fall through directly. The remaining, coarser grist is directed to the second pair of rollers.
- After milling, the grist is conveyed into the grist case where it is ready for mashing

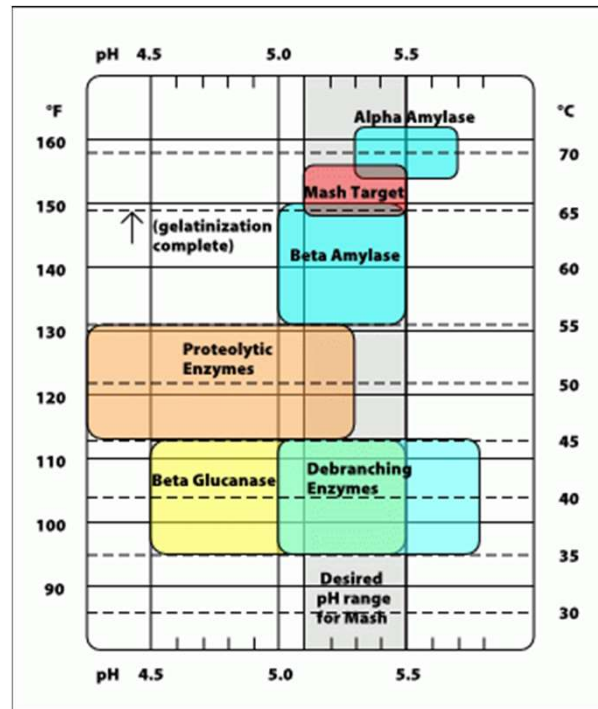
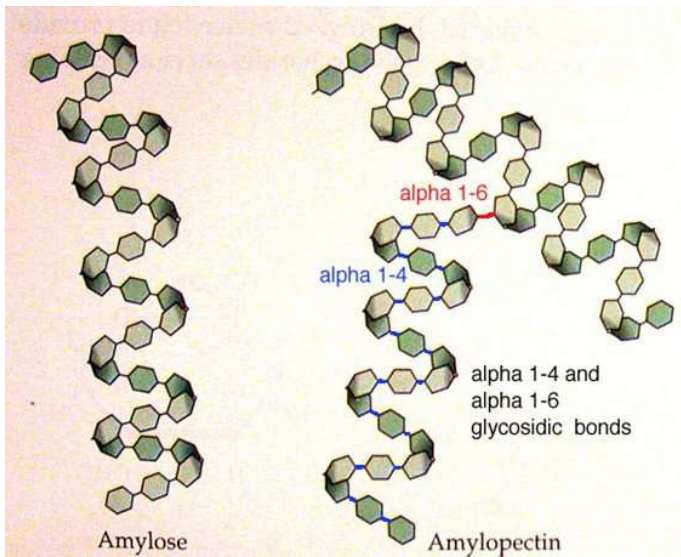


Process step 3: Mash conversion

1. Mashing as defined by the Institute of Brewing and Distilling:
 - Crushed malt and suitable dry adjunct is mixed with water under specified conditions so that enzymic action can take place to convert the starch into fermentable sugar and in certain cases break down proteins into more soluble forms.
 - Simply put: mash enzymes break down the starch packet into sugars that are accessible to the yeast.



Mashing, continued



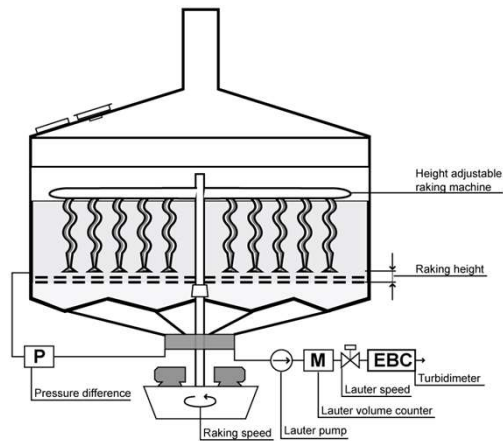
The goal is to convert starch into a sugary liquid called wort.

