The basic raw material for the paper industry is wood. Wood can be used in many different ways to generate a vast range of sub-products in many industrial sectors. A tree is made up of several different components and all can be put to good use. The tree’s cell wall is made up of cellulose (the fibre) and hemicellulose, which has shorter molecule chains and so less strength, but which can be easily synthesised to make other things. Binding it all together is lignin.

% may vary by species of wood
Borregaard: Leading the way

Norwegian company Borregaard is an example of one of the world’s most advanced biorefineries. It uses wood to make bio-chemicals, bio-materials and biofuel that can replace oil-based products. The Sarpsborg mill in Norway makes speciality cellulose which can end up in products in the construction and oil industries, foodstuffs, tablets, cosmetics, filters, hygiene products, textiles and paints, to name but some.

But it does much more than that. The wood’s binding agent, the lignin, is used in additives for everything from concrete and textile dyes to batteries and fishery products. The most important area of use for lignin products is as an additive in concrete. In addition to providing advantages in terms of strength and quality, the lignin also means that the water and cement content of the concrete can be reduced, resulting in a lower energy need and, not least, lower CO₂ emissions in the production of cement.

Lignin is also the source of the flavouring agent vanillin, the world’s most used taste and flavouring agent. Most of the world’s vanillin production is based upon petrochemical raw materials and Borregaard is the only producer in the world to make vanillin from wood at present.

Then there’s bioethanol, produced from the sugar in the wood. It can be used in the pharmaceutical industry, paints, varnishes, car care products, and as fuel in buses. The list goes on…

Turning agro waste into paper

FAVINI The paper industry is also working with alternative resources. One of these is waste from the agro-industrial sector, including waste from lemons, oranges, nuts, apples, corn and olives, now being used as a raw material for paper. The principle has been developed at Italian producer Favini who also came up with Alga Carta (a paper which uses algae as raw material).

The new paper, CRUSH, makes best use of a food waste which would otherwise be dumped, or perhaps burned for energy. Now that waste can be recycled, adding value and sustaining the circular economy.

More information at

www.cepi.org/resourceefficiency