Paper and the Bio-economy

cpi confederation of paper industries

FACT SHEET

Recent shocks to the economy have focused attention onto the industrial strength of the UK and reinforced the need to rebalance the economy away from services and towards manufacturing. Looming Brexit and a general perception that any present economic growth is not helping large parts of the country (especially the former manufacturing heartlands outside Greater London) has focused Government attention onto this topic with a series of policy measures being developed to support industry.

At national level, a Clean Growth Plan, a new Industrial Strategy, weakened sterling and of course Brexit, provide a once in a lifetime opportunity for things to change. At sector level, a joint 2050 Decarbonisation Roadmap has been published, and CPI (alongside those representing a number of other key sectors) has been invited to lodge ideas for a 'sector deal' through which Government and industry both commit to specific actions to help maximise opportunities.

As part of a move towards a more sustainable and resource efficient economy, the potential for increased bio-based manufacturing is also seen as a real opportunity for the UK economy. This attention is not new and builds on a number of initiatives developed alongside the European Commission:

- developing new technologies and processes for the bio-economy;
- developing markets and competitiveness in bio-economy sectors;
- pushing policymakers and stakeholders to work more closely together.

The UK is also developing a new bio-economy strategy (expected to be published by the end of 2018). Until now the UK focus has largely been on bioenergy (from forest fibre and wastes) and chemical processing in biorefineries - the new strategy is expected to widen this brief to include the development of existing bio-based industries.

The bio-based economy. Papermaking (alongside a number of other industrial sectors) is already firmly centered in the bio-economy – paper being made from renewable and recyclable fibres, with increasing amounts of energy being sourced from biofuels. This existing expertise of paper companies (papermaking machines, logistical systems, paper/card recycling routes, fibre processing knowhow and knowledge of wood and fibre chemistry) means the sector is key to further develop this part of the economy.

However, the bio-economy is a wide-ranging term and means different things at different times. At its widest, a general definition includes all economic activity based on bio-based products and processes, so including farming, fisheries, forestry and micro-organisms - thought current discussions tend to focus on innovative uses rather than traditional ones.

Increasing attention is focused on the bio-economy because of the potential for sustainability, resource-efficiency and the opportunity to displace non-renewable based materials with added value ones based on renewable resources. A move towards a bio-based economy is part of the response to growing environmental challenges facing the global economy.

Substituting renewable for non-renewable resources and then using such resources in an efficient manner (effectively the circular economy) is a huge area of focus for the European Commission and almost certainly will remain so for the UK post-Brexit.

An opportunity for UK industry. For papermaking these changes present both a challenge and an opportunity. A challenge, as new users for wood fibre and organic materials come to the market to compete for the same resources; but also an opportunity as companies already in the bio-economy should be well placed to take advantage of new business opportunities to bring innovative products to the market.

Paper and the Bio-economy

Our sector's primary raw material is wood.

45% of this is cellulose used for papermaking, 25% is lignin currently used as biomass for energy generation, 25% is hemicellulose and 5% is so-called extractives.

This means that to make 140 million tonnes of pulp currently produced worldwide only 45% of the wood intake is directly used.

In a rough calculation, this leaves 170 million tonnes of wood-based material handled by pulp companies to make other products.

The world chemicals production is 175 million tonnes that could be replaced by wood-based chemicals.

Lignocellulose can be turned into carbon fibre which, in turn, is the base for new materials that can compete in strength with steel or replace oil-based materials.

Wood - and paper - have already entered the league of new materials. (Source CEPI)

Recycling. A key attribute of wood fibre based products is the inherent sustainability of production. As the UK has limited forest resources and no market pulp mills, then it makes sense that the major source of fibre is from paper and board collected for recycling; indeed more that 70% of fibre used to make paper in the UK is manufactured from recyclate (so harvesting the urban forest). However as levels of recycling have increased, domestic reprocessing capacity has not kept pace, resulting in increasing amounts being exported unprocessed. The recent focus on quality by China looks likely to close one of the main export markets for this material. Clearly and over time, this material stream represents an opportunity for increased UK manufacturing, especially if the quality of sorted material can be improved – a huge area of attention for CPI.

Paper sludges. The wastes arising from paper recycling represent a real opportunity for innovation and added value. Most of this material is currently used for agricultural soil improvement or energy recovery. Alternately the fibre and filler content can be processed for alternative uses and research into such opportunities continue.

Bio-refining. Coincidental with a focus on the bio-economy, research is delivering new ideas about how value can be extracted from biomass – a chemical sector based on renewable resources (rather than non-renewable oil) is showing real potential. Paper companies operating chemical pulp mills already effectively operate such facilities, with opportunities to enhance the operation of such sites and produce a range of chemicals alongside (and in the longer term possibly instead of) pulp. Much of the research targets the lignin extracted during the making of chemical derived pulp; producing green bio-chemicals as a replacement for oil-based chemicals.

For the UK – with no chemical pulp mills (of any scale) and a limited indigenous forest resource – the focus is equally on the opportunity for innovation around paper extracted from waste streams – especially contaminated and composite materials hard to recycle back into paper.

Energy use. Increasing use of biomass for energy has been a feature of recent years. Indeed papermaking has been at the forefront of this change, with several UK mills investing in biomass powered CHP and several others considering biomass heat boilers. Such facilities tend to make use of locally sourced material – either forest arisings, low grade timber or otherwise waste materials – and used at high efficiency. Such projects tend to be widely supported by Green NGO's and policy makers.

By contrast a number of large scale electricity projects have also been developed – such projects use large amounts of imported wood chips utilised at low efficiency and driven by subsidy. Such projects are widely criticised by Green NGO's, and notwithstanding sustainability requirements, the political support for such project has fallen away on both environmental and cost grounds. While existing contracts will be supported, recent support is limited to projects with CHP or using waste materials.

New energy related projects still have a place, but more attention needs to be paid to a hierarchy of use and sustainability, with good quality biomass and high grade recyclate being used for high value processing, and energy use being restricted to low grade materials and waste at the end of their processing life.

Revised: October 2018