

# Deep Eutectic Solvents in the paper industry

Reaching 80% CO<sub>2</sub> reduction in the lignocellulose processing chain



**Project number** DES Cluster

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**Budget** 2 000 K€

**Duration** 2019-2022

The European project cluster aims to approach 80% CO<sub>2</sub> emission reduction in the lignocellulose processing chain, compared to the current chain based on kraft pulping by the application of Deep Eutectic Solvents (DESs).

## Objective

- To develop a radically new, sustainable and techno-economically feasible pulping technology for lignocellulose raw materials based on DESs
- Via DES: to isolate lignin, hemicellulose and cellulose at low temperature and atmospheric pressure for further processing into materials and chemicals with a high added value.

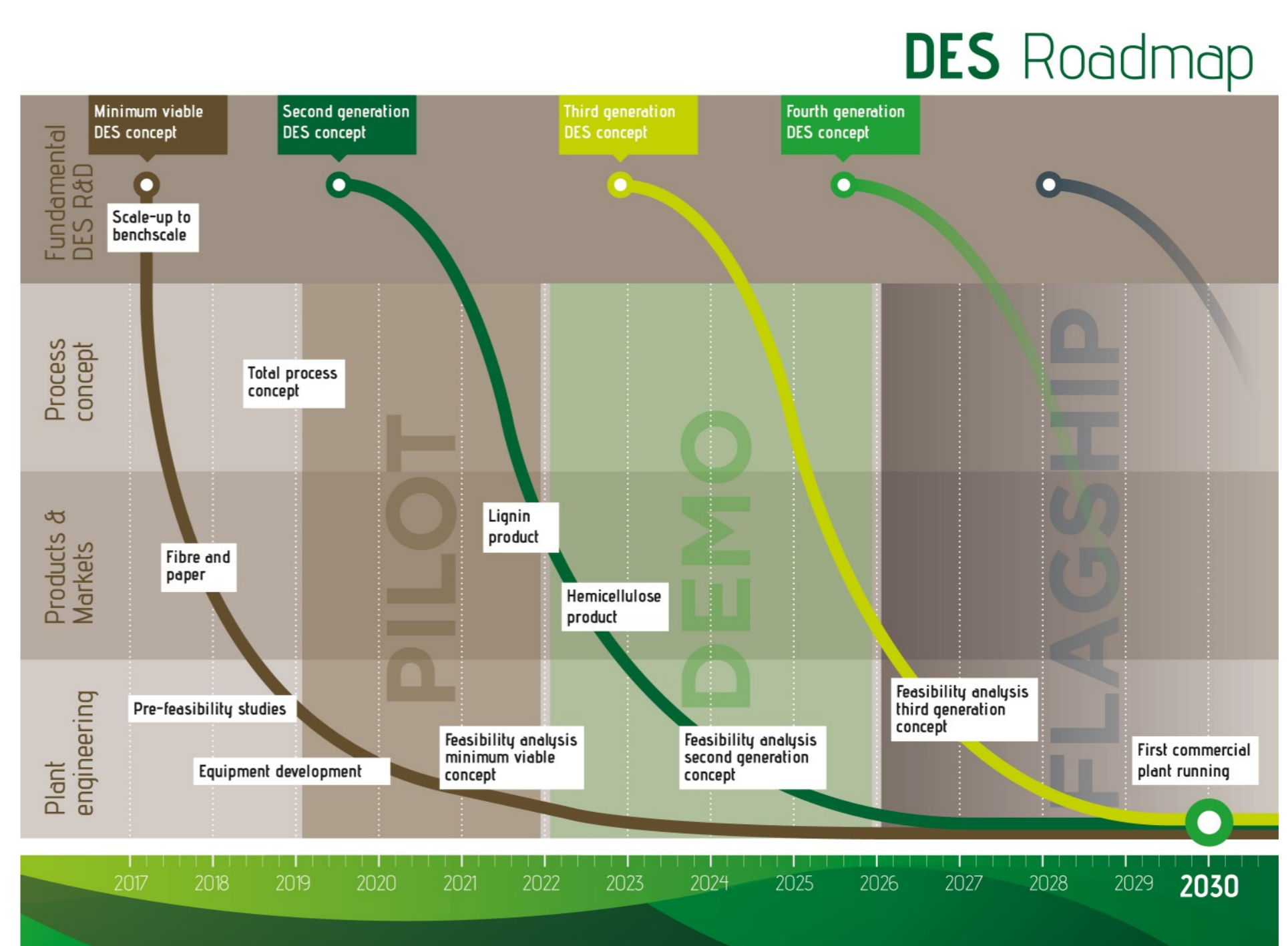


## What are Deep Eutectic Solvents?

DESs are composed of two or more components, at least one Hydrogen Bond Donor (HBD) and one Hydrogen Bond Acceptor (HBA), interacting with each other by self-associating forming an eutectic mixture with a melting temperature far below that of its constituents.

