

Word coming from Finland-based company UPM is wood-based biofuels can provide a real sustainable opportunity for European bioeconomy

Forest of opportunities

The European Union (EU) biofuel policy is governed by objectives of sustainability and environmental protection, growth and competitiveness of European economy and security of energy supply.

Wood-based biofuels are one of the few alternatives to fulfil set targets of energy security, environmental impact, sustainability and availability of biomass resources. The focus of current development is on biofuels for transportation but, in the long run, it also opens a possibility for aviation and maritime transportation fuels.

Europe's forest-based industry is one of the few industries that has the capacity to develop large-scale advanced biofuel production. For the EU to reach 2020 targets, large volumes are needed. These forest-based raw materials are mainly local, not exported from outside EU markets.

Wood-based biofuels also create one of the highest GHG savings, more than 80%, and under no circumstances is in conflict with the food chain. Sustainable sources of these raw materials for biofuels do not increase harvesting or cause any direct or indirect changes for land with high biodiversity value or high carbon content. There is a possibility to increase the use of woody biomass without interfering with the sustainability of forest management and without affecting the role of forests as carbon sinks.

EU forest biomass availability

Europe is the most forest-rich region in the world with 1.02 billion hectares of

forest amounting to 25% of the global forest resources. Over the last 20 years, the forest area has expanded in all European regions gaining 800,000 hectares annually. The total area of forest in Europe has increased by almost 13 million hectares, an area roughly the size of Greece.

This is due to the planting of new forests and natural expansion onto unused agricultural land. Wood volume is also growing, with the sharpest rise recorded in Nordic countries. European forests sequester increasing

covering two thirds of land area, Finland is an important supplier of forest products to global markets. According to the Finnish Forest Research Institute (FFRI), the total forest growth was 104 million m³ and fellings 57 million m³, resulting in a 33% positive impact for forest growth during 2012.

According to FFRI, the EU's forest energy reserve (the likes of forest residues, stumps, thinnings) is approximately 200 million m³/a (400 TWh). Currently, only 20 to 30 million m³ of forest residues are used for energy annually.

no more than a maximum of five such plants operational in Europe, therefore using at most an estimated 1% of European wood harvesting.

More with less

There is a significant amount of unutilised forest resources in Europe that can be used as feedstock. Fibre- and biomass-based businesses, recyclable raw materials and products have been the cornerstones of UPM's €10 billion global business.

UPM believes in efficient use of wood, meaning that various parts of the feedstock are best suitable for different kinds of uses: logs for saw milling and plywood, fibres to pulp, paper, biocomposites and biofibrils, extractives, bark and branches to biofuels, hemicellulose and cellulose to biochemicals, and lignin to new products.

Converting wood to transportation fuels is more value adding compared to any direct burning. For the conversion, the residues from current processes, as well as fractions not suitable for paper and pulp making for example, can be utilised.

UPM has highlighted sustainable products, as well as climate, water, forest and waste management, as key areas of environmental responsibility and has set 2020 responsibility targets. It has been listed as the only forestry and paper business worldwide in the Dow Jones Sustainability Indexes for both the European and World Sustainability Index, just one of many recognitions for its work in the sustainable field. Also, more recently, the biofuels brand UPM BioVerne won the Sustainability Award



Harvester processing logs in the forest

amounts of carbon in tree biomass and, according to Global Resource Assessment 2010, the carbon stock in the EU has increased 30% during 1990-2010.

Europe remains one of the largest producers of roundwood in the world. The net European annual increment is higher than the annual fellings; only approximately 40% of the increment is utilised.

In Finland, the forest cover is more extensive than in any other European country. With 23 million hectares

Finland and Sweden are the biggest users covering more than half of the total use. In comparison, the current European annual wood harvesting represents approximately 450 million m³.

As the EU's pulp and paper production is expected not to grow its raw material usage, increasing volumes of wood will become available for other uses. A wood-based renewable diesel plant uses an estimated amount of 1 to 1.5 million m³ of wood annually. It is likely that, by the end of the decade, there will be

2013 for Breakthrough Innovation in Technology for its renewable diesel.

