

Results of Competition: ISCF Smart Sustainable Plastic Packaging: Feasibility Studies and Industrial Research

Competition Code: 2001_ISCF_CRD_MMM_SSPP

Total available funding is £1 million

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
CRODA EUROPE LIMITED	Slip additive for PET plastic packaging (SAP3)	£70,002	£9,800
Queen's University of Belfast		£29,999	£29,999

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Project description - provided by applicants

The project will enable PET bottle manufacturing to be conducted in a more efficient and sustainable manner, with the use of a novel additive.

To do this Croda, a multi-national, UK headquartered specialty ingredient supplier will partner with Queen's University Belfast, a leading academic institute in polymer orientation and stretch blow moulding for PET bottles and BOPET films. Croda and Queen's University Belfast and will develop a new additive which will act as a processing aid & slip agent for PET plastic packaging.

With the use of this new additive, the bottle manufacturing process will produce fewer rejects (i.e. post-industrial waste), will be conducted at lower temperatures (i.e. energy savings) and will demonstrate reduced coefficient of friction (CoF) on the produced bottles, resulting in reduced downtime often caused by bottle stiction on the conveyor belt. The reduced CoF will also remove the need of externally applied lubricant sprays, which are potential contaminants, making the overall process safer too.

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BOCKATECH LTD	Sustainable Rigid Plastic Packaging — The Next Generation Lidded Plastic Packaging Pails	£44,818	£17,927
FSG TOOL & DIE LIMITED		£51,716	£20,686

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Project description - provided by applicants

****Creating Sustainable Plastic Packaging --- The Next Generation Lidded Plastic Packaging Pails****

Lidded plastic packaging pails are used extensively for everyday consumer goods from paint and confectionery to condiments and cleaning products. They're also used in supply chains for consumer as well as other goods from many sectors industry including food / beverages, automotive, construction, chemicals, lubricants / fuels, paint / coatings, pharmaceuticals and cosmetics.

EcoCore is a new patented foaming technology. It creates packaging with skin-foam-skin walls that reduce the amount of plastic needed to make packaging. Packaging made with EcoCore is sustainable, low-cost, lightweight, insulated, strong and durable.

EcoCore was first used to create more sustainable low-cost reusable recyclable cups to solve the problem of an estimated 100 Bn paper coffee cups being thrown away each year worldwide. EcoCore Zero Waste Cups have been used in a variety of ways from city reuse schemes such as the Shrewbury Cup, to innovative mobile app enabled initiatives like Ri-Cup in Ireland and even Waitrose stores. The cups were also recognised by the well-known sustainability and circular economy campaign group Ellen MacArthur Foundation as one of the top initiatives for reuse. This project will develop EcoCore foaming technology to create a "world first" --- a new generation of more sustainable foamed plastic pails that will cut plastic material use by an estimated 20 --30% and include at least 30% recycled plastic. In addition, the new containers will be more durable so it's more likely they will be reused. The combination of weight saving, recycled material, and reuse will reduce significant environmental impacts such as greenhouse gas emissions and the pollution of land and oceans with plastic packaging.

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Evolve Packaging	ANTHROPOCENE MINING	£20,957	£14,670
CAMBOND LIMITED		£54,790	£38,353

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We live in the 'anthropocene age'. This is the epoch where our use of technology and resources has left an indelible mark on the composition, surface and environment of our planet. The plastics once seen as indispensable for modern life are now regarded as a curse of the Anthropocene age. The current life cycle management of plastics causes a host of environmental issues. Despite numerous initiatives and campaigns plastic re-cycling rates are low (typically <30%) and the bulk of this 'modern miracle' material (>60%) is burnt or sent to landfill, generating millions of tonnes of CO2, potentially hazardous microplastics or global environmental pollution.

Consumer product packaging is one of the largest components of the problem. A wide variety of materials, material formats and combination of plastics all contribute to a systemic and fundamental re-cycling problem. Society has struggled to develop commercially viable solutions for effective recovery and re-use of the bulk of plastics. As a result the default state is a series of efforts to camouflage the problem by burning or burying the evidence.

