Pilot Programme 2026

Design Skills for Embedding Circularity

Can we design out waste? Case study exploring the immersive learning programme equipping UK designers with the skills to tackle the waste endemic.

CIWM

URGE

Design Council

WRAP

Circular Economy Institute

Design Skills for Embedding Circularity

www.designskillsforcircularity.com

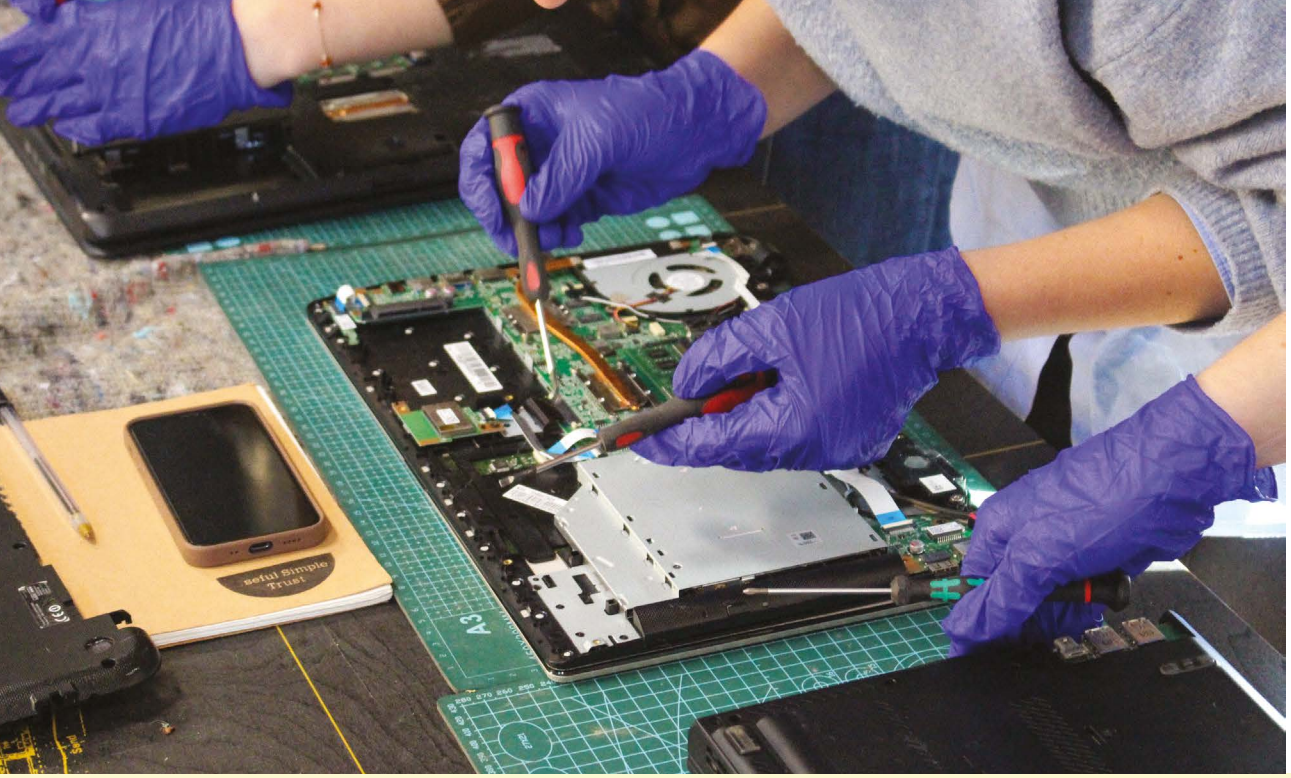


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Design Skills for Embedding Circularity

Design Skills for Embedding Circularity (DSfEC) is a pilot programme funded by The Chartered Institution of Waste Management (CIWM) and delivered by Urge Collective, with support from the Design Council, WRAP and the Circular Economy Institute.

Film Skills for Planet Explore, commissioned by the Design Council. Scan to watch on page 9.

Report by Alexie Sommer, and Sophie Thomas, with support from Tara Hanrahan and Oliver Lloyd. Printed for the DSfEC symposium held at the Design Museum on 12 November 2026.

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CIWM URGE Design Council WRAP Circular Economy Institute

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Programme Overview

An immersive learning programme equipping UK designers with the skills to tackle the waste endemic, and curating the space for circular innovation

Design Skills for Embedding Circularity is an immersive, applied learning programme designed to address the systemic waste endemic and accelerate the transition to a more circular UK economy. It tests a model for building green design skills through cross-sector knowledge exchange, connecting design expertise with the operational realities of the resources and waste sector to identify opportunities for upstream design-led intervention and waste prevention.

At the heart of the programme is explorative fieldwork at industrial waste facilities, including material recovery facilities, energy-from-waste plants, landfill sites and specialist treatment facilities. Site selection is informed by consultation with WRAP and the Circular Economy Taskforce, reflecting the programme's priority areas and ensuring participants gain first-hand insight into contemporary material flows, infrastructure and end-of-life challenges.

An open application process selects a multidisciplinary cohort of industrial product designers, engineers and researchers, representing organisations ranging from major corporate consultancies to micro-enterprises. Working alongside resources and waste sector experts, participant designers investigate the practical, technical and economic barriers to material recovery, identifying opportunities to intervene earlier in the design process and influence the systems that determine how products and materials are used, recovered and recirculated.

Fieldwork is complemented by online expert-led sessions covering key circular economy principles, including carbon and materials science, circular design, reuse and repair, product-service systems, packaging, waste-sorting technologies, and evolving policy and regulation. These sessions build shared knowledge across design and waste sectors, highlighting how design decisions influence material flows and end-of-life outcomes.

The programme culminates in a six-week facilitated, action-based design sprint, during which participants apply their learning to a key area of concern or to an industry-defined challenge. Working collaboratively with sector experts, the designers develop and test innovative approaches to circular design and end-of-life challenges. The resulting concepts generate practical insights for industry, demonstrate opportunities to design out waste at source, and help inform the development of emerging circular design practice, skills and interventions.



Partners

This pilot has been funded by The Chartered Institution of Waste Management (CIWM) and delivered by Urge Collective with support from the Design Council, WRAP, and the Circular Economy Institute (CEI).

Urge Collective is a creative industries network dedicated to system change. By convening the UK's design and waste management sectors, leading the programme's design and delivery, and curating cross-sector expertise, they have developed and facilitated an engaging learning journey equipping designers with knowledge, tools and practical experience to embed circularity into their work and tackle real-world waste challenges.

The Chartered Institution of Waste Management (CIWM) is the leading professional body for the resource and waste management sector. Its role has been pivotal in the linking of those with sector expertise and appetite to collaborate with design, facilitating the connection of designers with waste management professionals, creating opportunities for knowledge exchange and a more informed, systems-based approach to circular design. CIWM also bridges the gap by enabling access to waste facilities and experts through its industry network. Funding the 2026 DSfEC pilot has been a strategic component of CIWM's policy and innovation work.

The Circular Economy Institute (CEI) is the sister organisation of CIWM, supporting the development of knowledge and skills in its global community. It brings a broader circular economy perspective, helping translate technical knowledge about waste and resources into practical design skills and opportunities for systemic change. Participating designers become members of the CEI upon completing the programme.

WRAP is a global environmental action NGO working towards circular product and food systems. Their engagement with the designers brought deep specialist knowledge in resource efficiency, packaging, materials and circular economy systems. WRAP's involvement helped connect design practice with the wider systems, regulatory standards and infrastructure needed to make circularity work at scale.

