

Cambond & Evolve Packaging are tackling plastic waste - helping to solve this major environmental issue. A valorisation case study



Converting used plastic to new useable forms

Executive Summary

Cambond is a biomaterials company that has recently joined the community at the Eastern Agri-tech Innovation Hub (EAIH). It has a proprietary plant resin technology that can be used to replace oil-based resins in the manufacture of composites. This technology enables the rapid development of clean, green low carbon biomass bio-composites that can replace engineered wood or plastics in many applications.

Funding was recently won from Innovate UK and this is enabling Cambond to undertake R&D at EAIH. The company will pilot strategies to see how local businesses; including farmers/growers can benefit.

Cambond was set up in 2014 in Cambridge and has expanded to the point where it needed new premises to test products.

Challenges

The project will link existing expertise in retail, recycling, and manufacturing to take plastics destined for burning or landfill and turn them into valuable products for consumers.

Their mission is to find partners with existing recycling, manufacturing and retail facilities that can be linked together to form a circular economy that can deal with plastic pollution in an effective, sustainable, and profitable way. We live in the 'Anthropocene age' - a time where human technology and exploitation of resources have changed the surface and environment of our planet.

The consumption of fossil fuels has driven climate change; altering our environment. Drilling spills, mining spoil, power generation ash, paper and plastics manufacturing have produced contaminated land and there is increasing pollution of the oceans by plastics once they are discarded.

No country has a recycling system efficient enough to avoid the accumulation of plastic wastes. Plastics, once symbolic of modern life, are now regarded as a curse of the Anthropocene age. Recycling rates are low (<30%) and the bulk of this 'modern miracle' material (>60%) is burnt or sent to landfill, generating millions of tonnes of CO₂ hazardous microplastics and global environmental pollution.

Several factors need to be understood including available waste locally, cost and environment.

Strategy and feedstock choices

We will tackle this problem by applying innovation. By linking existing expertise in retail, recycling and manufacturing we aim to take plastics that are destined for burning or landfill RDF (refuse derived fuels) and turn them into valuable products for consumers.

Our project is looking for partners to develop Anthropocene mining.

- Anthropocene wastes are a valuable resource
- Anthropocene wastes can be used for making products – which can be mined
- Anthropocene materials can replace virgin materials in products
- Anthropocene mined products can be recycled to create a circular economy

Potential benefits from the system

Plastic is a feature of modern life. However, there are challenges - the industry is oil based, generates millions of tonnes of CO₂ and plastic products cause environmental damage.

Cambond has developed a sustainable plant-based resin that can be mixed with straw, nut shells and other types of biomass and polymers to make CAMPOSITE© - a planet-friendly alternative to plastics as shown Fig. 3.

Biomaterial alternatives to plastics have two main problems. They often cost more and sometimes they have limited supplies. These issues limit large-scale change.

Camposite© solves these issues. They are largely plant based (>50%) and can be made from the biomass waste products of food production (straw, peanut shells, tops of pineapples etc.). Biomass products from agriculture are available all over the world in very large, sustainable, quantities. Biomass feedstocks have significant cost advantages compared to oil.

By combining plastic waste, which is difficult to recycle with bio-based adhesives, new form of bio-composites can be produced and the life of plastic waste can be extended to avoid land fill or **incineration to generate CO₂**.

SME Interaction at EAIH

Cambond is a biomaterials company that has recently joined the community at Eastern Agri-tech Innovation Hub. It has a proprietary plant resin technology that can be used to replace oil-based resins in the manufacture of composites. This technology enables the rapid development of clean, green low carbon biomass bio-composites that can replace engineered wood or plastics in many applications. The interaction at EAIH with other SME in waste management has already generated some good proposals for future products and business development. The Cambond solution on solving plastic waste and food waste will have synergy within the EAIH and believe to have social and environmental impact in Eastern Agricultural region.

Results and Return on Investment

It was estimated by Mckinsey & Company that investment on circular economy business worth about 1.8 trillion GBP business opportunity in Europe alone ¹. Investment on/from Cambond's technology together with its business partnership within EAIH and other players identified in INNOVATE-UK projects will generate results that will be a good showcase of Circular Economy principles developed in Eastern England Region.

Development & Future Plans

- To complete Innovate UK innovation projects with expected output in new products and IP
- To find business partnerships for the next phase II grant applications
- To find extra investment to set up pilot plants

¹ <https://www.mckinsey.com/business-functions/sustainability/our-insights/mapping-the-benefits-of-a-circular-economy#>

- To launch WASWARE™ reusable coffee cups sale in UK
- To work with SME at EAIH for potential new business and products

3. Various homeware products produced from Camposite© by WASWARE (was-ware.com)
4. Range of recycled tableware

Connections at the EAIH

The Eastern Agri-Tech Innovation Hub is always looking for exciting new businesses to join us, either virtually, by becoming a Hub Club member, or by becoming a licensee and having space at the Hub. There is information on the website at: innovationhubuk.co.uk

This includes a benefits page and how to get in touch if you require further information.



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Figures



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Planet Friendly Products



Wheat Straw Pallet



Rice Husk Bowl



Bamboo Single Use Plate



Palm Fibre Plate



Reed Fibre Plate



Bamboo Fibre Plate

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1. Plastic waste plastic composite based pallet shown in TESCO UK headquarters
2. Reusable coffee cups and Wine Glass made from food waste (spent coffee ground & brewer's waste) together with biodegradable polymer.