## Expected Impact

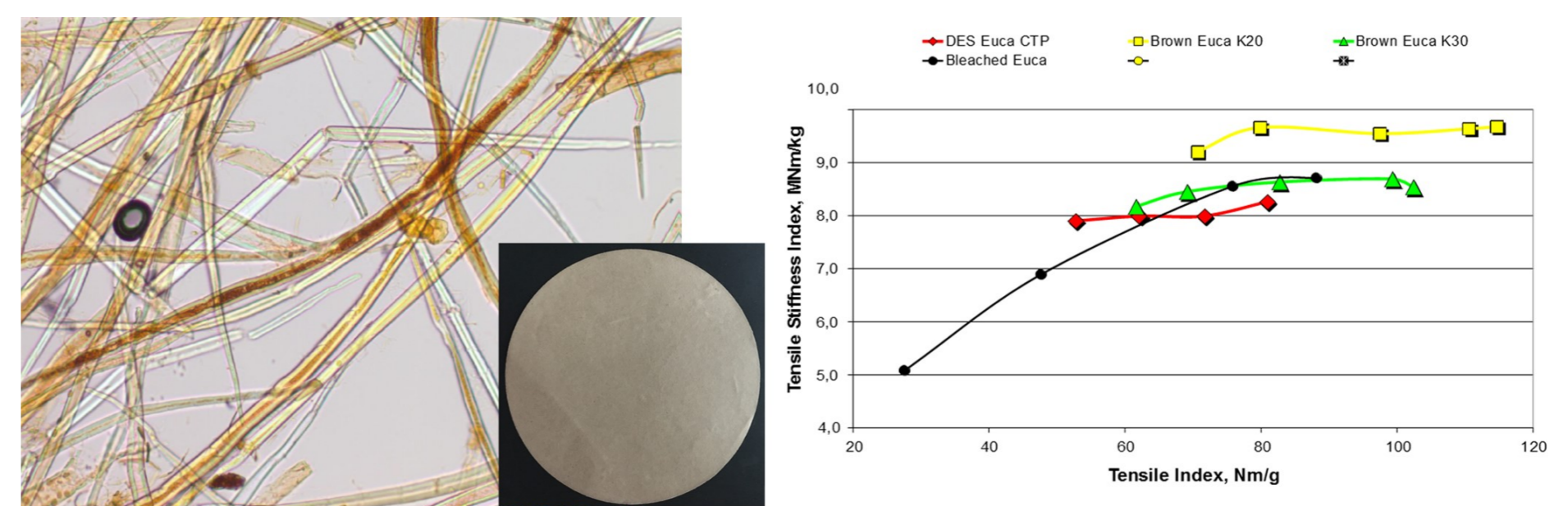
- Approaching 80% CO<sub>2</sub> emission reduction in the chain
- Reducing by at least 40% in process energy intensity due to lower process temperature and pressure
- Reducing by 50% of investment costs
- Strengthening market position of current wood-based products



## Status

Extreme progress made in delignification:

- Fast, complete, efficient and severe delignification
- also side reactions, incl. (hemi)cellulose degradation
- Insight in delignification mechanism
- Several reactions take place simultaneously
- Many buttons to control: DES functionalities, temperature, time, water, acidity
- In the coming period focus lays on optimisation
- Development of recovery process progresses well
- Proof of principle for lignin recovery
- Technologies for hemicelluloses and extractables are being developed



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