Approximate values of sugars in wort:

- i. 12% monosaccharides,
- ii. 5% sucrose
- iii. 47% maltose
- iv. 15% maltotriose,
- v. and 25% higher saccharides

Lautering

- Lautering is the filtration and separation step of the brewing process
- Lauter tun: false bottom, spray balls to provide hot water, rotating rakes to improve bed permeability
- A permeable grain bed is formed from the mash to filter out solids and other large particles
- A hot water rinsing process called sparging rinses the grains of residual sugars
- We are left with sweet wort, our main product. This is then boiled with hops and process aids, chilled, yeast pitched and fermented into beer.
- The co-product of this process: Brewers' spent grain



Co-product specification



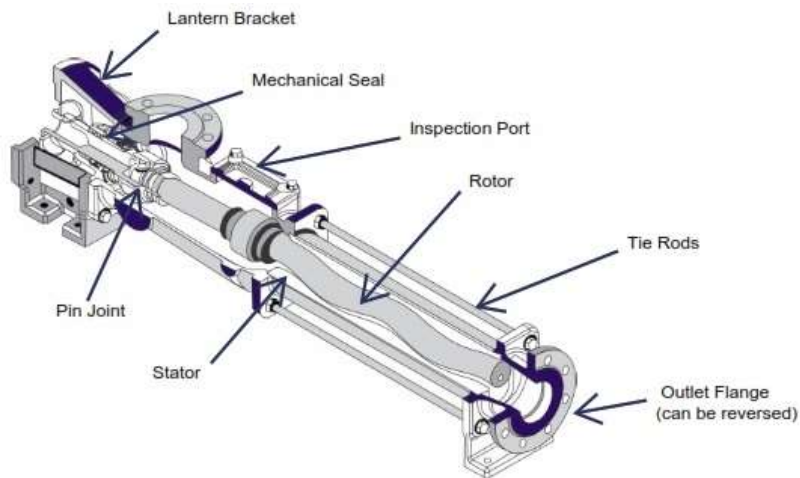
Typical analysis of BSG is:

- 24-30% dry matter, containing
 - o Crude protein 18-26% db
 - o Crude fibre 16-20% db
 - o Complex carbohydrates 4-8% db
 - o 50-60% digestibility yielding 13-15 MJ/kg dry weight

Spent grain removal

Spent Grain Removal

- Drain off residual water in lauter tun
- Knife valve opens on lauter tun false bottom and plow drops alongside rakes
- Progressive cavity / screw conveyor pump pushes the grain through a wide diameter pipe into outdoor silo
- We discharge the silo, again using a progressive cavity screw conveyor pump, into the back of a bulker trailer
- Away it goes to feed the AD plant every 7-10 days



Biogen Spent Grain AD

- Brewpoint produces up to ten tonnes of spent grain (i.e. food waste) per week
- Instead of giving it away, we're now selling it to Biogen, our local anaerobic digestion plant
- A fresh source of energy for the local community, a fresh source of income for Wells & Co., and a great PR story.



BIOGEN[®]

Operational Benefits for the Brewery

- Security of operation: Lauter tun full = no brewing!
- Regular income from co-product sales
- Reduced workload for compliance: BSG into feed requires certification.
 - Feed schemes (BFBI/FEMAS)
 - Regular microbiological testing
 - Standard scheduled review of HACCP, risk assessments etc.





The Hallmarks of a Great Pitch

- Tell the whole story – consider the entire system involved, provide a comprehensive life cycle analysis if possible
- Empathise – put yourself in your customer's shoes. What are their goals / needs / concerns?
- Speak their language – frame your pitch in terms of money saved, supply chain resilience, etc.
- “People don't care how much you know until they know how much you care”
- Be prepared to collaborate on PR – it will pay dividends for both parties



A hand-drawn illustration of a lightbulb with a glowing yellow interior and a red base, surrounded by various business-related sketches like charts, graphs, and icons. The lightbulb is the central focus, with its filament drawn in red and blue. The background is filled with numerous small, hand-drawn sketches and icons. On the left, there are bar charts, a pie chart, and the word 'BUSINESS' in large, bold letters. Above the lightbulb, there are sketches of a brain, a lightbulb, and the word 'search'. To the right, there are sketches of a target, a clock, and the word 'Time'. Below the lightbulb, there are sketches of a team, a work, and the word 'IDEA'. The overall style is a mix of hand-drawn sketches and digital elements, creating a sense of creative brainstorming and business planning.