The Design Council are the UK's national champion for design, providing strategic leadership in skills development and green skills education through the 'Skills for Planet' initiative, which aims to equip one million designers and commissioners with green design skills by 2030. The programme directly aligns with one of the six priority skill areas identified in the 'Skills for Planet Blueprint' – Embedding Circularity.

Key programme knowledge, tools and reflections, are collated in a learning and insights pack, compiled by the Design Council. This enables participating designers to share their experience, via CPD sessions, back into their companies and with clients, fellow design colleagues and their wider networks.

Looking ahead, the Design Council is exploring 'Skills for Planet Explore' programmes across all six green skill areas. The Playbook, which features Design Skills for Embedding Circularity as a case study, provides organisations with a step-by-step framework for developing immersive green skills programmes, with the ambition of establishing similar programmes across all six areas.



Team



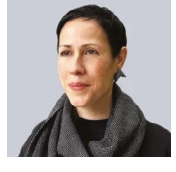
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Co-instigator, Design Declares

Programme Design Lead
& Creative Direction



Sophie Thomas OBE
Founding partner, Etsaw
Co-founder, Urge Collective

Design Lead
& Circularity Expert



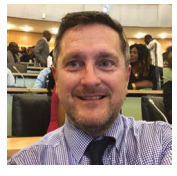
Tara Hanrahan
Creative Consultant,
Designer & Educator

Design Educator
& Sprint Lead



Bronwen Rees
Programme & Community Manager,
Design Council

Skills for Planet Lead



Richard Hudson
Technical manager, CIWM

Resources & Waste Lead



Oliver Lloyd
Product designer

Designer & Logistics

Why this programme is needed

by Alexie Sommer

The UK's current circularity index stands at just 7.5%, according to Circle Economy's 2026 Circularity Gap Report[1]. This means that only 7.5% of the materials entering the UK economy come from recycled or other recirculated sources. How do we accelerate progress? Can the circular economy afford to wait for regulation to catch up and economic conditions to improve? Arguably, we don't have the time. We need to act now: bring designers and industry together, challenge established ways of working, and turn circular thinking into practical actions and solutions.

This pilot responds to the argument posed by the 2024 CIWM's presidential report[2] that recycling and end-of-life solutions alone cannot address overconsumption and the current waste endemic. Instead, circularity needs to be embedded at the very core of business models, design briefs, product development, government policy and consumer behaviour.

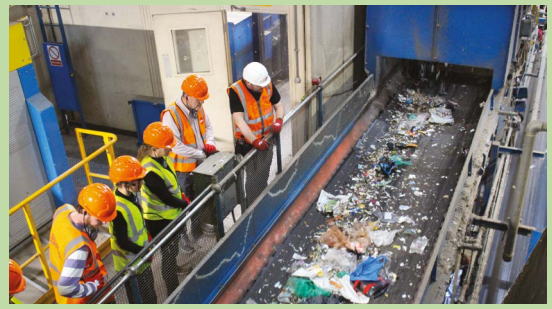
We have designed the programme to focus on addressing the significant skills and knowledge gap around product end-of-life through hands-on experience. The waste site visits are visceral, memorable, and often smelly! Combined with the expert sessions the programme exceeded the participating designers' expectations. They are now asking "what happens to this product at the end of its life?", from the very start and throughout the product design process. This is a fundamental shift in thinking.

We are convening actors from a product's life cycle, including manufacturers, retailers, policy makers, designers and wasters, and fast-tracking solutions through innovation.

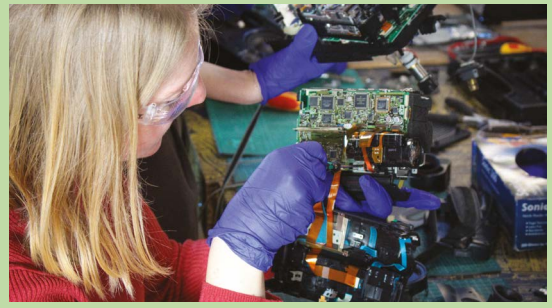
Watch the film, read the insights and case studies, and join us on future programmes.

[1] www.circularity-gap.world/report/uk/overview

[2] www.circularonline.co.uk/wp-content/uploads/2024/06/Root_CIWM_PresidentialReport_Final-Issued_v4.pdf







What happens when you take designers to the rubbish dump?

Sixteen designers embarked on a 9-month immersive programme to answer a key question: can we design out waste?

This Skills for Planet Explore film commissioned by the Design Council documents the 9-month journey undertaken by the design cohort and reveals how the hands-on experience accelerated their learning and created a human connection to designing in a planet-centred way.

Watch the film here:
www.youtube.com/watch?v=G1C7dEcNTI4

I'm a product designer, where does my stuff end up?

Many of the products created by the programme's cohort would not (and should not) end up in a household recycling bin. So where do they go? After initial visits to Material Recycling Facilities (MRF) we realised we had not yet seen the answer to this question.

Products that held electronics in them would hopefully end up in a Waste Electrical and Electronic Equipment (WEEE) bin, located on streets or at Household Recycling Centres (HRC), but they are few and far between.

What about products that didn't include electronics? Household products (cookware, cups and plates, toys, furniture etc) are more invisible in our end-of-life system. If they are lucky they get re-routed back into use via a reuse hub like the one run by Suez in Manchester. If they didn't have vintage or resale value, they would end up in the unrecyclable or black bin skips at the HRC. Worst case they would be thrown into the recycling bin. It was a shock to the product designers to discover that a big chunk of the things they design may well end up on the incineration pile.



Is waste a failure of design?
by Sophie Thomas OBE

Through this investigatory pilot we have embarked on a journey that looks at effective ways to build increased communication and learning between the Design and Waste Management sectors. Using the focus areas set out by the Circular Economy Task Force, and in consultation with WRAP, we focused on system hot topics like Extended Producer Responsibility (EPR), reuse and the business models around it, and mixed waste streams. The selected cohort designers are those that work in furniture, electronics, mobility and packaging.

The programme itself builds on design residency methodologies from The Great Recovery (2012–2016) through three main phases. The first is immersion – what we call 'seeing is believing' – with three months of waste facility visits and expert webinars. The second is response – a six-week design sprint enabling deep dives into observed challenges, supporting design development and iterations, encouraging collaboration across sectors. The third phase is feed-forward – sharing learning into industry and government, through discussions, case studies and demonstrating best practice for moving forward and scaling up.

Doing electronic tear downs with former CIWM President Dr David Greenfield and his team from Tech Takeback was just the beginning. The designers travelled across the UK visiting major waste Material Recovery Facilities, Energy from Waste incinerators, landfill sites, household recycling centres, reuse hubs, speciality recyclers, paper mills and manufacturing businesses.

But what difference does it really make to watch a trommel toss out paper from glass, or see a robot pick the flexible plastics off a belt? Does experiencing the impact of a MRF fire started by a vape device, or getting the low down on which plastic type is not economically worth sorting change the way we design our products?

Our response is that it does. The designers have experienced what most people don't get to see: how waste is handled and how value is recovered from bags of recycling. They have articulated and demonstrated that it changed their understanding of 'end-of-life'.

The resource and waste industry is in continual reaction mode: to legislation shifts, to economic market impacts and to the continual influx of new products and materials where they have no direct input to help reduce end-of-life impact. In parallel, packaging and products are evolving all the time, often with big R&D budgets and briefs that emphasise better ergonomics, more efficient material usage and customer satisfaction. Why is the waste management sector not included in this process?

