# UK SME seeks a technology partner to conduct a pilot of 1,000-10,000 tiles made from a novel bio-based material validating automated manufacturing. A long-term relationship involving technology licensing, development, or scaled production is sought.

## Summary

| Profile type | Company's country | POD reference |
|---|---|---|
| **Technology request** | **United Kingdom** | **TRGB20250627020** |
| **Profile status** | **Type of partnership** | **Targeted countries** |
| **PUBLISHED** | **Commercial agreement with technical assistance**<br>**Investment agreement** | **• World** |
| **Contact Person** | **Term of validity** | **Last update** |
| **Enrico FRANZIN** | **27 Jun 2025**<br>**27 Jun 2026** | **27 Jun 2025** |

## General Information

### Short summary

UK based SME developed carbon negative construction materials storing -1.2 kg of CO2 per kg of material. For market entry, they focus on brick slips and tiles, which can store -11 kg CO2 / m2. They have:

- produced prototypes
- tested their mechanical properties
- explored flame retardancy & low thermal conductivity.
- PCT patent pending

The SME seeks a technology partner to conduct a pilot run using their novel material. The manufacturing process is similar to conventional brick production.

### Full description

This UK Company develops advanced composite materials and offers bespoke consultancy services. The company began operations in September 2021, initially focusing on in-house R&D activities before expanding into consultancy services in mid-2022. In this short time, they have built-up a vast growing portfolio of clients ranging from SMEs to large automotive OEMs, from the EU to NATO and also supports clients with technical expertise in litigation

proceedings. They have secured EU Horizon funding to develop novel storage concepts using biomimicry and Innovate UK funding to develop the basics of their carbon-negative construction materials used here. Furthermore, the company works with a team of five freelance consultants to offer a broad range of technical services in all aspects of composite material development and production. This engagement also offers quick access to expertise, the partners respective networks and support in manpower when required. Together, they have combined decades of experience in the R&D, design and manufacture of composite products. Their background provides them with a unique insight and out-of-the-box thinking for solving the challenges in the civil engineering industry.

Our development:
The Company has developed a carbon negative construction material based on char (aka biochar, bio-carbon). Pyrolysis creates energy and the waste product 'char' prevents the carbon to become CO2 emissions. Using this waste material as the base of their products, bonded with bio-based binders, they achieve a carbon negative construction material storing -1.2 kg CO2 / kg. Rather than emitting CO2 during construction, their construction products remove this from atmosphere and store permanently. Their material, lighter than traditional clay products, has insulating and flame-retardant properties. Compression strength can be tailored and is similar to traditional clay materials. Flexural strength is similar to wood. For market entry, they have decided to target bricks slips and coated tiles for indoor use offering the lowest barriers and highest rewards.

Partnership Opportunity:
The Company seek a technology partner capable to conduct a pilot run of 1,000 to 10,000 tiles made from a novel bio-based material to validate feasibility of automated manufacturing.

Target specifications for this prototype series:
- Tile dimensions to be determined, but ranging between 60mm – 300mm (width and length) and approximately 12mm thickness

Production process:
- Milling biochar to a specific particle size
- Mixing with bio-based binder
- Pressing into moulds
- Allowing hardening outside the mould in a safe environment or optional low-temperature oven curing to accelerate the process
- If possible, applying an in-mould coating or apply secondary surface treatment, depending on final aesthetic and functional requirements

The production process is similar to traditional clay brick manufacturing but eliminates the need for firing, reducing both energy consumption and emissions.

They are interested in developing a long-term collaboration that aligns with the partner's specific competencies — whether in technology provision, production, or another strategic role. Their aim is to jointly define a partnership model that supports both the validation of the innovation and its successful industrial scale-up. While their initial focus remains on brick slips and tiles, their material applies to other clay-based products, and they look forward to exploring additional opportunities together after successful market entry such as roof tiles, brick slips for outside use, sanitary ware and more.

## Advantages and innovations

The Company's bio-based materials are designed to replace traditional fired clay products but offer significant environmental and practical benefits.