Independent Adviser- Diet, Health & Sustainability

BBNet Annual Conference – 10th April 2024

Consumers understanding

Overall awareness remains low on sustainability claims

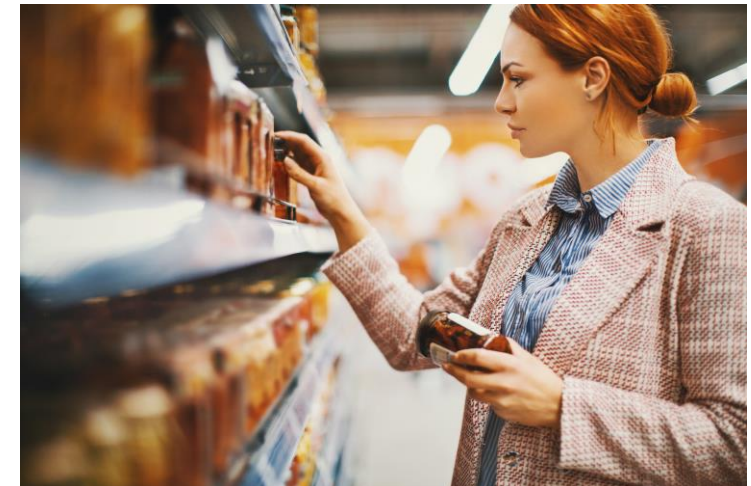
Greatest awareness

- Fairtrade – 73%
- Rainforest Alliance – 44%

Least awareness

- Carbon Reduction 9%
- B Corp 10%
- Better Cotton Initiative 9%

Source: KPMG YouGov plc August 2023 Online n-2067



The greenwashing effect

76% of respondents felt that false or misleading claims were a clear example of greenwashing

- Exaggerated or unsubstantiated sustainability credentials (73% of those surveyed)
- misleading commitments on net zero (66%)
- inconsistent ethical policies (60%)
- missing sustainability targets (39%)

54% of respondents said they would stop buying from a company if they felt their sustainability claims were not valid

38% would cease to invest in such companies

% Respondents believe these sectors are engaged in greenwashing

- Energy 58%
- Fashion 57%
- Transport & Automotive 51%
- Grocery, Food & Agriculture 47%

“What is clear, is that any signs of greenwashing will diminish trust further, so it is imperative that companies continue to ensure all claims can be evidenced and that as new regulations are introduced, they are understood and adhered to. The risks of overselling being ‘greener than green’ are too high.” Richard Andrews Head of ESG – KPMG UK

Retailers' challenges

- Polystyrene/Polyform alternatives – white goods/TV/furniture
- Alternative to palm oil in non-food products
- Protein diversification for animal feed – Next generation
- Raw materials – Greater sustainability in polyester, leather, man-made cellulosic fibres (MMCF's) e.g. viscose/lyocell
- Mandatory method of production labelling for meat to help consumers make informed choices

Clear Food Labelling

- Significant long-term relationships with suppliers
- Multiple Compassion in World Farming, Marine Stewardship Awards
- Highest animal welfare main priority
- Conveying benefits to customers can be difficult – on label/off label/ POS/publications
- Support recent push for ‘Method of production’ labelling for meat
- “The government needs to ensure that primary method-of-production data, from pre-farm to on-farm to processing and manufacturing, that shows the reality of UK food production, underpins all environmental and social food labelling,” says Clear Food Labelling Consortium (40 farming, food and civil society organisations and businesses)