The programme has been interspersed with expert sessions, covering topical subjects including simpler recycling, standards and regulations, technology advances and limitations, fluidity and economics of secondary material markets, and design potential in recycling and circularity. This level of access for designers is very much wanted and needed if we are to shift towards more circularity in our systems.

Spending days deep in household waste streams at MRFs across the country, understanding the nuances in the UK's infrastructure and collection systems from those at the coalface is a completely different experience to reading about it. It's not only eye-opening but there is a huge amount of myth busting along the way.

You cannot change just one part of the system. Circular Economy is not about making one resilient factory or recycling one piece of packaging. Everything must be scrutinised. This programme should be a mandatory part of the training for all new designers if we really want a paradigm shift in our resource use.

Waste Site Visits

Locations of industrial site visits including material recovery facilities, landfill, energy-from-waste plants, specialist treatment sites, circular businesses, and research hubs.

■ Location of Participants



Manchester

Allermuir Sustain



Manchester

Suez Renew Hub



Coventry

Sherbourne Super Material Recovery Facilities



Gloucestershire

Hempsted Household Recycling Centre



Gloucestershire

Enovert Landfill



Brighton

Tech Takeback, Waste House



London

UCL Plastic Waste Innovation Hub & Institute of Making



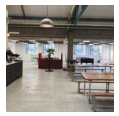
London

Biffa Material Recovery Facilities & Greyparrot



London

Decathlon HQ



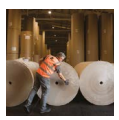
London

Blue Garage Innovation Hub



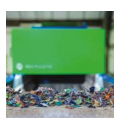
Kent

Enfinium Incinerator



Kent

DS Smith, Kemsley Paper Mill



Kent

SWEEEP Kuusakoski



Kent

Elvis & Kresse Regenerative Farm



“With unprecedented behind-the-scenes access to a broad spectrum of waste management facilities, we've been able to really peel back the layers of complexity in a way only possible by getting hands-on and asking difficult questions. My perspective has been permanently shifted by our shared experience over the last 6 months.”

Matt Granger
Product Design Engineer,
Venn Projects

Experts

A curriculum of design for circularity expert sessions brings manufacturers, designers, materials scientists, standards bodies, policymakers, waste operators and circular business leaders together with the cohort.



Leyla Acaroglu
Founder, Disrupt Design.co, UnSchools.co & Circular Futures.co

ISO & Systems Mapping



Amir Afshar
Co-founder, Shellworks

Shellworks: Bio-plastics Grown with Bacteria



Chris Allen
Director of Sustainability, Decathlon

Decathlon Repair Centre & Circular Business Models



Duncan Baker Brown
Architect, Academic and Environmental activist, Creator of Brighton Waste House

Building a House from Waste to Demonstrate Circularity



Jo Barnard
Founder & Director, Morrama

Design Approaches to Circularity



Oliver Broadbent
Founder & Design Trainer, Constructivist

Patterns for Regenerative Design



Olivia Broughton
Group Sustainability Manager, The Senator Group

Circular Manufacturing at Allermuir & Senator



Graeme Buckman
Area Manager, Enovert

Enovert: Landfill Management & Aftercare



Scott Campbell
Director, Surface Matters

Surface Matters: Sustainable Surfaces



Richard Cham
Technical Director, RECOUP

RECOUP: Plastics Recycling, Packaging & EPR



Yaseed Chaumoo
Managing Director, Greyparrot

Biffa & Greyparrot: AI-Enabled Waste Identification



Liz Corbin
Co-founder, Materiom

Materiom: Regenerative Biomaterials Research



Jen Emerton
Head of Business Engagement, WRAP

WRAP OC&C Report: Are UK Businesses Leaving Money on the Table?



Francesca Franke
Circular Economy Consultant, Circul'R

EU Policy & Regulation: ESPR & Digital Product Passports



Dr Nick Gant
Founder, Community21.org; Academic, University of Brighton

Design Approaches to Circularity



Justin Greenaway
Commercial Manager, SWEEEP Kuusakoski Ltd

SWEEEP Kuusakoski: WEEE Recycling



Prof David Greenfield
Founder, SOENECS; Visiting Professor, University of Brighton

Tech Takeback: E-Waste Teardown



Tara Hanrahan
Creative Consultant, Designer & Educator

Design Sprint Facilitation: From 'How might we?' to Concept in 6-weeks



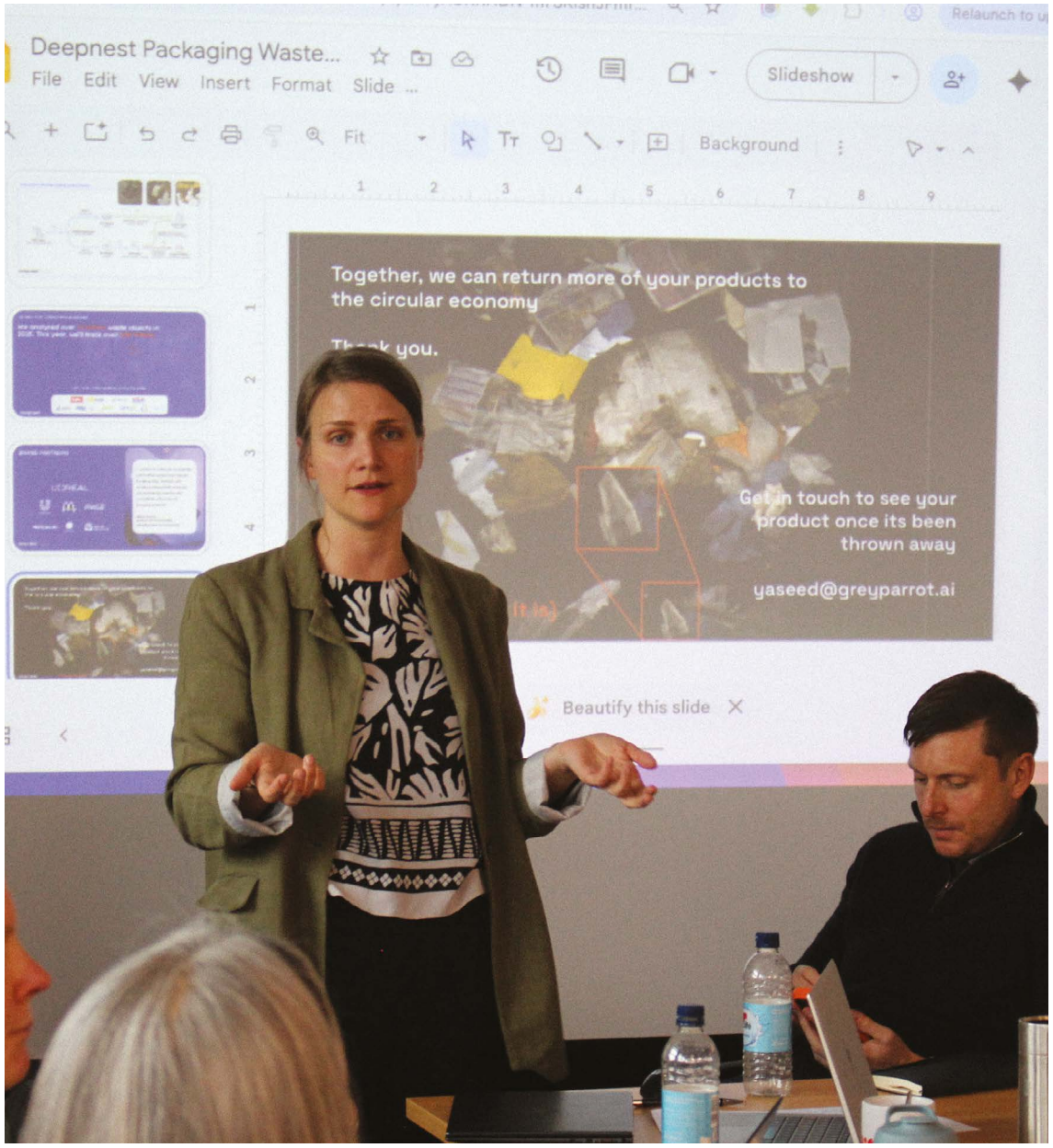
Amy Hooper
Head of Innovation & Sustainability, Biffa

