

ReNEW

Resource innovation Network
for European Waste

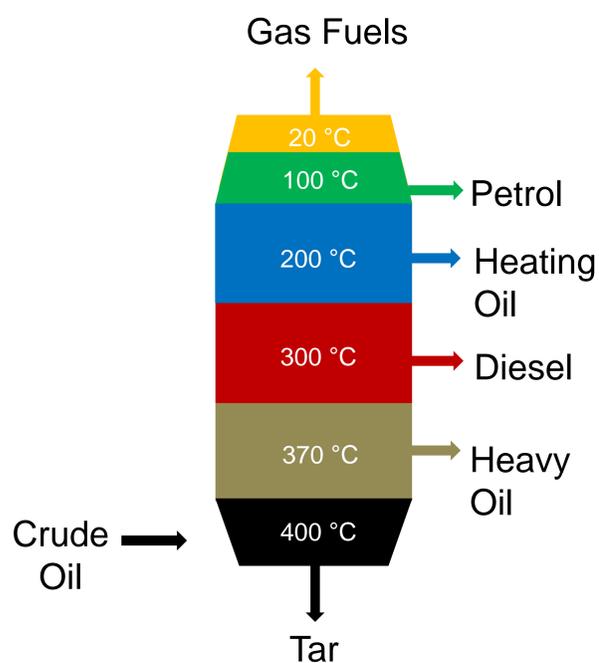


Valuable Products from Tree Barks

W.G. Forsythe, M. Garrett, S. Glover, C. Hardacre, C. McCallum,
K. Morgan, N. Strachan, R. Douglas and G.N. Sheldrake

Fuels from Oil

Most of the energy used in the world comes from fossil fuel sources, such as crude oil. However, there is only a limited amount of fossil fuel resources.

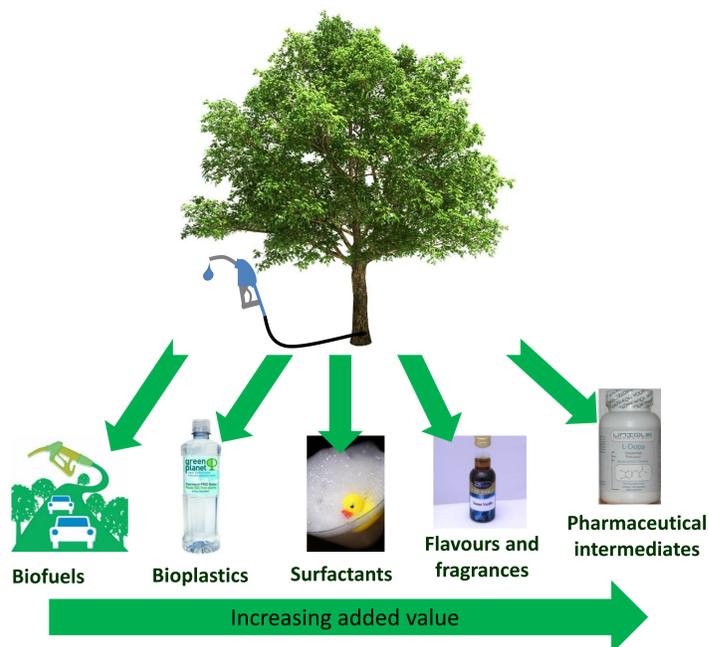


The crude oil that is pumped up from rocks deep underneath the surface needs to be processed before it can be used. The oil is heated and then separated based on the temperature at which the different chemicals turn into a gas, in a process known as distillation.

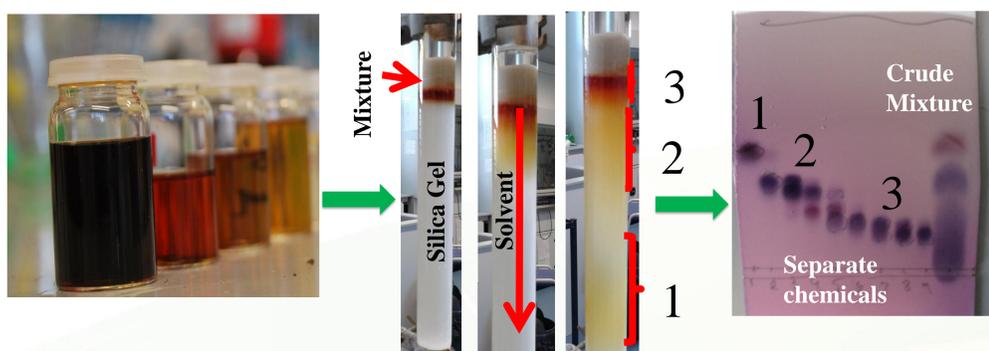
Fuels and Chemicals from Wood

There is a lot of focus on finding alternative sources for fossil fuel. The forestry industry is seen as a potential source. Half of all felled wood is left to rot in the forest, while half of what is actually processed is also wasted. Chemists at Queen's University Belfast have developed ways to make fuels and chemicals from waste wood sources, such as twigs, small branches and barks. Waste from wood is mostly used as a low grade fuel, or in cement binders. New methods of valorising or "upcycling" this waste can result in the production of value-added products.

Depolymerisation of suberin and lignin from milled bottle corks or tree barks is conducted at 200 °C and 40 bar pressure of nitrogen. Hydrogenolysis can also be performed under these conditions when nitrogen is exchanged for hydrogen and Rh/C catalyst is used.



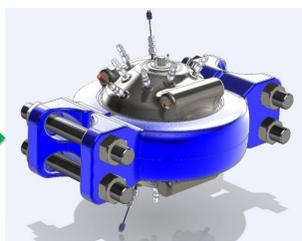
Product streams are separated by column chromatography. These processes result in the production of value added products such as aromatics and fatty acids, which ultimately have uses as varied as the cosmetics, food and biofuel industries.



From lab to litre scale



Lab Scale (100 mL)



Litre Scale (2 L)

As part of the ReNEW project a larger scale reactor has been constructed and is currently undergoing validation tests. This reactor is capable of higher temperatures and pressures leading to a more efficient catalytic processes.

The processes developed in this project will deliver a range of chemical products from low-value forestry waste that could be implemented commercially in Northern Ireland within five years.

Queen's University Belfast and ReNEW

Queen's scientists are working as part of a network of 11 partner organisations funded by Europe (INTERREG IVB NWE) to promote recovery of valuable materials from waste. We need to stop thinking of waste as something to throw away, and find technologies that can allow us to reuse it. ReNEW has been supporting processes to recover metals from old computers, nutrients for fertiliser and valuable chemicals from many different kinds of waste.

Contact Information

Dr Gary N. Sheldrake
QUESTOR Centre
School of Chemistry and Chemical Engineering
Queen's University Belfast
Email: g.sheldrake@qub.ac.uk