Waitrose initiatives

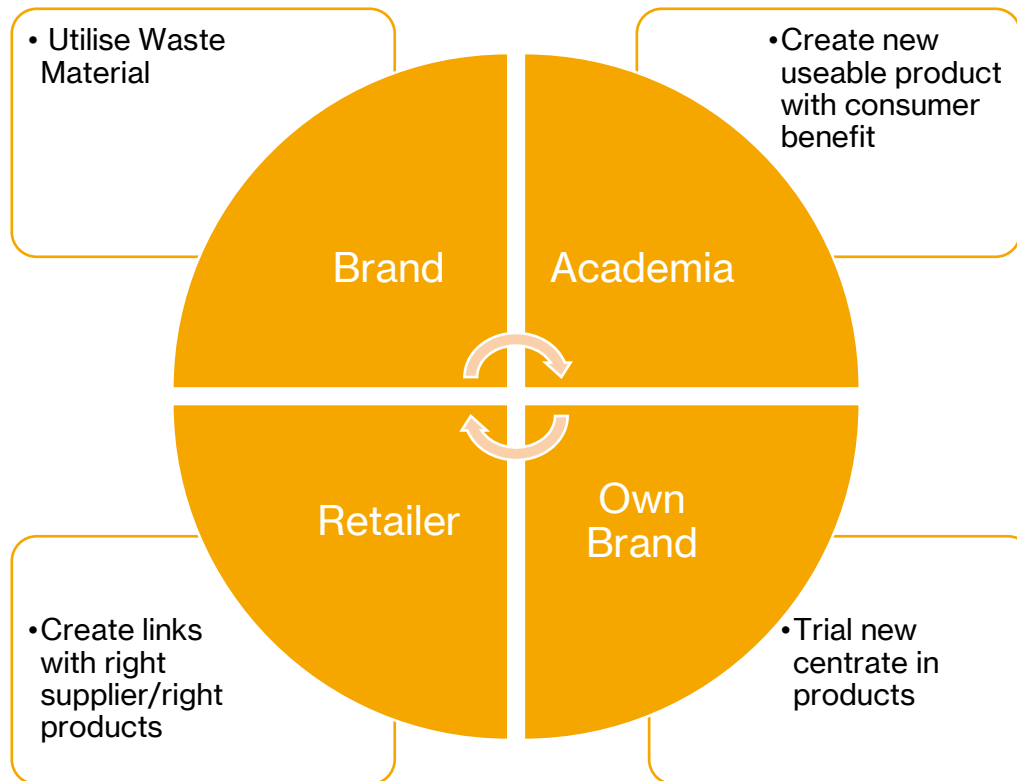


- British Asparagus season has arrived at Waitrose nine weeks early
- Grown by New Forest Fruit Ltd, the bumper crop is grown in recycled strawberry coir
- By using recycled composted strawberry coir, the grower reuses around 4.5 million litres of leftover matter

- Box uses ryegrass and recycled paper
- 60% less water & 10% less CO₂ compared with standard pulp boxes
- Label fully sustainable using recycled materials and is recyclable
- Supporting circular economy