Biffa & Greyparrot: AI-Enabled Waste Identification



Anthony Hornsby
Partnerships and Communications Manager, Sherbourne Recycling

Sherbourne Recycling: Super MRF Visit



Experts



Nat Hunter
Regenerative Design & Systems Coach

Future Visioning: 3 Horizons



Michael Korn
Entrepreneur & Founder,
Blue Garage

Creating the Space for Innovation



Maël Le Couëdic
Product Designer, Second Life,
Decathlon

Repair and Reuse at Decathlon



Chris Lefteri
Materials Expert & Author,
Chris Lefteri Design

Materials: Origins, Life Cycles & Impacts



Jean-Gabriel Leynaud
Cinematographer & Director,
Of Mud & Blood

Of Mud & Blood: Director Q&A



Liz Mallard
Fibre and Sustainability Manager,
DS Smith

DS Smith: Paper Recycling at Scale



Julia Martin
Circular Living Standard Lead,
WRAP

WRAP's Circular Living Standards



Prof Mark Miodownik MBE FREng
Professor of Materials & Society, UCL

The Big Repair Project



Lucas Muñoz
Contextual Designer,
Lucas Muñoz Studio

Site Specific Contextual Design
& Urban Mining



Matt Ousby
Design Director, Allermuir

Allermuir: Sustain Programme



Danielle Purkiss
Head of Research & Development at
UCL Plastic Waste Innovation Hub &
Institute of Making

UCL Waste Innovation Hub:
Working with Citizen Science



Dr Adam Read MBE
Chief Sustainability & External Affairs
Officer, Suez UK Ltd

Suez Renew Hub: Consumer
Behaviour & Circularity



Sara Walton
Engagement Lead for Sustainability,
Circular, Net Zero, British Standards

British Standards: Circular
Economy Framework



Kresse Wesling CBE
Social Entrepreneur & Regenerative
Farm Owner, Elvis & Kresse

Elvis & Kresse: Regenerative Farming
& Social Entrepreneurship



Designers Cohort

Meet the designers, and their potential to embed circularity

When the pilot was announced at the World Design Congress in September 2025 over 120 designers sent in applications. Through a process of long listing and interviews, sixteen designers from big corporate consultancies, SMEs and micro-business across the UK were selected.

The reach of these designers represents around 800 practising designers directly through their organisations, with the potential to influence thousands more through their clients, supply chains, and professional networks.

The skills and knowledge learned on the programme is amplified by the Learning Pack and the CPD sessions the designers are now able to give to their organisations and networks.

LinkedIn content has performed well with over 15,000 impressions just from Urge Collective and CIWM updates, with higher than usual engagement and click-through rates.

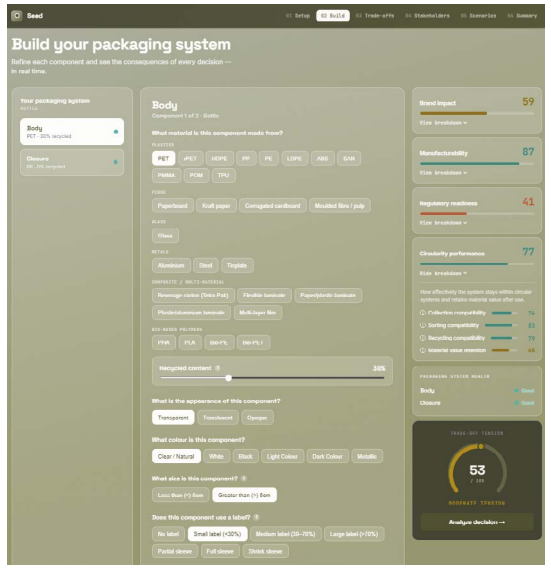
The designers took part in a six-week sprint to explore a challenge revealed by the site visits, or respond to one of the industry briefs set by Biffa and Decathlon. Through regular workshops and feed-forward sessions they each developed an innovative proposition to design out waste. Explore their concepts on the following pages.

Sprint Project
SEED

Decision intelligence tool designed to close feedback loops and provide real-time insights for packaging designers early in the design process.



Juliette Bouilly
Independent Industrial Product Designer



SEED interface: the real-time impact of pack type, market, material, colour, structure and labelling choices.

Key Challenge

How might we give packaging designers feedback from the waste system before they commit to a decision, not after?

Packaging designers make decisions every day that directly influence whether packaging is recovered or lost after use. Yet the realities of waste and recycling systems are often invisible during the design process. The Ellen MacArthur Foundation estimates that 30% of plastic packaging is fundamentally difficult to recycle because of upstream design decisions, highlighting a critical feedback gap between design and end-of-life systems.

“As designers, we often think about end-of-life through an environmental lens, but visiting waste and recycling facilities revealed a far more complex and valuable system. I realised that waste is not only something to reduce, but a resource with economic value that can be recovered, transformed and reintegrated. The programme challenged me to rethink the role of designers – not only as creators, but as contributors to circular systems, helping bridge the gap between materials, products and waste infrastructure.”

Sprint Project
x-brush

Manual toothbrush that bridges the gap between circular design and current UK recycling realities, turning a 0% recyclable daily essential into a 97% recoverable mono-material resource.



Abby Brazier
Senior Industrial Designer, Bibado.
Co-Director, Co-Lab 3

Key Challenge

How might we harness existing knowledge of materials, waste systems & recycled material markets to create a manual disposable toothbrush that reduces waste, with a higher % of recoverable material?



X-brush on a MRF conveyor after successfully passing through a trommel size sorter.

Globally, 23 billion toothbrushes are discarded annually, heading to landfill or incineration. Manual brushes need replacing every three months, yet their mixed materials – plastics, elastomers and metal staples – are designed to last for centuries, locking them out of recycling. High-performance bristles still require nylon, with no viable recyclable alternative. Sustainable electric options remain a premium niche. x-brush applies practical circularity within these constraints. Replacing staples with in-mould tufting and eliminating colour additives maximises material purity and recycling value. Once worn, a push-and-rotate mechanism changes the product's shape, enabling safe passage through UK Material Recovery Facilities (MRFs). This allows natural HDPE to be captured and reused up to 10 times.

"Circularity isn't about waiting for a 100% perfect solution; it's about making incremental changes in design practice to nudge us toward better outcomes for all involved – from where materials originate and the human cost of production, to where products end up, and whether they need to exist at all."

Sprint Project
The £1bn Crisis

Mitigating dangers of rechargeable e-waste disposal through design for detection and battery removal.

Biffa



Pippa Bridges
Senior Product Designer, Designability



E-waste with clear, identifiable labelling.



For every cigarette bin, we need a vape bin too.

Key Challenge

How might we redesign products to aid battery removal and detection, to ultimately prevent battery-related fires in waste recovery?

