

## **Towards a more sustainable pulp and paper industry with Deep Eutectic Solvents**

### ***Successful conclusion of first phase of PROVIDES project***

17 October 2018 – Today, at a special conference organised as part of the Paper & Beyond 2018 event in Brussels, the first phase of the PROVIDES project was officially completed. PROVIDES, which stands for ‘PROcesses for Value added fibres by Innovative Deep Eutectic Solvents’, is a research and innovation project within the Biobased Industries Initiative, with the goal of significantly reducing CO<sub>2</sub> emissions in pulp and papermaking. The Royal VNP is an active participant in the project, thus supporting the pulp and paper industry’s technological transition towards meeting its climate objectives. The completion of the first phase was celebrated with the publication of a booklet describing the potential of Deep Eutectic Solvents (DESs) for creating breakthrough innovations in the pulp and paper industry. The publication ‘Deep Eutectic Solvents in the paper industry’ can be downloaded [here](#).

### **Revolutionising the industry**

In 2011, CEPI launched its vision for the sector in the next 35 years, concluding that breakthrough technologies are needed to make the industry more sustainable. Specifically, it aims to achieve an 80% reduction of CO<sub>2</sub> emissions and at the same time create 50% more value. The PROVIDES consortium shows that a revolutionary change is possible. New, mild pulping technologies based on natural Deep Eutectic Solvents lead to a significantly more sustainable process that is energy-, cost- and resource-effective, while producing much lower CO<sub>2</sub> emissions.

### **The total DES concept**

Deep Eutectic Solvents are nature-based, renewable, biodegradable, low-volatile and cost-effective. The overall objective of the DES concept is to achieve a 40% reduction of energy use and an 80% reduction of CO<sub>2</sub> emissions in pulp and papermaking. The DES concept will enable the industry to obtain a radically new, sustainable and techno-economically feasible pulping technology, while also enabling the selective recovery of dissolved components. In addition, DESs can be regenerated and recycled, ensuring economical use of resources. This technological innovation produces high-quality cellulose fibres for papermaking, while simultaneously producing high-quality lignin and hemicellulose fractions for a variety of high-volume applications.

### **Results and achievements**

In the first phase of the PROVIDES project, more than one hundred new DESs were developed. Of these, two have been further developed as successful delignifying agents. The project proved that the entire DES pulping process can be run at operational costs similar to those kraft pulping, and that the resulting cellulose fibres have good tensile strength and extreme internal bond strength. In addition, it was proven that DES delignification results in 95% lignin removal, and that the lignin can be successfully recovered and the DES regenerated.

### **Next steps**

In the coming years, the pulping part of the DES research cluster, coordinated by the Institute for Sustainable Process Technology (ISPT), will continue to conduct further applied research towards the realisation of a DES pulping pilot and demo, ultimately leading to commercial implementation in 2030.

For more information contact Annita Westenbroek ([a.westenbroek@providespaper.eu](mailto:a.westenbroek@providespaper.eu)) or visit [www.providespaper.eu](http://www.providespaper.eu).