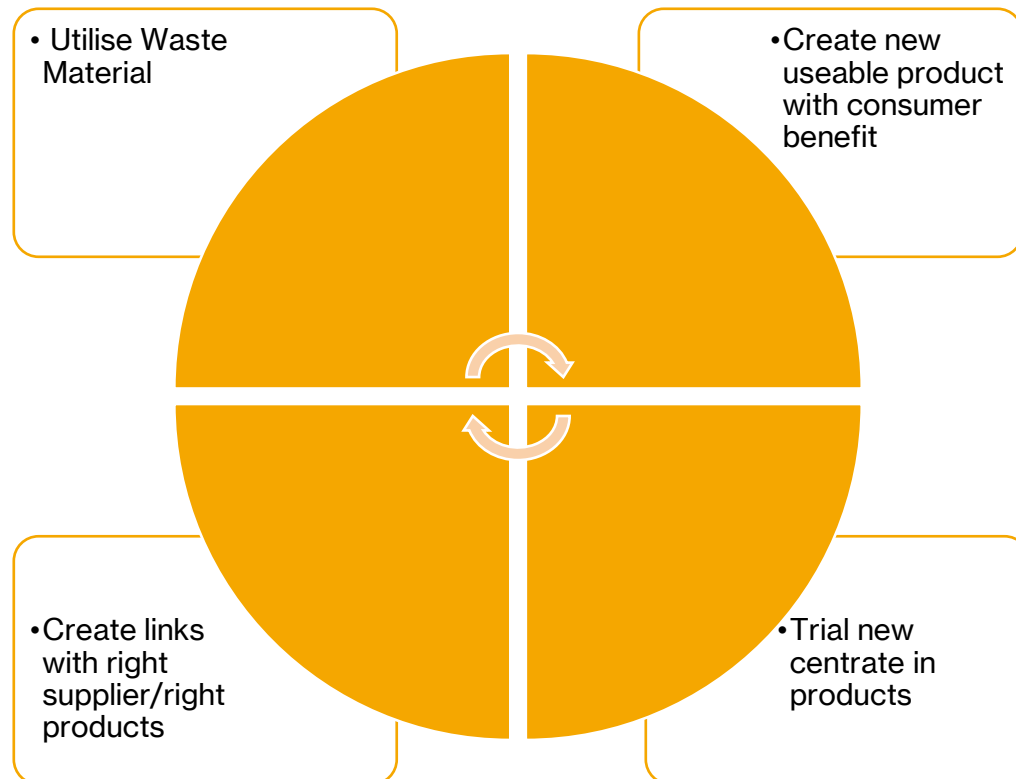


Waste Valorisation Project



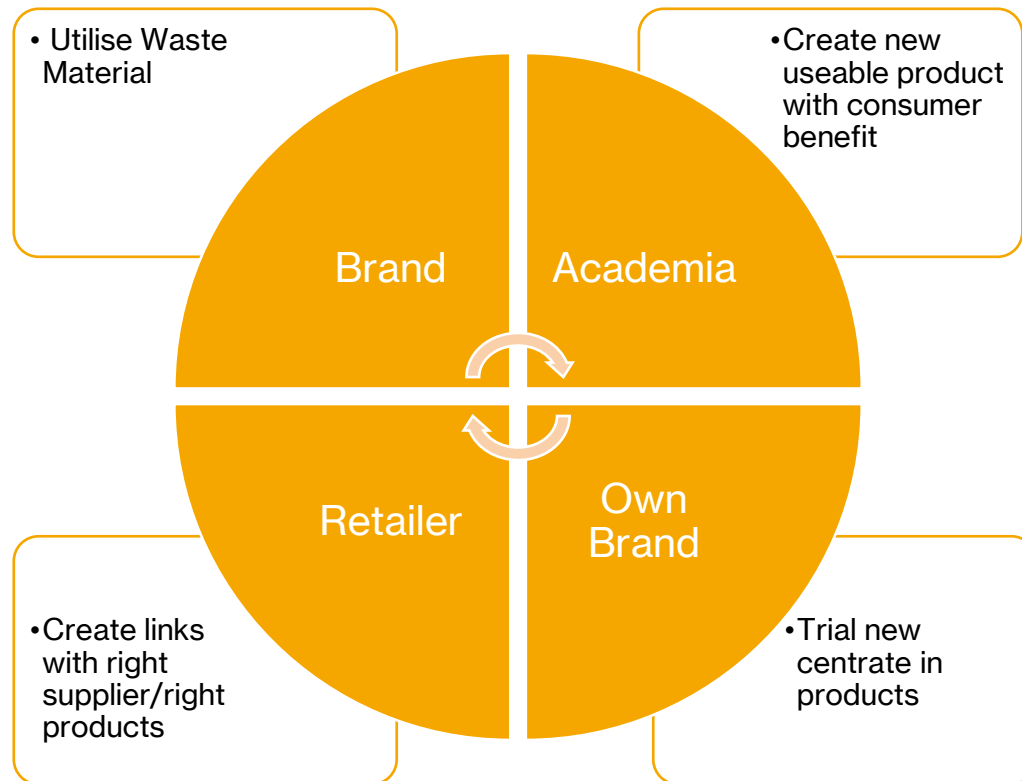
- Multi partner 2-yr BBSRC funded project
- End use evaluation & application of waste material
- Proposed salt replacer
- Negative aspects of potassium chloride & monosodium glutamate
- Government salt targets in 80 categories of food

Waste Valorisation Project



- Work with academia & other smaller companies to create a **usable** centrate from waste material
- Ensure new centrate meets food grade requirement
- Trial in selected products with own brand supplier

Waste Valorisation Project



- Set & measure the key parameters of success
- Repeat process with learnings
- Select products
- Taste tests with project members
- Trial on factory line
- Test with consumers

Waste Valorisation Project

Selected meals

- Spaghetti & Meatballs
- Macaroni Cheese
- Initially 100% substitution of NaCl but 40% substitution yielded best results
- -8.8% and -20.3% respectively