There's a battery-related fire every week, burning down multi-million waste facilities in seconds. Every rechargeable product contains a lithium-ion battery, and when these products get into general waste or recycling, they remain undetected and cause huge safety risks. The waste facilities are becoming uninsurable. However, consumers aren't clear what products contain batteries, and where they need to put them. Products also aren't designed for battery removal, so it's economically unviable to remove these (without heavy subsidies). We need new government guidelines to address dangerous fast-growing electronic waste recovery. We need product redesigns to aid battery removal and we need mandatory clear labelling interventions to both help consumers identify e-waste, and waste facilities detect misplaced electrical products.

"The problem isn't necessarily battery products themselves, the problems occur when they get into the wrong places, like general recycling or waste, that aren't set up to handle them. Can the government mandate labelling interventions to identify e-waste for both consumer sorting and facility detection, and designers enable easy battery removal?"

Sprint Project

Bio-plastics challenge: How to dispose of your cup?

Designers require support in understanding bio-plastics, low-carbon materials and how to reduce plastics waste.



Anna Eerdmans
Product & Interior Designer, Studio Onesta



'Compost, recycle or bin?' experiment.

Key Challenge

How might we design an appropriate identification process and waste stream for bio-plastics?

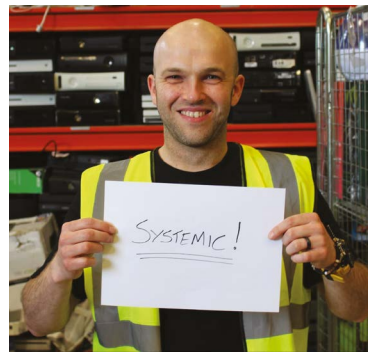
Confusion, miscommunication and complex processes, mean that a clear system and consumer guidance framework is needed to help properly identify and dispose of (bio-plastic) items (e.g. cups) across composting, recycling, or general waste options. Designers should use as much recycled plastics as possible, to keep carbon impact low and to reduce the existing waste pile. Potentially they can add virgin bio-polymers (for strength), as this can also be recycled. In the longer term, industrial composting sites require developing so that there can be an increase in use and capture of biodegradable bio-plastics such as PLA and PHA.

"The programme has been incredibly informative, incentivising and change-inducing. I feel empowered and strengthened with my new knowledge and I can make better informed decisions on how to consider materials and design construction, when working on a project."

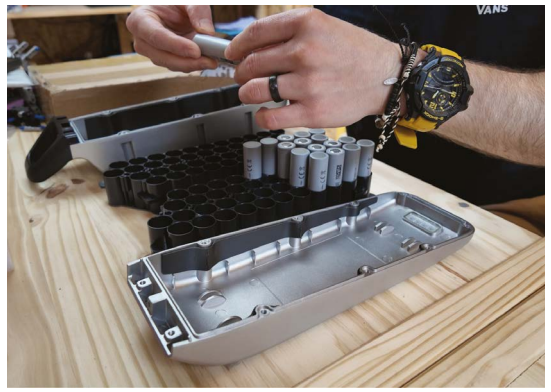
Sprint Project

E-bike Lithium-ion battery extended life

Design standards and testing conditions for e-bike battery packs that allow safe cell recovery, reuse, and life extension.



Matt Granger
Product Design Engineer, Venn Projects



E-bike battery pack exploration.

Key Challenge

How might we determine the conditions under which a recovered cell be declared safe and economic to put back into service, and what does that mean for how packs are designed?

This sprint challenged the assumption that faulty e-bike batteries must always be destroyed. Research with specialist repairers, bike shops and waste operators, alongside regulatory analysis and independent CT scanning of over 1,000 cells, revealed that many battery failures are mechanical or software-related rather than cell-related. Seven conditions were identified to assess whether recovered batteries can be safely and economically returned to service. The findings highlight opportunities for better battery design, greater repair access and improved industry guidance.

"I joined the course with an inkling that everything that I thought I knew about the 'job to be done' on sustainability and how that translates into our waste management systems was going to be challenged. I was not disappointed.

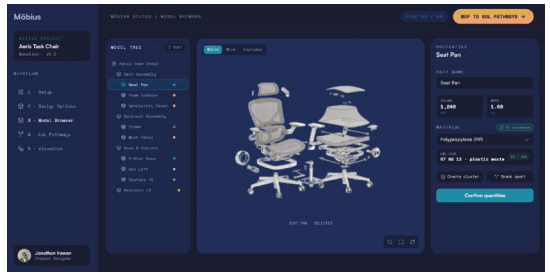
My perspective on a whole host of topics has been permanently shifted by our experience. It's exciting to take a moment to imagine the catalysing effect that this pilot has had on our shared future impact and contribution to these topics."

Sprint Project
Mobius

Common digital platform mapping circular material flows between waste producers, waste processors, and the public to enable data-driven design decisions and circularity indexes.



Jonathan Irawan
Computational Design Lead, Hassell Studio





Model Browser – Material Assignment and End-of-Life Configurator within Model Element Tree/Hierarchy.

Key Challenge

How might we generate a better dialogue and exchange between designers and waste management professionals to understand end-of-life impacts?

Designers make decisions every day that determine what happens to products at the end-of-life, yet we work largely on assumptions. Environmental Product Declarations (EPDs) are beginning to fill the gap, but most carbon accounting schemes are voluntary and inconsistent across industries. Meanwhile, designers who want to use recovered or secondary materials rarely know where to find them. Mobius closes this loop with a common data environment – connecting the three archetypal groups in a product's journey to waste: producers, processors and the public. Producers (designers, product owners and procurement teams) can test options against end-of-life scenarios. Processors (waste management) feed back data on what is recovered, revealing which materials are available, in what volumes, and where design could improve. The public can take a photo or scan an item to learn where it will end up, helping them with correct reuse or disposal. The result is a feedback cycle in which design informs recovery and recovery informs design.

"… the programme also introduced us to organisations that see waste not as a problem but as an opportunity, and showed how much economics shapes their day-to-day decisions and operations. That economic reality is what we, as designers trying to embed circular principles in our work, most often overlook."

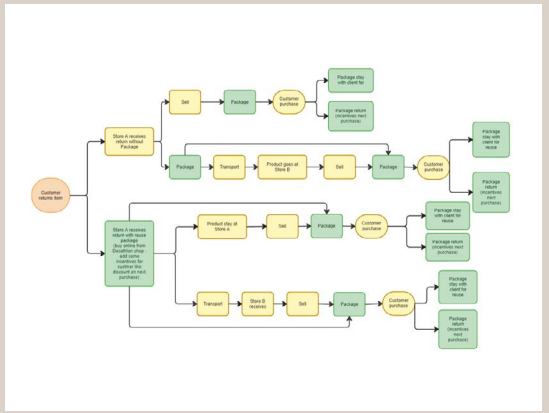
Sprint Project
Reusable Packaging for Buy-back and Resell Schemes

Modular, collapsible reusable packaging system tailored for large sporting equipment in Decathlon's reverse logistics and buy-back network.

Decathlon



Rafaella Klaus
Civil Engineer, Useful Simple Trust / Expedition Engineering



Flow diagram exploring how customer incentives drive high circulation.

Key Challenge

How might we create a reusable packaging solution for large second-hand sporting equipment for the benefit of the environment, Decathlon, and its customers?

As Decathlon expands its buy-back programme to include home collection and store-to-store transfers, transporting bulky second-hand products safely and sustainably becomes a growing challenge. Currently, around 90% of buy-back volume comprises large items, including bikes, tents and fitness equipment. This project proposes a modular, collapsible reusable packaging system to protect products in transit, reduce reliance on single-use cardboard and minimise storage and transport costs. Customer return incentives will encourage reuse, supporting a scalable, economically viable circular logistics model.

