

REFFIBRE NEWSLETTER MAY 2016

REFFIBRE: Maximising the value from paper for recycling

The REFFIBRE project aims at developing tools and knowledge that are necessary to eco-design resource-efficient paper and board production processes. The focus is on paper for recycling as the main raw material in paper and board production. In the multiple-output mill concept novel bio-based products - along with traditional paper and board- are produced from side streams taken out of the main production line. New processes will be proposed and demonstrated in cooperation with the REFFIBRE industrial partners and the newly developed tools will be validated based on the trials.

European fibre flow analysis and value chain environmental indicators

PTS has made great progress on the analysis of European fibre flows, which are used in calculating allocation factors in life-cycle analysis. Key parameters, such as the Mean Fibre Age (number of times a fibre has been used before entering a paper mill) and the Mean Number of Uses (number of times a fibre will be used after leaving the paper mill), can now be calculated on national and regional levels. These parameters are being utilised within the project by VTT and ITENE in order to develop environmental indicators for whole paper value chains based on paper for recycling as the raw material. The impact of measures for optimising the use of recycled fibres can be determined at a value chain level through the use of these indicators. Such environmental and economic indicators are applied by the REFFIBRE industrial partners to evaluate the impact of various scenarios on e.g. material efficiency, water footprint and climate change, but also on profitability.

Attention is furthermore being paid to the impact of selecting different allocation methods for carrying out life-cycle analysis calculations. An example of analysing the impact of a specific new scenario through the use of an environmental indicator is provided in Fig.1.

Modelling of the production process and of paper properties

PTS has also developed a tool for the prediction of paper properties (structural, mechanical, optical) based on pulp characteristics. Raw material selection and stock preparation processes influence pulp properties. Given that the ash content of paper for recycling will be one of the main challenges for the paper industry in the years to come, modelling work has concentrated on the impact of fillers on paper properties.

The REFFIBRE project focuses also on modelling various stock preparation processes and the adjustment of their parameters. This work is being carried out by TUDA. Such models can be useful in eliminating the time lag between action on the production line and the evaluation of its effects, but can also support sustainability indicator calculations or the assessment of the viability of various proposed sidestream applications. An example of such work is the modelling of flotation deinking, where in a scenario with increased reject rates the model can provide good forecasts or indications regarding pulp composition, ash content and fibre composition, while it can also precisely predict optical properties. The models can also



assist process operators in the management of the production process by acting as “soft”, or virtual, sensors. Soft sensors can make up for the lack of actual sensors and online measurements of various parameters or for inconsistencies in the data provided by existing instruments.

