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All products based on fossil fuels could be made from biomass – Dr Philippe Mengal

Non-edible biomass could replace petrochemicals in providing energy to heat and light our homes, as well as in producing a vast array of plastics, lubricants, paints and a host of industrial chemicals, according to Dr Philippe Mengal, the recently appointed executive director of the Bio-Based Industries Joint Undertaking (BBI JU), a public-private partnership between the EU and bio-based industries.

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Using biological material - biomass - to produce energy or materials is considered to be a sustainable alternative to fossil fuels, but is there competition between this and food production?

'Biomass is living raw material that is produced directly or indirectly by photosynthesis. Biomass can include material from animals, vegetables or microorganisms. Typically, it's municipal waste, cereals, by-products from the agri-food industry or forestry biomass.

'One of the priorities for us is to avoid competition between food and, for example, biofuels. This was an issue with the first generation of biorefineries that used edible biomass. We target second-generation biorefineries that use non-edible material such as straw, forest-based biomass and municipal waste. We also strive to increase crop yield, to make use of marginal land, to reduce reliance on fertiliser and to reduce imports of soy as a feedstock for animals.'

What is a biorefinery and what is their potential importance for rural economies?

'A biorefinery is a kind of factory that transforms biomass into end products such as bioplastics. The term refinery comes from the petrochemical industry where crude oil is processed into a multitude of useful products. Biorefineries allow us to use biomass that would not be used otherwise – we are extracting value from agricultural by-products which would previously have gone to waste.

‘For us, biorefineries are the second stage of the value chain: first comes biomass production, then the biorefinery, and finally the use of the end product. Biorefineries are often located in rural areas close to the site of biomass production. This brings clear logistical advantages.’

Could you give an example of products that could be made using biomass?

‘Potentially, all products that are produced today based on fossil fuels could be made from biomass. One of the objectives of the Bio-Based Industries Joint Undertaking is to help Europe embrace the potential of biofuel, biomaterials and other biochemicals which can replace dependence on fossil fuels. It should be noted that bio-based products are already part of our daily lives – silk, cotton and materials based on wood or natural fibres are all produced by existing bio-based industries.’

Can plastics and packaging be produced in a more sustainable way?

‘They certainly can. One of our flagship projects is a biorefinery located in Sardinia which uses cardoon oil to produce bioplastics. The plant is already making plastic shopping bags for the Italian market. It is a former oil refinery and uses a kind of thistle grown on semi-arid land, so we are adding real value there.’

(Article continues after the image)

A biorefinery in Sardinia is using a thistle-like plant called cardoon to make plastic shopping bags. Image credit: Flic
A biorefinery in Sardinia is using a thistle-like plant called cardoon to make plastic shopping bags.
Image credit: Flickr / Martin LaBar

Why is the BBI JU helping to set up flagship biorefinery plants?

‘For us, it’s about funding the projects in order to de-risk the investment. In other words, because it’s a public-private partnership, it is easier to attract private investment when there is also financial and practical support from Europe.’

How else are you supporting bio-based industries?

‘We fund research into technologies at different levels of maturity. In some cases, we aim to fill the gap where technologies are not yet developed or not efficient enough to be deployed at a commercial scale. We also fund demonstration projects and flagship projects where the technology is mature but its value needs to be demonstrated.’

Can bio-based industries help tackle climate change?

‘One objective of the BBI JU is to enable European industry to replace 30 % of fossil-oil products with bio-based products. This would reduce greenhouse gas emissions and is more sustainable. The bio-based industry is secured by nature. Biomass is the best way to transform, reuse and recycle carbon dioxide.’

What can be done to support the development and uptake of biofuels?

‘It is absolutely key that the public realises that second-generation biofuels are based on non-edible biomass – there is no competition with food. But on top of this we want to boost consumer acceptance by explaining that these products are produced in a more sustainable and credible way. For the industry itself, certainty regarding future regulation will be an important determinant of investment.’

How do you see the European bioeconomy developing?

‘Today, the bioeconomy has a turnover of EUR 2.1 trillion and supports 22 million jobs – that’s 10 % of total employment in Europe. That includes the food and beverage sectors. The bio-based industry excluding agriculture and forestry, is worth around EUR 600 million.

‘Looking ahead, we want to create one million jobs in Europe by 2030, (of which) 80 % will be created in rural areas. It is already happening. For example, the project in Sardinia directly generates 60 jobs for every 1 000

tonnes of bio-based plastic it produces so the scope for job creation is considerable.'

Ensuring sustainability

The EU's Renewable Energy Directive requires the EU to produce at least 20 % its energy from renewables, including biomass, by 2020. However, in order to benefit from the potential of biomass to reduce greenhouse gas emissions, every step along the chain from biomass production to the end product, must be sustainable.

The EU has issued non-binding recommendations for the sustainability of biomass. These include a ban on the use of biomass from land converted from forest, a requirement that biofuels emit at least 35 % less greenhouse gas than fossil fuels, and a push to monitor the origin of all biomass consumed in the EU.

In 2014, the EU published a report into the state of play of biomass used for electricity, heating and cooling, and will continue to closely monitor the use of biomass in the coming years. It plans to develop an improved biomasss policy for the post-2020 period.

More info

Bio-Based Industries Joint Undertaking