"The highlight of this programme was the site visits, which gave me a new perspective on material and waste systems. Seeing where our waste ends up and how it is processed made the concepts of circular design much more tangible. Since then, I've found myself sharing what I've learned with friends and family, from explaining why bottle caps are attached to bottles to how to dispose of pizza boxes correctly. I've also started applying the same thinking at work by considering the end-of-life and reuse potential of building materials."

Sprint Project

Circular Design Improvement Plan Tool

Digital decision-making tool for product designers to integrate circular practices early during projects.



Marion Lutigneaux
Senior Industrial Product Designer, Polaroid



Interface showing a decision-making tool for improving the circularity of design projects.

Key Challenge

How might we close the gap between circular theories and manufacturing and corporate realities, giving the product team the leverage to convince the leadership team?

The Circular Design Improvement Plan Tool is a digital tool for product teams to integrate circular practices early during the briefing stage.

The programme exposed a gap between circular design theory and manufacturing reality. Too often, circular ideas remain unrealised because product teams lack downstream insight and struggle to make the business case. The Circular Design Improvement Plan addresses this by helping teams embed circularity at the product briefing stage. Its interactive flowchart guides users through regulatory requirements and business opportunities, providing practical actions, supporting evidence and case studies.

"The outcome is a clear set of circular design requirements that teams can integrate directly into product briefs, before manufacturing begins.

Taking part in this programme has been an extraordinary opportunity! We have learnt so much, and still a lot to learn! Being able to explore the different aspects of the circular economy has helped me to better identify what interests me most within such a vast subject. I will continue to deepen my knowledge over the coming years and carry on along the path we have started."

Sprint Project

Ambessa Play: a Study into Repairability

Circular business model study for Ambessa Play's DIY flashlight focused on repairability, modular component replacement, and return incentives.



Amelia Kociolkowska
Industrial Product Designer, Pentagram



The components of the Ambessa Play DIY flashlight.

Key Challenge

How might we build a system based on return and repair values to reduce throwaway culture?

This study explores the repairability and circular potential of Ambessa Play, a DIY flashlight comprising 59 components. Its buildable kit format enables users to disassemble the product easily, replace broken parts and carry out repairs at home. The research identifies challenges including hazardous capacitors, non-recyclable silicone components and difficulties reaching users displaced from their homes with replacement parts. In response, it proposes a return-and-repair system to reduce throwaway culture. End-of-life opportunities include recycling old component casings into new shells and using recycled ABS to manufacture stools for displacement camps.

"Achieving circularity is very complicated. There are many partners involved and a lot of human error/confusion which creates problems and slows down improvement. There is also not usually one clear answer; it requires knowing a lot to decide what is the best solution per project. Profit still motivates design decisions and end-of-life activities i.e. recycling is just selling of materials. This was probably one of the most shocking but motivating lessons learned."

Sprint Project
CleanLoop

End-of-life collection stream combining injection devices, razor blades and other household sharps using reversible packaging for easy returns and identification.



Tom Lever
Product Designer / Mechanical Engineer, PA Consulting



CleanLoop packaging and graphics.



CleanLoop sharps returns.

Key Challenge

How might we collect and handle complex biosharps waste more intelligently and more safely, to improve its chances of a second life?

CleanLoop is intended to improve factors contributing to effective end-of-life return and recycling of complex waste streams. Providing the returns packaging and graphics on the reverse of the on-shelf pack signifies and advertises the scheme, as well as ensuring that all SKUs are provided with corresponding returns packaging. This should make the end user returns process more seamless. The returns packaging itself clearly signifies the relatively high risk of the contents, while providing machine and human readable information for effective sorting. The graphics should also allow for identification and separation of product if they end up in the incorrect end-of-life stream.

It is proposed that CleanLoop packs would come in a variety of formats, would be returned through multiple easy-to-access locations, and be robotically sorted upon receipt in order to send sorted devices back to participating partners.

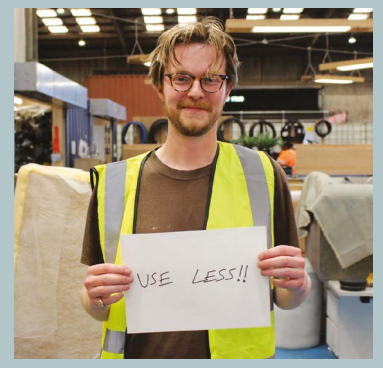
"It has been an eye opening experience which I think will be instrumental in informing how I design products going forward. It has provided many visceral, in person, hands on experiences which have broadened my understanding of multiple different end-of-life streams."

Sprint Project
Bird Boxes from 'Local' Recycled Plastic

Decentralised local 3D-printing systems turning recycled plastic into functional community products like bird boxes.



Luke Pearson
Co-founder & Senior Industrial Product Designer, Pearson Lloyd



Rory Mullins
Industrial Product Designer, Pearson Lloyd



Community bird box.

Key Challenge

How might we redefine ownership of materials so products become temporary custodians of valuable resources, not their final destination?

This proposal challenges the hidden social costs of virgin plastics by treating materials as borrowed rather than owned. It introduces a two-stage incentive system, combining deposit returns with Value Recovery Tokens, to reward clean material separation. Hyper-local, AI-enabled machines identify and process polymers, reducing transport volumes by up to 90%. Tokens support local manufacturing networks, turning waste into valuable resources. A 3D-printed bird box made from recovered PLA demonstrates how material recovery, open-source design and local production can create more circular, repairable economies.

"The DSfEC pilot provided valuable insight into the logistical and economic realities of circularity, from waste infrastructure to the challenges of material separation, transport and recovery. Understanding these end-of-life barriers will help us work more proactively with clients to design environmentally responsible products. A future module exploring larger, longer-life products, such as furniture and bicycles, would be valuable."

Sprint Project

Tent Waste Challenge

Tent rental service designed for music festival attendees in partnership with Decathlon to eliminate single-use festival tent waste.

Decathlon



Gary Poolman
Senior Independent Product Designer, Aileron Design



Decathlon rental tents for festivals.

Key Challenge

How might we prevent tents from being abandoned after music festivals?

In response to Decathlon's challenge to tackle festival tent waste, this project proposes a rental scheme targeting 16–25-year-olds at Reading and Leeds festivals. Based on the assumption that tents are abandoned due to the inconvenience of packing, transporting and storing them, the service offers pre-booked tents, collection at festival entrances and on-site pitching support. At the festival's end, users mark their tent's location via an app for Decathlon teams to collect, clean, dry and prepare for reuse. Tents are designed specifically for this circular model.

"I have thoroughly enjoyed the programme and felt privileged to be able to experience the site visits and opportunities to meet and speak with such a knowledgeable group of people, so generous with their time to educate us. That goes for the facilitators, partner business representatives and the members of the cohort.

I can already see the results opening up new opportunities beyond the programme, which I'm sure will be invaluable in my career progression into circular product design and business strategy."

Sprint Project

Tennis Ball Project

Community reuse programme for tennis balls incorporating eco-social contracts and educational outreach around eco-ableism.

Decathlon



Natasha Trotman
Designer & Researcher, Natasha Trotman Studio



Revealing the hidden journey of tennis balls.

Key Challenge

How might we create new eco-social contracts for used tennis balls and raise awareness of eco-ableism within tennis communities, and beyond?

The project began by exploring used tennis balls as a circular-waste challenge, before evolving into a wider enquiry into responsibility, awareness and inclusion within sport. Billions of tennis balls are used globally each year, yet their bonded felt, rubber and adhesive construction makes recovery technically difficult, with no widely viable solution at scale. Limited data access, material supply and the sprint timeframe prompted a shift towards the concept of eco-social contracts: the shared responsibilities of retailers, players, clubs and recovery partners. Research also raised questions of eco-ableism and inclusion. The outcome is an awareness-led object making the hidden journey of tennis balls visible and encouraging shared accountability.