Anthropocene mining could provide a solution to these issues.

A number of companies have developed partial technical solutions for dealing with plastics. Evolve Packaging and Cambond have shown that an efficient, commercially viable, circular economy in mined post-consumer plastics is possible.

The mining project aims to identify circular economy partners and demonstrate that:

Post consumer waste plastic can be processed effectively at scale

Mining of plastic waste can produce viable feedstock materials

Anthropocene feedstocks can be used to make consumer products

These products can meet consumer needs for plastic products

Products from mined plastics can be re-cycled creating a circular economy in plastics

The ability to turn post-consumer plastic waste into products would provide a potent commercial rationale for investing in and scaling new supply chains for manufacturing low carbon, re-cycled plastic products.

This project will identify the materials, technology and supply eco-system required to deliver a scalable environmental and commercially acceptable solution to the plastics problem.

Our solution develops UK expertise in dealing with the plastics problem and provides the UK with an alternative to virgin oil derived plastics. The UK could develop an advanced level of expertise and technology in post-consumer plastics processing and manufacturing capacity whilst reducing the carbon footprint

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of the end products.

UK leadership in this area would generate valuable trading and technology transfer business opportunities.

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STOPFORD PROJECTS LIMITED	CircuPlast - Assessment of a Novel Process Technology to Enable a Circular Approach to the Management of Plastics Packaging Waste	£75,769	£53,038
University of Birmingham		£24,112	£24,112

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Project description - provided by applicants

This project will seek to assess and validate a novel process technology that will seek to enhance plastics packaging waste recycling rates and increase the recycled content of plastics packaging, whilst preventing the release of plastics waste into the environment.

Using water as a green solvent, our super critical water (SCW) technology aims to enable the indiscriminate recycling of plastics (PP, PE, LDPE, HDPE and laminates) into a chemical feedstock for primary plastics manufacture, offsetting the requirement for fossil-oil derivatives for plastics production.

This project will therefore seek to assess the applicability of our SCW for plastics recycling, enabling the preliminary design of a commercial scale plant to be completed, and enabling a review of both capital and operational costs. The project will also seek to identify how this novel technology can be deployed within the waste plastics packaging supply chain, enabling highly efficient recycling of plastics whilst providing a sustainable source of chemical feedstock for primary plastics manufacture.

As well as helping to address the well documented issues relating to plastics in the environment, this project will also seek to enable a truly circular economy approach to the management of waste plastics packaging.

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BIOAWARE LTD	Creating Long-Life, Plant-Based, Biodegradable Food Containers to Meet UK Plastic Goals: Polylactic Acid, Rotomoulding, Annealing across a mix of Products and Target Markets	£99,238	£69,467

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Project Summary - Public Description

The vision of the project is to enhance our bioplastic food containers in the following three ways: i) able to withstand dishwashers, microwaves and boiling water -- through our material processing approach, ii) leakproof for water and oil even when bumped about in a shopping bag -- via effective seals, iii) with unit cost reduced -- by means of our moulding approach. Achieving these three container enhancements is the final milestone in the project plan. Each of these enhancements is a product innovation in the market today and requires engineering innovation to bring it about.

After the project, we'll apply these enhancements to our other three PLA products: lunchbox, sports water bottle and vegetable box. Also, after the project, we'll scale our manufacturing volume, giving our workshop an increased monthly capacity. Furthermore, franchise licencing will scale our reach.

Before this project we have created this project's foundation or point-of-departure, by having achieved and established the following eight points or facts: i) we have designed, made and sold containers \[focussed on dry food refill\] and trial lunchboxes with excellent customer feedback, they are ii) made from plants grown with managed land use, iii) biodegradable without residue, iv) toxin free, v) taste free, vi) durable, vii) lightweight, and viii) appreciated as beautiful.

Our first containers cost more to make than they sell for, which we reduced over the last two years with many improvements. Likewise, we've improved quality and reduced time to make a container from two days down to seven hours -- and coming with the project down to one hour. Our focus is and continues to be on the bioplastic polylactic acid (PLA). Running throughout this timeline is sales, with the project enabling a shift to online sales and scaling.