Key advantages of their material over clay products:
- Products are carbon-negative and store -1.2 kg $CO_2$ per kg permanently instead of emitting 0.2 kg $CO_2$ per kg.
- Transform construction from a carbon emitter to a carbon sink.
- Can be produced in similarly bricks but without energy intensive firing

- Existing equipment can be reused minimising CAPEX
- Have a lower density and weight about 50% compared to clay products, reducing physical strain while handling and allowing for lighter support structures
- Have good insulating properties and enhance a building's energy efficiency
- Fully circular and can be 100% recycled or reused.
- Mechanical properties can be customised (matched) to clay products
- Can use char from low quality waste streams and therefore avoiding landfill
- Char is a side product of pyrolysis which prevents CO2e emission rather than emitting CO2 while excavating clay and sand

Despite their materials being carbon-based, flame retardancy can be achieved. When used in brick slips or tiles, the installation is done using standard practices (plug-and-play), requiring no additional workforce training. Additionally, using their material a wide range of shapes and surface textures can be produced. Surface coatings can be applied to make the material water-impervious and achieve various aesthetic finishes.

## Technical specification or expertise sought

The Company seeks a technology partner capable of automating the production of their brick slips and tiles. The ideal partner could be an equipment manufacturer able to produce small series in-house, an established producer equipped with an automated press for press-formed flat plates, or a traditional brick producer as their materials can be processed using equipment typically used for brick manufacturing.

Existing presses and moulds can be used, but the moulds tools would ideally have similar dimensions as standard brick slip or wall tiles. Pressing can be performed in a batch-wise or continuous process, but the material requires a minimum pressure of 50 MPa. Cycle times can be fast. They would also consider extrusion as an alternative production method, but this would require initial feasibility testing.

A grinding process is required to produce fine char material with a particle size of approximately 300 mesh. For production, they estimate a requirement of approximately 125 kg of ground material per 1,000 brick slips or tiles. Additionally, a mixing facility is needed with sufficient capacity to ensure a continuous supply of the binder/char mixture to support the production run.

Product curing / hardening can be accelerated using an oven capable of reaching temperatures between 80°C and 120°C. If oven curing is not available, a secure storage facility would be needed to allow the material to cure naturally over approximately 14 - 28 days.

To achieve the desired surface finish, two coating methods can be employed. A thin layer of powder or a sheet material can be applied directly into the mould before filling and pressing, or a secondary surface coating similar to traditional painting can be applied post-production on the cured product. If the selected production partner does not have in-house coating capabilities, they are open to sourcing a specialized partner for this step at a later stage.

## Stage of development

**Lab tested**

## Sustainable Development goals

- **Goal 9: Industry, Innovation and Infrastructure**
- **Goal 8: Decent Work and Economic Growth**
- **Goal 12: Responsible Consumption and Production**
- **Goal 13: Climate Action**

IPR Status

**IPR applied but not yet granted**

IPR Notes

**PCT pending.**

## Partner Sought

Expected role of the partner

The Company expect their technology partner to conduct a pilot run to produce a prototype series using their materials, which they will provide. Further small-series production runs will likely be required at a later stage for testing, refinement, and early market adoption. They also envisage using the production facility as a demonstrator for potential licensees, customers, or investors to showcase the manufacturing process and final product.

The ideal partner will have experience in automated pressing, composite or brick manufacturing, or materials processing, with access to suitable production equipment. The ability to handle industrial-scale material preparation, mixing, and surface finishing would be beneficial. A flexible production setup or an interest in pioneering sustainable materials would be well-suited for this collaboration.

The Company values the partner's technical input and feedback throughout the process, particularly regarding equipment optimization, process stability, and material behaviour during forming and curing. Know-how related to process parameters, quality control, and material compatibility will be essential to refine the production method and ensure scalability. The Company anticipate close collaboration to troubleshoot early challenges, iterate on process settings, and co-develop solutions for consistent, high-quality output.

The Company seek a mutually beneficial partnership and are open to discussing the commercial aspects early on. They envisage this collaboration evolving into a long-term relationship, potentially involving technology licensing, joint development, or scaled production.

Type of partnership

**Commercial agreement with technical assistance**

**Investment agreement**

Type and size of the partner

- **SME 11-49**
- **SME <=10**
- **Big company**
- **University**
- **SME 50 - 249**
- **R&D Institution**

# Dissemination

Technology keywords

**• 02006001 - Materials, components and systems for construction**

Market keywords

**• 09007002 - Manufacture of construction materials, components and systems**

Targeted countries

**• World**

Sector groups involved

**• Construction**