"This programme pushed me to think beyond technical circularity and engage more critically with responsibility, participation and inclusion. The sprint format encouraged rapid yet meaningful reframing of the project, particularly when practical constraints made a purely material solution less realistic. It was valuable to test how systems thinking, research and design can work together to reveal hidden assumptions and open new forms of dialogue. The experience strengthened my interest in community informed, socially conscious circular design."

Sprint Project

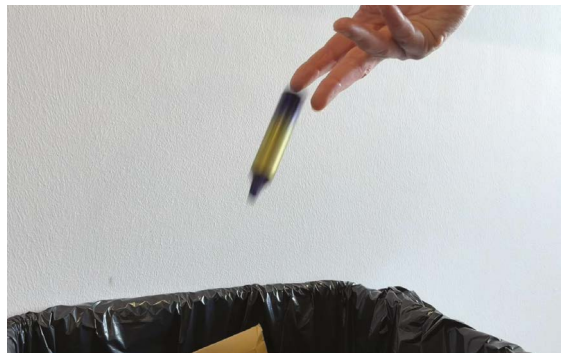
Another Day Another Fire: Vape Disposal Barriers

Targeted disposal bins and behavioural interventions encouraging consumers to keep the reusable vape body and recycle/replace pods separately.

Biffa



Jess Wright
Junior Industrial Product Designer, Imperial Brands



Current dangerous vape disposal via household waste.



Dedicated vape disposal bins.

Key Challenge

How might we influence consumer behaviour to correctly dispose of vapes and prevent fires?

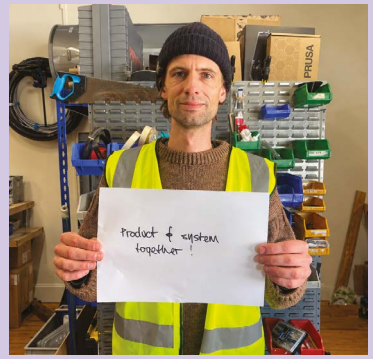
The incorrect disposal of vapes and the associated fire risks caused by their lithium-ion batteries is a key waste management issue. Research showed that many consumers want to dispose of vapes responsibly but are hindered by low awareness, poor accessibility and inconvenience. Nearly half of users currently dispose of vapes in household waste, contributing to waste stream contamination and battery fires that cost the UK an estimated £1 billion annually. Consumer insights revealed distinct behavioural differences between age groups. Younger consumers (20–39) often delay disposal due to convenience-driven lifestyles, while older consumers (40+) prefer simple, routine-based disposal methods. Informed by this, two targeted solutions were developed: dedicated vape disposal bins in high-use public areas and a kerbside collection service for vapes and small WEEE items. Consumer testing demonstrated strong support for both concepts.

“The breakthrough came when I realised the problem wasn't a lack of intent. Consumers want to dispose of vapes correctly, but convenience continues to outweigh good intentions. The disposable vape ban hasn't changed how people value these products, many users still view them as disposable, low value and replaceable. Rather than trying to change attitudes, the opportunity was to remove barriers and make circular disposal the simplest option.”

Sprint Project

Plastics in the Open

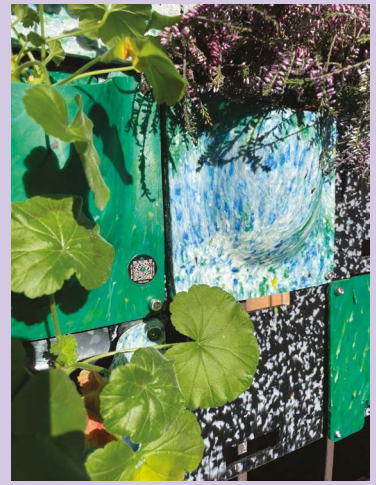
Plastics in the Open, a proposition for localised micro-recycling and re-manufacturing hubs making plastic recycling visible and community-driven.



Matt Willox
Co-Director, Co-Lab 3



Oliver Lloyd
Strategic Designer, Oliver Lloyd Design



Prototype of a planter tile system showing QR code linking to Digital Product Passport (MW).

Key Challenge

How might we change the perception of plastic as waste through community involvement?

Plastics in the Open proposes a network of small-scale recycling and re-manufacturing hubs that make plastic recovery visible, trusted and locally owned. Local plastic is collected, shredded and transformed into useful products, with residents involved through sorting, co-design and manufacturing workshops. A tile-based template structures accessible co-design sessions, with modular planters and shelving demonstrating long-lasting value. Reconfigurable pin-bed tooling enables flexible, low-volume production. Each product carries a QR-linked Digital Product Passport, sharing its material history and community story while enabling feedback. Delivered with residents, schools and community partners, the model reconnects communities with recycling and gives them greater ownership of local resources.

“One of the biggest realisations was how difficult it can be for people to engage meaningfully with the discussion around plastics and recycling. We see a need for design and designers to make complex issues tangible and accessible, helping communities use materials to build connections, develop skills and knowledge and feel empowered to create their own products and systems.”

“Visiting waste and recycling facilities, speaking with experts and connecting with other designers has highlighted the significant disconnect between what we assume to know about end-of-life and the reality of waste management systems (a complex valuable system).”

Juliette Bouilly
Independent Industrial Product Designer



Case study

Biffa's brief to tackle the wicked waste challenge: vapes in the wrong place

Biffa's journey with the programme started with welcoming the design cohort to their Edmonton MRF for a site tour and workshop. Encouraged by the expertise and engagement of the design cohort, Amy Hooper, Biffa's Head of Innovation and Sustainability, set two real-world design sprint briefs. This case study focuses on the brief about 'Vapes: Designed with Real-World Infrastructure for Safe Return, Collection & Recovery'.

Lithium-ion batteries hidden inside discarded vapes pose a growing fire risk to the UK's waste and recycling sector, with thousands of battery fires reported each year. The June 2025 disposable vape ban has failed to eliminate the problem: more than 6.3 million vapes and pods are still discarded every week, according to Material Focus, continuing to contaminate the waste stream.

Fires caused by incorrectly discarded lithium-ion batteries are occurring more than ten times a week at UK recycling centres. They put workers at risk, place additional pressure on fire services and threaten vital waste infrastructure. The estimated annual cost has soared from £150m in 2021 to £1bn today[3].

Vapes are among the biggest culprits for fires because they're cheap, abundant and typically have a short use-life. There is consumer confusion and an inadequacy of on-the-go street and home collection systems for vapes, meaning that these products end up mixed in with paper, plastic, food and household waste causing a major fire hazard.

In response to the Biffa challenge, cohort participant Jess Wright, designer at Imperial Brands, asked: "How can we influence consumer behaviour to ensure vapes are disposed of safely and prevent fires?" During the six-week sprint, she explored the role of designated disposal bins and behavioural interventions to encourage consumers to retain reusable vape devices while replacing and recycling pods separately.

Building on this work, Biffa and Imperial Brands are now developing a partnership to investigate the challenge further.

[3] esauk.org/2025/09/15/esa-publishes-battery-fire-policy-briefing-calling-for-urgent-reform/

"This is exactly what we need: bringing industrial product designers, design engineers, resource managers and circular economy practitioners together to explore how we can embed circularity into products and systems from the very beginning. The quality of the final presentations was exceptional, with creativity, curiosity and insight in abundance! The cohort broadened our thinking with fresh perspectives on complex real-world challenges and explored ideas that don't often emerge when we stay within the boundaries of our own sectors. The programme created the space for new ideas, new ways of thinking, and new collaborations. If we're serious about accelerating innovation and the transition to a circular economy, we need more opportunities like this."