A key learning from this foundation is that to eliminate plastic waste from the environment, packaging products need to be long-life. Thus, consumers have to look after and keep the containers for a decade and this means not only must they be strong and functional, but also, they absolutely have to be beautiful. This point is profound in that it implies that the future sustainable world economy has to have art as an integral ingredient (not sprinkled on at the end) so that products are cherished for decades and thus last.

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POMELO COLLECTIVE LTD	Reath's reuse.id	£62,950	£25,180

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Project description - provided by applicants

Consumer goods packaging, particularly in Cosmetics and Food & Drink, cannot continue to rely on single-use plastics. Digitally tracked, "smart" packaging is a growing industry, but has not yet been applied to the circular economy. This "track & trace" market was worth 1.65 billion USD in 2018, and is growing at a rate of 18.9% (Business Insider).

Reath was established in 2019 by Claire Rampen and Emily Rogers to apply "track & trace" technology to reusable packaging in order to accelerate business adoption and reduce single-use plastic pollution.

Currently, adopting reusable packaging can prove both challenging and risky for businesses of all sizes:

- * Packaging is tied to its contents for purposes of traceability and product recalls.
- * Businesses struggle to select appropriate, durable materials for reuse, a challenge particularly relevant for companies experimenting with new bioplastics.
- * Reusable packaging trials are expensive

Our project focusses on standardising reusable packaging data, thus improving utility and efficiency. We achieve this by creating an Open Data Standard (ODS), called "reuse.id" and integrating this with our existing packaging "track & trace" software. An ODS organises information into a template, for different applications. Think of it like a Passport Template: Every passport needs data (e.g. Name, DOB) organised in a machine-readable format.

The critical innovation of combining our "reuse.id" with our "track & trace" technology, solves the challenges and risks latent in reusable packaging:

- * Packaging is no longer tied to its contents: every time a piece of packaging is returned and reused, its "Digital Passport" is updated with its new contents.
- * Businesses no longer need to operate in the dark: They can draw on the data we collect. We funnel data into a "Reusable Materials Database", which, over time, creates the world's most comprehensive resource for reusable packaging types and material durability.
- * Reusable trials no longer need to be costly: Our software creates "Digital Passports" allowing businesses to test customer demand before investing in packaging redesign projects.

Our goal is to facilitate systemic change; we do not create reusable packaging or the devices used to track them. Rather, with our consortium, _HappyPorch_ and _Open Data Services_, we are developing a new generation of software to deploy reusable packaging.

Currently, businesses are attempting to create reusable systems in their own silos. Our vision is to bring stakeholders together to create a standardized digital infrastructure for reusable packaging. This stops businesses replicating costly environmental and financial mistakes.

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CAULI LTD	CauliBox's Digitally-Enabled Reusable LUnch-Box Scheme (DERLUBS)	£85,534	£34,214
SUSTAINABLE VENTURE DEVELOPMENT PARTNERS LTD		£9,569	£3,828
Westminster City Council		£4,526	£1,810

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Linked to a global increasing population, is the increasing production, consumption and disposal of plastics. Plastic production has grown from 1.5 million tonnes per annum in 1950 to 359 million tonnes in 2018, yet only 9% of this is recycled (Plastics Europe, 2019). While plastic packaging has revolutionised the way in which we store and consume food, there are many negative impacts associated with the growing amount of plastic packaging on our planet.

In response, CauliBox has developed a unique solution to address the 'food-to-go' single-use plastic packaging challenge: a digitally-enabled reusable lunchbox scheme that rewards sustainable behaviours. CauliBox's aim is to disrupt the urban food industry, helping customers and vendors transition to reusable boxes by making the processes of sourcing, returning, collecting and washing lunch boxes, convenient and reusable. In this project, CauliBox will partner with Sustainable Ventures and Westminster City Council to deliver a trial of its reusable lunch box scheme in within a cluster of food vendors in London. As a result, CauliBox directly addresses both the SSPPP and UK Plastics Pact to reduce the amount of plastic waste entering the environment by 2025.

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