



## Biorenewable Insights: Biomass Pyrolysis

Biomass Pyrolysis is one in a series of reports published as part of NexantECA's 2021 Biorenewable Insights program.

### Overview

The increasing pressure on global economies to reduce their greenhouse gas (GHG) emissions is leading many companies and governments to invest in the development of technologies to produce energy, fuels and chemicals from biomass. At present, biomass processing is largely limited to fermentation of sugars to products like ethanol and hydroprocessed esters and fatty acids (HEFA) technologies, which convert vegetable oils, animal fats and used cooking oil into biofuels. Vegetable oils and sugars, however, typically originate from food crops and so their use for energy purposes on a global-scale are seen as a threat to food supply for the growing global population, and the cultivation of oil crops is being increasingly linked to mass deforestation and rainforest loss. As such, there is growing interest in biomass processing technologies that can consume biomass waste, including municipal solid waste, instead of vegetable oils.

Biomass pyrolysis is one such technology, alongside gasification and torrefaction. Thermochemical pyrolysis technologies are commercially-proven processes for the production of a liquid pyrolysis oil product, or bio-oil, for energy and heat purposes, with emerging catalytic pyrolysis and hydrolysis technologies, as well as ongoing research into alternative bio-oil applications, showing the potential for the production of drop-in biofuels and biochemicals. The biomass pyrolysis sector is generally still technically and commercially immature.

This report aims to answer the following strategic questions:

- What are the major existing and developing biomass pyrolysis technologies? Who are the key technology holders and licensors? What are the potential products of biomass pyrolysis technologies?
- Are the products of existing and developing biomass pyrolysis technologies competitive in terms of costs relative to competing products?
- What is the current global capacity, and which announced projects are likely to materialize?

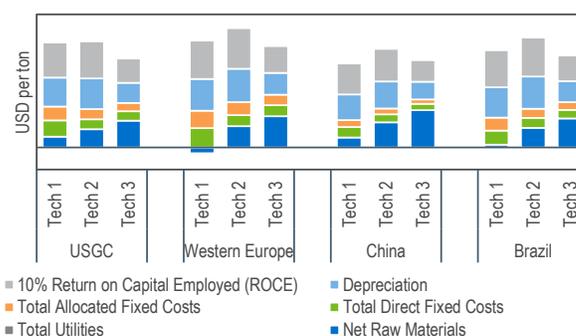
### Technologies

This report covers existing commercial technologies as well as technologies in the process of commercialization:

- BTG Bioliquids' Biomass-to-Liquids (BTG-BTL) technology
- Ensyn's RTP™ technology
- VTT Technical Research Institute of Finland technology
- Anellotech's Bio-TCat™ technology
- Shell's IH<sup>2</sup>® technology

### Process Economics

Estimates of overall competitiveness for various leading technologies are presented for four locations (United States, Brazil, Western Europe, and China). Regional pricing is set on a Q2 2021 basis. All major biomass pyrolysis technologies are included, with reference to specific technology developers and licensors.



### Commercial Impact

This report covers existing biomass pyrolysis capacity and includes a risk-adjusted capacity list, which considers the likelihood of success of announced capacity additions in light of recent business developments. The report also examines the key implications of biomass pyrolysis on conventional energy, fuels and chemicals industries.



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