Amy Hooper
Biffa



What Next?

Re-designing everything

The 2016 concluding report from The Great Recovery programme set out ten recommendations to be scaled up and taken into business and communities. This four-year programme led by the RSA and Innovate UK pulled together its findings ready to be tested and refined through practice and iteration. The Design skills for Embedding Circularity has built on the learnings and recommendations, specifically in the development of design focused programmes that span sectors and value chain, and closer links with the design sector, material science and waste management to identify challenges and build solutions.

It is really clear from the feedback the programme has received that there is a need for collaborative programmes like DSfEC. It is scalable, replicable and valuable - beneficial for all the sectors involved.

In summary, every part of the supply network needs to be talking and collaborating, every brief needs to be re-written, and infrastructure built that is fit for purpose.

Here are the ten updated recommendations, ready for government and businesses to act upon.



The Circular Network Wheel
www.greatrecovery.org.uk

[1] Governments support and lay out route maps for nationwide circular economy strategies, heavily involving the design and waste management sectors as keystones for circularity.

[2] Government and trade organisations build datasets of material demands and waste created (mass balance) and develop AI platforms to predict future resource and value opportunities.

[3] Research bodies, trade and government organisations partner in a convening role to broker network relationships, catalyse diverse partnerships and creatively engage network sectors through a range of experimental and design focused programmes.

[4] Comprehensive analysis and coalition of the legal and legislative barriers and opportunities within different sectors as seen through the lens of the Circular Economy.

[5] Physical 'skunkworks' test spaces established across the UK for face-to-face interactions, experimenting and modelling. Dedicated to circular economy research, design and development.

[6] Patient capital and long-term investment opportunities fostered in the UK to support circular innovation, accelerating prototyping and accelerating route to market.

[7] Closer links with the design and material development sectors and resource management fostered through a programme of design residencies funded through business partnerships, waste organisations and government programmes.

[8] University and education organisations develop foundational circular economy education programmes and curricula, incorporating action-based learning, that can be tailored for schools, universities, colleges and make spaces.

[9] Government continue and increase support, promoting cross-sector programmes of innovation-focused competitions and loan schemes to fuel new business ideas and enable ‘leapfrogging’ in the R&D stage through knowledge sharing and collaboration.

[10] National campaigns to engage the circular network through creative public programmes that disseminate real-world challenges that need circular solutions and tell positive stories of solutions, showing the massive benefits that a shift to a circular economy could bring.

Recommendations for future programmes



Programmes like Design Skills for Embedding Circularity bring designers directly in contact with the business partners, waste operators, recyclers and specialist treatment facilities who work at the coalface of big societal challenges in resource management.

By using a core structure built around ‘Seeing is Believing’ designers were asked; “how can you design for the infrastructure we have today, how can you develop your designs to be fit for tomorrow’s legislation, and who should you collaborate with to future-proof your designs so they keep value in the system for the future?”

Amplifying and transferring learnings across industry sectors and enabling accelerated development is key if we want to unlock the potential of a circular economy. The number of jobs and new businesses cited by organisations, worldwide, are significant and must put this economic model high on the government’s priority list.



The pilot was intentionally designed to be broad, testing methodologies and gaining insight on specific opportunities and challenges that would benefit from the following future programmes.

Lithium-ion batteries and small WEEE

The DSfEC designers saw first-hand the devastating impacts caused by batteries in products like vapes, mobile phones, laptops, and e-bikes if they ended up in the wrong collection vehicles and waste processing facilities. The consequences were not only costly, involving substantial financial bills, and hikes in facility insurance but also brought serious risks to workers, infrastructure and communities.

The DSfEC designers identified solutions for improved battery and component removal, segregated collection for households and on-the-go, identification, and take back schemes, as well as ways to improve critical material recovery from end-of-life electronics.

Future programmes are required to go deeper. More research is needed into customer behaviours on disposal in household and on-the-go locations as well as testing of new designs for identification and easy removal.

Insight from the pilot

One of the tangible outcomes of the pilot is the developing collaboration between resource management company Biffa and Vape Manufacturer Imperial Brands to focus on the challenge of incorrect vape disposal and the subsequent fires.

Plastics, packaging and Extended Producer Responsibility for Packaging (pEPR)

In 2018 the UK Government report, 'Our Waste, Our Resources, A Strategy for England' set out the intention of introducing EPR schemes for different waste streams starting with packaging, then moving on to textiles, bulky waste (white goods), WUDS (waste upholstery domestic seating), construction materials, car tyres and fishing gear. EPR schemes rely on compliance and will be much more successful if all of the value chain understand their role. The DSfEC cohort were not knowledgeable their roles and responsibilities when it comes to EPR and have not been taught about the new pEPR regulations.

Future programmes should focus both designers and businesses who place packaging on the UK market to rethink how it is designed, produced, used and recovered. The emphasis should be on: building a deeper understanding of pEPR, upstream reduction in material complexity, eliminating unnecessary packaging, and ensuring that products and packaging are compatible with the realities of existing and emerging waste infrastructure and regulations.

Insight from the pilot

RECOUP ran an expert session called 'Plastics recycling, domestic recycling capacity loss'. The cohort questioned Richard extensively on Extended Producer Responsibility implementation challenges, and its design criteria for material recovery. This knowledge transfer session added incredible value to the programme.

Working with and, disposing of, novel biomaterials

Interest around biomaterial use in design is growing at a fast rate - much faster than the investigation into its correct disposal. Our waste visits identified gaps in the current systems where these types of materials fall through, ending up in the wrong place, sometimes defeating the point of using them in the first place.

The DSfEC pilot highlighted the complexity and confusion surrounding bio-based alternatives replacing fossil-fuel-derived plastics. In the UK it is currently impossible for a biodegradable material on a product like furniture to get into any composting or bio breakdown plant as there is not provenance for it to do so. Instead it will be diverted to be incinerated.

Future programmes should explore misunderstandings held between bio-based, biodegradable and compostable materials where they are leading to incorrect disposal, contamination and materials entering unsuitable waste streams. The emphasis would be on co-designing viable circular systems for these new materials.

Insight from the pilot

Long discussions at Enovert's Windrow composting site were eye opening for the designers already working in, or considering substitution to, bio-plastics. Seeing what was accepted, included and rejected was very different to common belief in the design world.

There is equally an opportunity to use the methodology for other material and systems challenges:

Bulky Waste

Increased occurrences of fly-tipping and waste crime has brought the complex and broken systems around disposing of bulky waste items and WUDS (Waste Upholstery Domestic Seating) into the limelight. This challenge suits the DSfEC cross-sector approach that could unpick the societal triggers and find new solutions.

Fashion & Textiles

DSfEC can explore design for longer product lifespans, simpler material compositions and investment in domestic sorting and recycling infrastructure, all essential to shifting the sector from a linear model of consumption and disposal towards a genuinely circular textile economy.

Built Environment

DSfEC is a programme that convenes value chains to find solutions. DSfEC could bring together the built environment design, construction and demolition chain to investigate moving beyond improving construction waste management and towards creating the conditions for material reuse.

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Contact details via the website:
www.designskillsforcircularity.com



Design Skills for Embedding Circularity

Yes, we can design out waste.

www.designskillsforcircularity.com

CIWM URGE Design Council WRAP Circular Economy Institute

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