



Biorenewable Insights: Bio-Coal and Bio-Crude

Bio-Coal and Bio-Crude is one in a series of reports published as part of NexantECA's 2020 Biorenewable Insights program.

Overview

Bio-crude and bio-coal (also called biochar) are alternative feedstocks with the purpose of supplementing or displacing current fossil inputs for fuels and chemicals in existing conventional infrastructure and processing. Bio-coal is produced through thermal transformation of lignocellulosic biomass, and bio-crude is produced from biomass pyrolysis oil. Together they have the potential to “green” significant segments of the petrochemicals and fuels sectors, particularly if they are substituted for fossil feedstocks early in the value chain.

While these products are already available in limited quantities, the sector has major potential for growth from public and regulatory pressure. Additionally, existing businesses may favor feedstocks that allow them to continue to operate existing processes rather than seeking alternative routes to major products. As such, processes for the production of bio-crude and bio-coal are likely to be increasingly important in reducing the environmental impact in industry. However, the sector is still relatively immature from a technical and commercial perspective.

This report aims to answer the following strategic questions about bio-coal and bio-crude:

- What technologies are available for bio-coal and bio-crude, and what is their current level of technical maturity?
- Who are the major players in bio-coal and bio-crude?
- What is the current market availability of bio-coal and bio-crude, and how much is likely to appear in the near future?
- What are the costs of processing biomass feedstocks into bio-coal and bio-crude, and how competitive are they with their conventional counterparts?

Technologies

This report focuses on technologies used for production of these feedstocks from biomass, with a focus on commercial partial combustion-type processing. Bio-coal processes covered include torrefaction and hydrothermal carbonization. Bio-crude processes covered include pyrolysis and hydrothermal liquefaction.

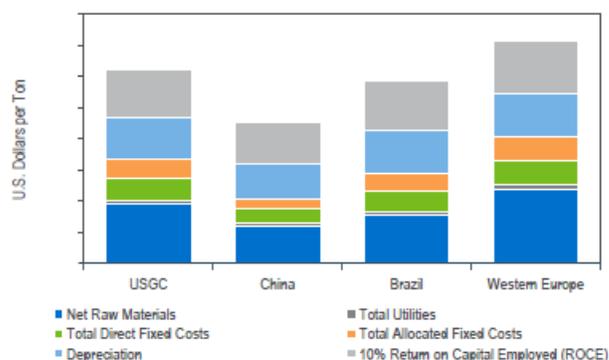
Process Economics

The report assesses the cost of production of generic bio-coal via torrefaction and bio-crude via catalytic pyrolysis, uncatalyzed pyrolysis, and hydrothermal liquefaction, and where necessary reflecting current developmental technologies. Economics are covered with comparison to conventional feedstocks on location bases including the United States, Western Europe, Brazil and China for 2Q 2020.

Commercial Impact

The report covers announced capacity from all major players in the sector and provides risk-adjusted future capacity to project future availability. In addition, the report also covers the potential for sole and co-processing of bio-coal and bio-crude feedstocks in a variety of applications. It discusses chemical suitability, process adaptations, product concerns, and potential pitfalls of feedstock substitution.

Catalytic Pyrolysis Cost of Production Comparison, 2Q 2020



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The BI program (sister program to the world renowned TECH program, formerly known as PERP) is globally recognized as the industry standard source of process evaluations of existing, new and emerging of interest to the renewable energy and chemical industries.

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- Chemistry
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- Process economics – comparative costs of production estimates for different technologies across various geographic regions
- Capacity tables of plants and analysis of announced capacities
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Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program (formerly known as PERP), the Biorenewable Insights program (BI), the Sector Technology Analysis, and the new Cost Curve Analysis. These programs provide comparative economics of different process routes and technologies in various geographic regions.

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