Climate impact case Holmen

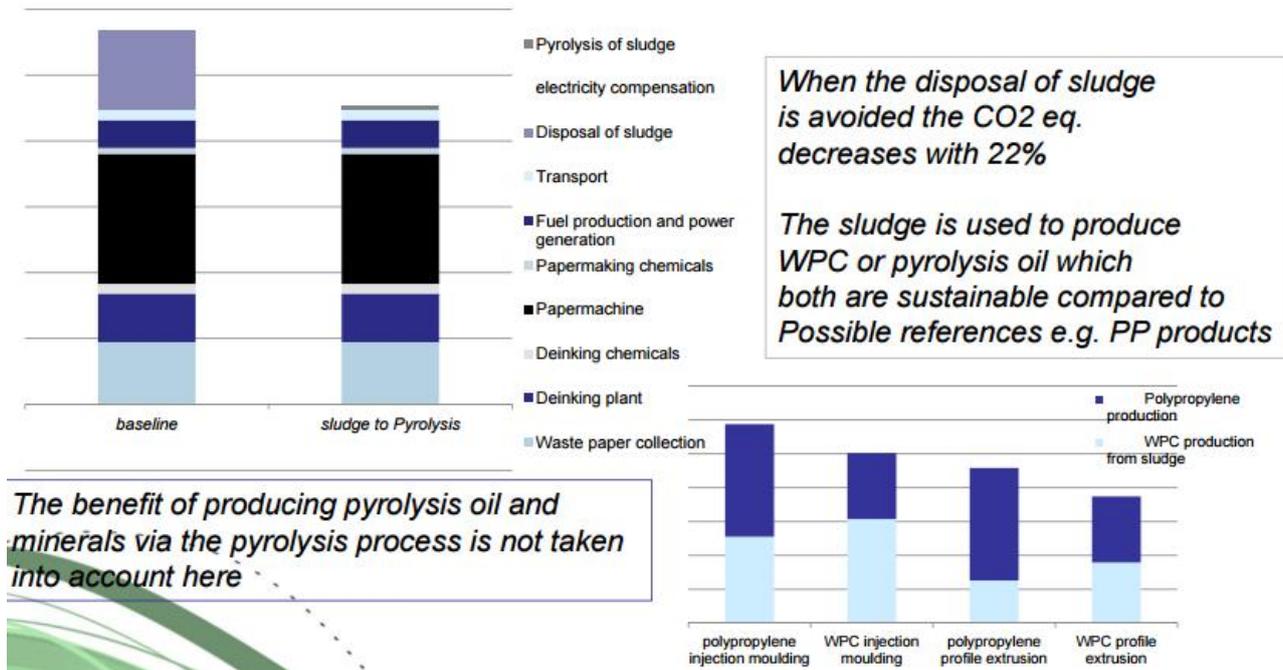


Figure 1. Impact on climate of substituting sludge disposal by sludge pyrolysis or utilisation in the production of Wood-Plastic Composites in the case of Holmen Madrid; an example of the application of environmental indicators within the REFFIBRE project

Demonstrations

REFFIBRE industrial partners are carrying out several demonstrations on a pilot scale in order to test and validate the models developed within the project. The Finnish company Plastec, in cooperation with VTT, has successfully injection-moulded composites of polypropylene (PP) and Holmen Madrid sludge, PP and Utzenstorf fly ash, as well as PP and Utzenstorf deinked pulp into floor tiles.

More trials with other parties have been planned, both with the use of injection moulding for the production of various products (ice scraper, transportation box) and with the use of profile extrusion for applications in the building sector. Regarding the pyrolysis of sludge, Alucha has been conducting trials with material provided by Holmen Madrid and Utzenstorf.



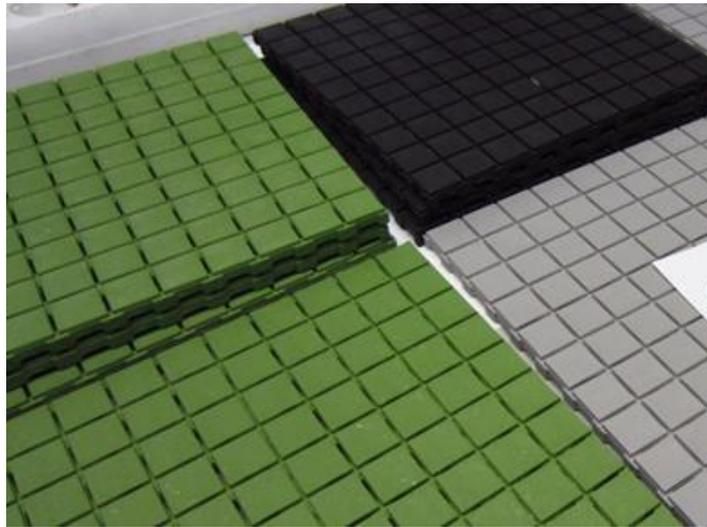


Figure 2. Floor tiles injection-moulded by Plastec from composites provided by VTT

Two more new ideas are being tested within the project. The first of these is the preparation of composite filaments for 3D printing, which will involve the combination of REFFIBRE partners' materials with PP, as well as with PLA for a 100% bio-based product. The second new idea revolves around the fractionation of paper industry streams by means of a technique developed by Kadant Lamort. This combines various technologies already applied within the sector in order to fractionate the input material into a fibre fraction, an ash fraction, a bonding fines fraction and a residual fraction of non-bonding fines, which can subsequently find their best applications within or outside the paper and board industry.

The progress and results of both the modelling work and the pilot tests will be published on the REFFIBRE webpage (www.reffibre.eu).

REFFIBRE workshop and meeting in Darmstadt, Germany

On April 19 and 20, 2016, the project partners met to discuss their progress and coordinate their actions for the upcoming months. The Technical University of Darmstadt hosted the meeting, which was also combined with the third public workshop of the REFFIBRE project. During the latter the project partners had the opportunity to present their work and results so far to participants from the German paper industry and trade associations. Furthermore, Ms. Almut Reichart of the German Federal Environment Agency provided as a guest lecturer some insights into the German positions with regard to the environmental aspects of utilising sidestreams. The presentations given during this public workshop can be found on the REFFIBRE project website:

<http://reffibre.eu/news/the-third-public-workshop-held-in-darmstadt>

