NNFCC
The Bioeconomy Consultants
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# Industrial Biotechnology Special Issue

## UK targets growth in industrial biotechnology

Industrial biotechnology could be worth £12 billion to the UK economy by 2025, but just how is the UK capitalising on this new market opportunity?

Industrial biotechnology (IB) – the use of biological substances, systems and processes to produce material, chemicals and energy – is expected to play a vital role in the creation of a new low carbon economy in the UK.

According to a Government funded report "IB 2025 – Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy", the IB market could be worth up to **£12bn** to UK businesses by 2025. The UK already has a thriving research and development sector for IB and there are five major pilot facilities spread across the UK, offering expertise in scale-up and commercialisation of processes.

In the North East of England, the National Industrial Biotechnologies Facility at the Centre for Process Industries (CPI) offers process expertise and fermenters from 20 to 10,000 litres scale. These can be used by companies to ensure processes work robustly and cost-effectively on a large-scale.

Further South in Yorkshire there is the Biorenewable Development Centre (BDC) in York, which opened in 2012. Facilities at the BDC are open-access and arranged in modules allowing flexibility in the design of processes. Facilities include a 30kg/hour microwave pyrolysis unit, 42 litre fermenter and 10 litre supercritical carbon dioxide extraction system.

In the Midlands, the Food and Biofuel Innovation Centre (FBIC) at The University of Nottingham conducts research on brewing, food processing and bioenergy production. Brewers SABMiller are partners in the project and have developed a 1000 litre pilot scale brewery within the centre.


Further East, Norwich Research Park (NRP) is home to the Institute of Food Research Biorefinery Centre, which contains a steam explosion pilot plant. The pilot plant can be used to convert lignocellulosic biomass into next generation biofuels and chemicals using a thermal/hydrolysis process which operates at up to 230°C.

In Wales, the Beacon Centre is a focal point for IB research. Beacon is a collaboration between Aberystwyth, Bangor and Swansea Universities. Aberystwyth boasts a plug and play, multi-feedstock pilot processing plant. While Bangor hosts a pressurised refining and pilot scale facility coupled with supercritical fluid and chemical/analytical support.

Together these facilities are making the UK an **attractive** place for industrial biotechnology companies to do business.

Bio Base Europe Pilot Plant, Belgium

## Coupons worth €10,000 each to help SME's unlock potential of bio-based technologies

A new scheme has been launched to help small and medium enterprises in North West Europe assess the feasibility of taking a bio-based idea or technology to industrial production.

SME's can apply for 'Innovation Coupons', worth up to €10,000 (£8,400) each, which can be used to access the state-of-the-art technology and expertise of the Bio Base Europe Pilot Plant in Ghent, Belgium.

The pilot plant is a flexible and multi-purpose facility which can be used for developing bio-based products and processes. Processes being tested at the plant include biorefining, biomass pre-treatment, biocatalysis, fermentation and downstream processing technologies.

The scheme is provided by Bio Base NWE, which launched in April 2013. Bio Base NWE is a €6.2m project funded under the INTERREG IVB NWE framework programme to support the development of the bio-based economy in North West Europe.

The 'Innovation Coupons' scheme is open to any small or medium enterprise in the UK, Ireland, Belgium, Luxembourg, The Netherlands, Switzerland, Northern France or Western Germany.

For full details on the scheme and how to apply visit **www.biobasenwe.org**

Bio Base NWE
Innovation and training for the biobased economy

Investing in Opportunities
This project has received European Regional Development Funding through INTERREG IV B.
INTERREG IVB

## What is the potential market size for Industrial Biotechnology?

Global sales of industrial biotechnology are estimated to be between £35bn and £53bn (3 to 4 per cent of global chemical industry sales). Under different scenarios these sales are predicted to grow to between £150 and £360bn by 2025.

While the UK IB manufacturing sector is likely to remain relatively modest in the short-term, a strong position in this knowledge-intensive area would allow UK-based companies to increase their share of the much larger global market.

UK IB sales are projected to grow by 5 to 11 per cent per year or between £4bn and £12bn by 2025. This would be equivalent to between 7 and 16 per cent of total chemical industry sales.

## Consultancy at NNFCC

Want to understand how you can take advantage of the growing industrial biotechnology market? Then get in touch with us. We offer industry leading consultancy including;

- Future market analysis
- Sustainability strategy development
- Technology evaluation

Contact Dr Adrian Higson, Head of Biorefining at NNFCC.

