Master thesis proposal
Life cycle inventory of lignin production

Background:
Lignin is a byproduct from pulp mills and from some types of biorefineries. At pulp mills, lignin is today almost always combusted for internal energy use at the plant. There are however different ways of extracting lignin in order to valorize it; for example; acidification followed by precipitation and filtration. Lignin is increasingly considered as an interesting raw material for various products, ranging from biofuels to carbon fibres. A life cycle assessment can shed light on what uses are environmentally preferable and how to optimize different systems. However, little is today known about the environmental impacts of lignin production.

Project description:
The purpose of this project is to do screening LCAs for different lignin production pathways. The tasks include to:

- Select and describe typical processes from which lignin can be extracted
- Create a life cycle inventory for the selected processes
- Compare the processes and identify environmental hotspots and knowledge gaps for each of them

The results will be a basis for future research on lignin’s life cycle environmental impacts and how it varies between sources and extraction methods.

The project will be conducted at Environmental Systems Analysis, Chalmers, during the spring 2019. It connects closely to the LIBRE research project that aims to generate carbon fibres for composites from lignin.

Qualifications
This project could be done by one (or two) students in sustainable energy systems, industrial ecology or sustainable and innovative chemical engineering. Basic knowledge about life cycle assessment is preferable but not necessary.

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