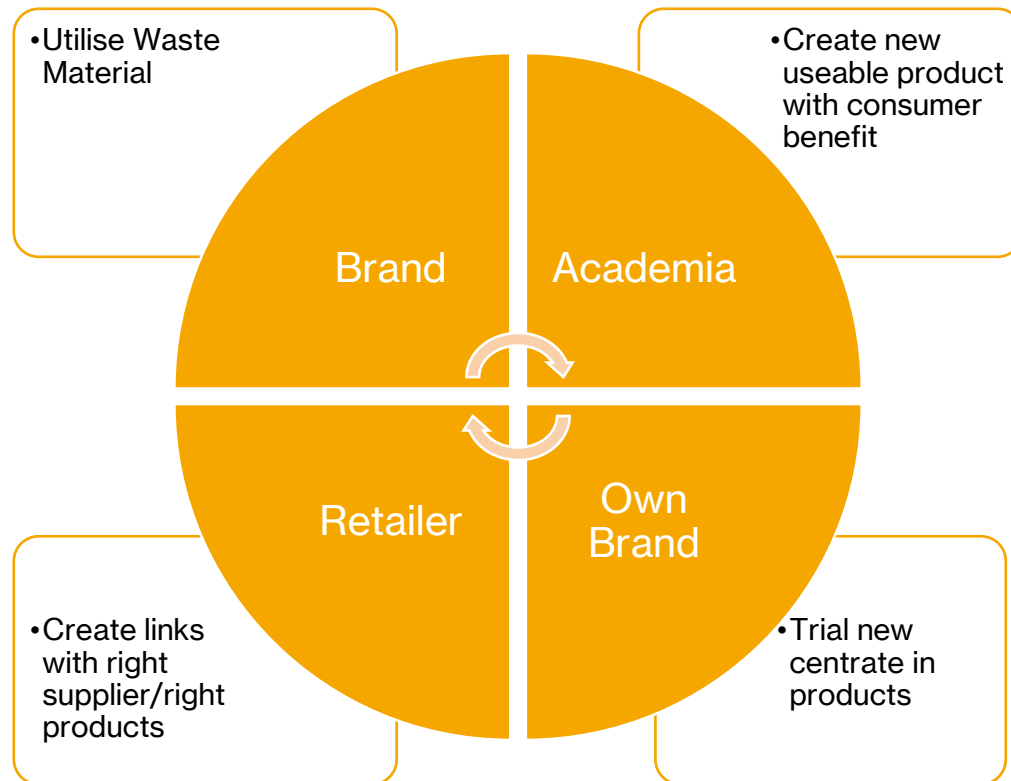


-20.3%



- 8.8%

Waste Valorisation Project



- Record the nutritional improvements
- Look at cost vs benefit
- Look at original vs. new material
- Consider overall business case
- Illustrate proof of concept
- Share results

Waste Valorisation Project



WAITROSE
& PARTNERS

The project has been carried out in partnership between Quorn Foods, and Aberystwyth University, along with retailer Waitrose & Partners, Create Flavours Ltd, Amano Enzyme Europe, Membranology and colleagues at Harper Adams University.

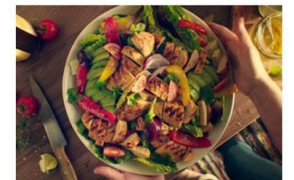
Natural flavour enhancer developed to enable significant salt reduction in foods



Quorn claims 'flavour enhancer' may help salt reduction effort

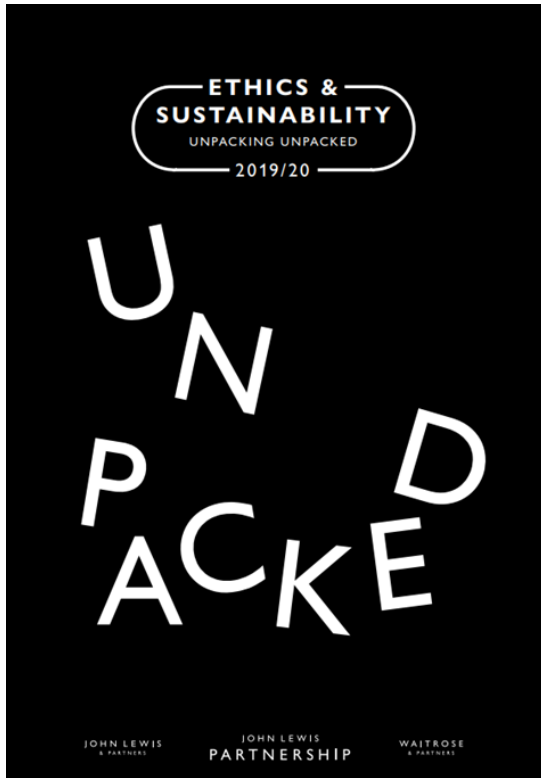
By [Ian Quinn](#) | 27 February 2020

Research has shown use of an enhancer can enable a 15%-40% reduction in salt content