*Industry News*

## Can Europe achieve its renewable energy targets without biofuels?

Food-based biofuels are under intense scrutiny at present. But if European Union proposals to cap the use of food-based biofuels are passed how will we meet our target to derive 10 per cent of the energy used in transport from renewables?

With transport being such a large component of energy use in Europe – around one fifth of total energy use – reducing the use of food-based biofuels will cast doubts over Europe's renewable energy plans.

It has been suggested that advanced biofuels, made from wastes and residues, could make up the shortfall but the scale of development is unlikely to make a significant dent in the 2020 targets.

Without strong policy support and favourable economic conditions, NNFCC estimate that advanced biofuels will only contribute 2.1

per cent of the UK's fuel by 2020. Therefore first generation biofuels still have a hugely important role in reaching our 10 per cent target.

## 'Clean' sources of food waste becoming harder to find for anaerobic digesters

There are around 16m tonnes of business and household waste suitable for anaerobic digestion in the UK. But much of this waste isn't readily accessible for AD and the rapid expansion of the UK market is putting a premium on existing sources of 'clean' food waste.

Developers must start looking at more variable food waste streams, such as household waste, and will need to work with local authorities to promote source segregation.

The UK currently has around 50 AD plants in the UK designed to treat food waste with a combined capacity of 1.8m tonnes, and there are another dozen in construction with a capacity to treat a further 0.68m tonnes of food waste.

Add to this the fact that there are more than 300 in-vessel composters in the UK, with a combined capacity to treat 5.4m tonnes of food and green waste, and the market starts to look quite crowded. Not only this but the UK composting market is growing by more than 10 per cent per year.

However, AD can complement composting systems by treating waste that can't be processed through windrow composting (e.g. cooked kitchen waste and animal by-products).

*Interview*

## Dr Yvonne Armitage, Industrial Biotechnology Expert at Biosciences KTN

In each issue of the Newsletter we feature an expert voice from the bio-based economy. In this issue, we talk exclusively to Dr Yvonne Armitage from the Biosciences KTN about the role of industrial biotechnology (IB) in the UK.

**Why is IB important to the UK?**

Developing IB is very important to ensure UK based process companies remain competitive in a global marketplace and that we maintain our leading edge in fundamental research in this area. Countries such as the US, Germany, Japan and China have for many years embraced the use of IB as an enabling technology and the UK needs to follow suit.

**What is the main driver behind the industry investing in bio-based chemicals and products?**

Some bio-based products show superior functional properties compared with synthetic products in a number of applications, such as thickeners used in a number of industries and various personal care product additives. The availability of new and novel bio-based products also gives additional market and application potential. There is no doubt that the use of bio-based materials – particularly by the consumer facing big brand owners – is becoming an increasingly attractive marketing tool.

**What advice would you give to those businesses looking to start developing IB?**

There is a lot of expertise and help in the UK to assist businesses and they should take full advantage of this. We have an excellent technology base in our universities and technology-provider companies and the recent setting up of networks in IB and Bioenergy by the BBSRC and the future IBBE Catalyst in conjunction with the TSB, should give a real focus for companies to tap into these multi-disciplinary networks for expertise.

My final advice is what have you got to lose in at least considering the potential of IB in your business and join the dozens, if not hundreds, of companies who have already taken steps in IB.

*To read the complete interview visit;* ***www.nnfcc.co.uk/news/ib-interview***

## NNFCC Celebrates Being Ten Years Old


"The bio-based economy has changed dramatically since 2003. The Renewable Energy Directive has driven a sharp increase in bioenergy use across Europe, while bio-based chemicals have benefitted from the biofuels boom to become more mainstream. And as the market has changed so has NNFCC.

We remain a principle advisor to the UK Government, but we have also grown to become a successful commercial consultancy serving a range of global clients from across the energy, chemicals and materials sectors; providing expertise not only on crops but also on wastes and residues, which are valuable resources we cannot afford to ignore.

We look forward to working with all our clients and partners over the next ten years."

*Dr Jeremy Tomkinson, Chief Executive of NNFCC.*





## NNFCC Events

Following the success of our previous workshops, NNFCC and North Energy are pleased to bring you two **new life cycle assessment workshops** in September.


- **Day 1**: 17 Sept. Introduction to LCA Workshop
- **Day 2**: 18 Sept. Advanced LCA Workshop

The first workshop covers the principles of LCA, requirements and issues. The second looks at the issues in greater depth and supports you in taking the first steps to drawing up an LCA. The workshops can be taken together or separately.

For more details visit **www.nnfcc.co.uk/events**


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