Introduction to CCm Technologies – a climate-smart fertiliser producer

CCm Technologies is an award-winning clean tech company established in 2011 and based in Swindon. CCm's unique fertilisers are produced by a UK developed process that uses carbon dioxide to stabilise organic waste streams. These nutrient rich materials are then combined to create fertiliser formulations that address specific agronomic and environmental needs through a **significantly lower than usual carbon and resource footprints.**

How does it work?

The fertiliser production technology uses four different waste streams – carbon dioxide from the construction of all forms of anaerobic digester biogas, concentrated ammonium from sewage water and food waste, waste process heat and organic fibre from digestate and other fibrous wastes, including treated sewage sludge. The result is a slow-release pellet that ticks all three principles of the circular economy by eliminating waste and pollution, keeping materials in use and helping to regenerate soils, as concluded by the Ellen MacArthur Foundation.

By harvesting their raw materials from waste materials CCm's approach is able to return value added materials to the economy, stimulating circularity but also displacing existing, imported energy intensive and polluting conventional Nitrogen and Phosphate containing fertiliser**. CCm's materials have the capability to transform agricultural production from a massive GHG source into a major tool for emissions reduction and carbon storage as well as cutting the need for imported fertilisers by 30%.**

CCm is a member of HRH The Prince of Wales' Sustainable Markets Initiative and a signatory of its Terra Carta initiative. CCm was also awarded £2 million from Innovate UK's Sustainable Innovation Fund to demonstrate the technology at COP26 as it relates to biochar. It also received the Solar Impulse Foundation Efficient Solutions Label and is one of the 1000 solutions identified that address sustainability challenges while enabling economic growth. As recognised in this video by the Sustainable Market Initiative, CCm's technology has a significant role to play in moving to a circular economy and accelerating decarbonisation. It allows a wide range of businesses to **generate commercial value** from captured carbon and other agricultural and industrial waste streams while also **delivering improved sustainability**.

CCm Technologies' full scale demonstration plant (pictured above), at the UK's 3rd largest sewage treatment works owned by Severn Trent, has been fully operational for over two years, producing significant quantities of ultra-low Carbon footprint fertiliser materials in solid and liquid formats.

CCm Technologies®

The environmental benefits of CCm's technology:

1. Utilisation of waste streams – promoting a circular economy

CCm's systems produce high-value, high-performance materials from low or negative value inputs, particularly from the water, food and agriculture sectors. The waste component of CCm's fertiliser is up to 90%, including components which could otherwise have ended up in landfill or discharged into water courses. Nitrate leaching is also reduced by 80% and ammonia volatilisation by 70%. The utilisation of existing resources reduces demand for finite elements and reliance on the highly energy-intensive processes usually involved in fertiliser production.

2. Reduction of carbon emissions – contributing to the UK's net zero target

Current agricultural processes produce around 10% of all UK greenhouse gases and conventional fertiliser production has massive carbon footprints. CCm's technology can meaningfully tackle this issue and contribute to reaching net zero as every two tonnes of CCm product sequesters one tonne of carbon. Carbon savings result from: direct capture and utilisation of waste CO_2, avoidance of primary carbon use, and carbon storage in soil.

3. Ensuring high yields, improved soil fertility and low costs – facilitating farmers' net zero transition

CCm's products have been demonstrated to equal or outperform conventional fertilisers in terms of yield ad protein quality, with around 10% less nitrogen and phosphate applied (based on seven years of data with trials at Luton Hoo). They also deliver additional environmental benefits including enhanced water and nutrient retention contributing to lower run-off and reduced water pollution with regenerated, pH stable soils and a 30-60% increase in soil moisture and nutrient retention.

CCm's technologies can be **deployed immediately** and via the delivery mechanisms that currently supply UK agriculture. By drawing on end-of-use materials as inputs and involving a low-energy manufacturing process, the **sale price of CCm's materials is directly competitive** with existing products and is **financially viable without reliance on government subsidies**

50 standard CCm units could result in **emissions avoidance equivalent to removing around 375,000 cars from the road each year**. By switching to biogenically derived alternatives for agricultural resourcing the UK would save over half a billion tonnes of CO2 emissions by 2050.

There is significant global potential for this technology to contribute to emissions reduction, CCm's technology permanently sequestrates CO2 in the soil to the effect of 1 tonne per tonne of fertiliser. 5 million tonnes of fertiliser are used globally per annum.

Case study 1: PepsiCo partnership – reducing the carbon footprint of Walkers Crisps by 70%

In December 2020, PepsiCo announced that CCm's technology will be used to manufacture low-carbon, nutrient-rich fertilisers using potato peel waste from the crisp production supply chain, which will go directly back into the fields growing potatoes for Walkers Crisps. By increasing the recovered resource input, use of the fertilisers is expected to reduce Walkers' carbon emissions from growing potatoes by 70%. **PepsiCo** mentioned CCm in its new "*Global Sustainability Report*" (July 2021) as one of the technologies supporting their regenerative agriculture ambitions.

Case study 2: Severn Trent Water – exploring sustainable ways to recycle wastewater

CCm Technologies in partnership with Severn Trent Water is exploring new sustainable ways to recycle wastewater and convert it into a commercial product. The project focusses on a new process, developed by CCm, which uses captured carbon dioxide to stabilise nitrogen, phosphate and organic chemicals held within waste streams at Severn Trent, turning them into sustainable plant nutrients and significantly reducing greenhouse gas emissions on site.

Case study 3: Tesco innovation programme - cutting the environmental impact of the average shopping basket

In May 2022, CCm was announced as one of the winners of Tesco and WWF's Innovation Connections accelerator programme, which pairs sustainability start-ups with Tesco suppliers to fast track innovation in the food supply chain. CCm's partnership with Tesco potato supplier Branston will mean that Tesco shoppers will have access to products with a significantly lower carbon footprint, that helps the environment without changing their behaviour.