UPM and sustainable forestry

Sustainable forestry ensures that forests are productive and regenerated, and that methods are in place to protect biodiversity, water quality and quantity, and stakeholders are engaged. Public EMAS reports, audited by a third party and forestry certification systems, are important tools in high level of transparency at UPM.

UPM's wood sourcing is based on the principles of sustainable forest management, chain of custody and forest certification. The chain of custody model, certified to both PEFC and FSC, traces the origin of all of UPM's wood, pulp and biomass to guarantee that all fibre comes from legal and non-controversial sources. It also allows UPM to accurately measure the amount of wood coming from certified forests.

UPM's global biodiversity programme aims to maintain and increase biodiversity in forests as well as promote best practices in sustainable forestry. As a large forest owner, UPM also ensures regeneration takes place after harvesting, including planting more than 50 million seedlings per year.

Dialogue on sustainability criteria for forest biomass

National Forest Programmes are the most widely applied approach by countries in Europe to develop sound forest policy frameworks. Forest sector policies, institutions and instruments in Europe are stable and adapted but the forest industry has raised serious concerns with regard to the new sustainability criteria demanded in the context of discussion of ILUC proposals.

UPM considers that it is of utmost importance that sustainability of wood-based biofuels is guaranteed, and believes that the current existing complex schemes, laws and requirements are sufficient.

Sustainability requirements for liquid biofuels have already been set in the original RED. And those for solid biomass will be proposed by the Commission in the near future, as these issues should not be mixed.

Also, the recent EU timber regulation ensures that forest biomass comes from legal sources. Criteria for sustainable forest management cannot be defined in the ILUC-proposal for biofuels, while the forest management principles and criteria should be the same, irrespective of the end use. Improper and confusing classification of forest-based feedstock, and demand for

further sustainability criteria on top of existing systems established in forest industry, would harm the development and growth of second generation biofuels industry.

UPM recognises the importance of proving sustainability of wood-based biofuels and has therefore engaged with several NGOs on the subject, while also participating in numerous research programmes and projects looking at the various aspects of availability and sustainability of wood residues.

Wood-based biofuels and carbon balance

In fossil fuels, carbon has been stored in the soil for millions of years and is released into atmosphere via combustion of the fuel. Wood and other biomass also contain carbon which is released into the atmosphere during combustion or natural decomposure.

However, unlike fossil fuels, forests can grow back and recapture CO₂ from the atmosphere. In the long run, carbon balance stays positive. Even if the harvesting was increased to some small extent, for energy or biofuel purposes, there is little effect on soil carbon balance, but still sustainable forest management practices ensure carbon balance on regional level and over time on a plot level.

When biodiversity, carbon or wood resources are in

question, the sustainability of forest ecosystems should be viewed on a real level instead of single forest or tree level.

Commercial scale wood-based biofuels

UPM is currently building the world's first biorefinery producing wood-based biofuels in Lappeenranta, Finland. The biorefinery uses crude tall oil, a residue of pulp production, as feedstock and the production process is developed in-house.

The biorefinery, at an industrial-scale cost of €150 million, will produce 100,000 tonnes a year of renewable diesel for transport when ready in 2014. Tapping into underutilised, lower grade material streams, the biorefinery will only be a minor addition to the overall total demand of crude tall oil.

Forest industry outlook

Wood-based biofuels can provide an opportunity for renewal for the European pulp and paper industry. Forest industry biorefineries can become key parts of European bioeconomy by providing numerous fuels, chemicals and products from natural and renewable raw material to replace non-renewable and fossil raw materials and fuels.

Investment into wood-based biofuel is benefitting economy and employment in both domestic and EU sectors like raw material, technology, equipment and labour. Existing integrated pulp and paper sites offer possibilities for conversion into biorefineries, based on the existing infrastructure and raw material supply chains. Forest-based biomass, either directly from forest or through industrial processes, offers a sustainable alternative for biofuel production. ●

For more information:

This article was written by Sari Mannonen, director of business relations and marketing at UPM Biofuels



The UPM Kaukas mill site in Lappeenranta, Finland