<https://www.aber.ac.uk/en/news/archive/2020/02/title-229342-en.html>

Unpacked – Reduce, Reuse, Recycle Model



Which? Survey 2021 n=2000 consumers
League table on efforts to reduce greenhouse
gas emissions, food waste & plastic

61% of consumers cited plastic as the biggest
issue followed by food waste



Unpacked – Reduce, Reuse, Recycle Model

- 2019 trial, 200 products
- 7000+ customer queries regarding plastic & packaging
- Test customers propensity to shop differently
- Environmental assessment to calculate indicative packaging reductions & greenhouse gas impact
- 98% of single-use plastic eliminated across 200 products
- 72% of customers very satisfied with the experience
- 80% very likely to do so again & expressed interest in more products
- Some customers missed the nutritional information
- Request for more gluten free and other special diet requirements

Unpacked – Trial Findings

- The proposition has the potential to reduce greenhouse gases but dependant on whether food waste is increased in the supply chain or at customer homes
- Investment in automated measuring equipment to align with weights & measures legislation
- Food safety standards & allergen cross contamination a concern on wrapped vs. unwrapped foods
- Washable food label solutions required for returnable containers to eliminate single use labels
- Integration of information into product QR code and encouraging consumers to pro-actively use codes
- Impact of covid 19
- Increase resource back and front of stores



Tackling plastic pollution



NATURE PROVIDES SOLUTIONS

The inspiration behind two of the projects is the concept of nature-based solutions and the potential to harness the power of natural processes. PML has carried out research into using mussels to filter out microplastics from the ocean, exploring the natural filter feeding of these robust shellfish. Onion Collective and Biohm have conducted research into mycelium, a fungus which can be trained to grow by digesting plastic. This gets rid of plastic waste and grows it into valuable new products.

Onion Collective & Biohm

- Developed 4 strains of 'plastic-digesting mycelium'
- A fungus which can be trained to grow
- Gets rid of plastic waste and grows into valuable new products

Plymouth Marine Laboratory

- Demonstrated that 5kg mussels can filter out of 250,000 microplastics per hour
- Providing a nature-based solution to microplastics in water

Behaviours

Build long term supplier relationships

Transparency in ESG reporting

Business values resonate with customers immediate needs and long-term aspiration

Taste and quality are key for products

Community help and enhancement

The ability to produce sustainable packaging and products is the sustainability practice consumers value the most



- consumer interest in sustainable and ethical values is highest for the more frequently-purchased and essential categories
- sustainable packaging scores high for grocery products, while reducing waste and a product's carbon footprint are valued more when buying major household appliances
- consumers also pay attention to ethical working practices and human rights issues when they shop for clothes and footwear, or when eating out.

Consumer Survey

This year, across several categories, there was a higher proportion of consumers not buying certain brands or products because of ethical or sustainability-related concerns

- one in three consumers (30%) stopped purchasing certain brands or products because of ethical or sustainability-related concerns. Compared with a year ago a higher proportion of consumers stopped making purchases particularly in grocery, beauty and hospitality due to such concerns.

Affordability remains the number one barrier to the adoption of a more sustainable lifestyle

- 62% of those that did not adopt behaviours to lead a more sustainable lifestyle claimed it is because it is too expensive
- 58% of the same group blame a lack of interest in sustainability
- 50% of the same group do not have enough information.

Consumers want businesses and institutions to take the lead in supporting them in their adoption of more environmentally sustainable habits

- 53% would welcome better schemes to remove plastic and packaging
- 46% want clearer guidance on disposal and recycling
- 35% want more regulations requiring companies to improve options for consumers
- 31% also expect more government intervention to make low-emission modes of transport more affordable.

Main Grocery Shop – Consumer switching

Consumers continue to switch stores

In food consumers continue to switch stores and brands to ease pressure on their household budgets.

Our data shows that more than one in three (34.5%) consumers are now doing their main food shop at a discount store, up from 30.4% a year ago.

According to [data from research company Kantar](#), one leading German discounter increased supermarket sales in Britain by more than 10% for the first time in April. The same research also shows that own-label sales across all supermarkets rose 13.5% in April compared with a year ago.



Source: The Deloitte Consumer Tracker Q1 2023

THANK YOU FOR LISTENING

<https://www.johnlewispartnership.co.uk/>

