## KTH VETENSKAP OCH KONST

## Conversion of biomass to olefins

KTH ROYAL INSTITUTE OF TECHNOLOGY

Building blocks for fuels and chemicals

Elise Farah\*, Klas Engvall and Efthymios Kantarelis Department of Chemical Engineering, KTH Royal Institute of Technology, Sweden



The total forest biomass residues in Sweden is about 1750 million tons.<sup>1</sup>

35 000 – 40 000 tonnes of dry wood residues produce a round 25 000 tonnes of bio-oil.<sup>2</sup>

Possibility of plastics integration into pyrolysis plant

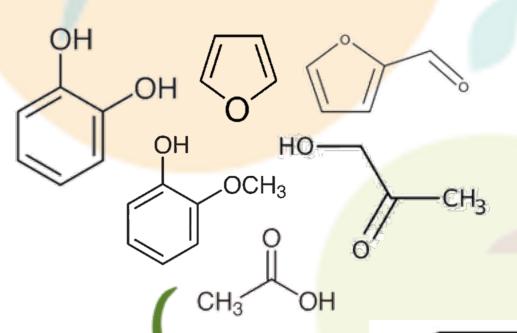


Biochar

Bio-oil contains more than 400 different chemical compounds of various chemical classes and suffers of chemical instability and low market penetration.<sup>3</sup>

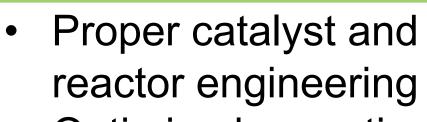
The olefin market size is valued at 350 billion USD by 2029 and is anticipated to grow at a compound annual growth rate of 4.75% between 2022 and 2029.4



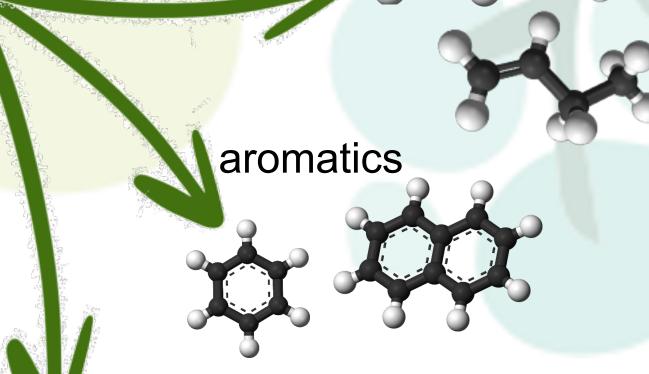


An upgrade is necessary to convert it into sustainable and economically viable products

olefins



Optimized operating conditions



KTH Energy dialogue 2022







[1] SLU: The Swedish National Forest Inventory. https://taxwebb.slu.se/ layouts/15/slu-xlviewer.aspx?source=/&id=/PowerPivot

Coke

[2] Bioenergy International. (2020). *Groundbreaking held for Sweden's first biofuels pyrolysis plant*. Bioenergy International. Retrieved from https://bioenergyinternational.com/groundbreaking-held-for-swedens-first-biofuels-pyrolysis-plant/

[3] Dinesh, M., Charles, U. P. J., and Philip, H. S. (2006). Pyrolysis of wood/biomass for bio-oil: a critical review. Energy Fuels 20, 848–889. doi:10.1021/ef0502397

[4] Data Bridge Market Research. (2022). *Global Olefins Market Is Forecasted To Reach Nearly USD 347.91 Billion By 2029* | *Upcoming Trends, Revenue & Size, Share*. Retrieved from https://www.databridgemarketresearch.com/reports/global-olefinsmarket.

