



Waste2Road Presentation

March 10th 2022





Agenda

1. BTG Bioliquids company introduction
2. Fast pyrolysis technology
3. FPBO applications
4. Summary

Company introduction

- As a **technology provider** and **product leader** we are committed to the commercial deployment of our fast pyrolysis technology.
- Explicitly made from biomass residues which is known as **second generation (2G)** or advanced biofuel which means that it does not compete with the food chain.



Our company history & milestones



1987

BTG starts as a spin-off from the University of Twente



2008

BTG Bioliquids is established by BTG



2015

Start up of Empyro in the Netherlands



2016

Cooperation agreement with TechnipEnergies

Starting BTG Bioliquids webshop



2020

Start up of GFN plant in Finland



2021

Start up of Pyrocell plant in Sweden



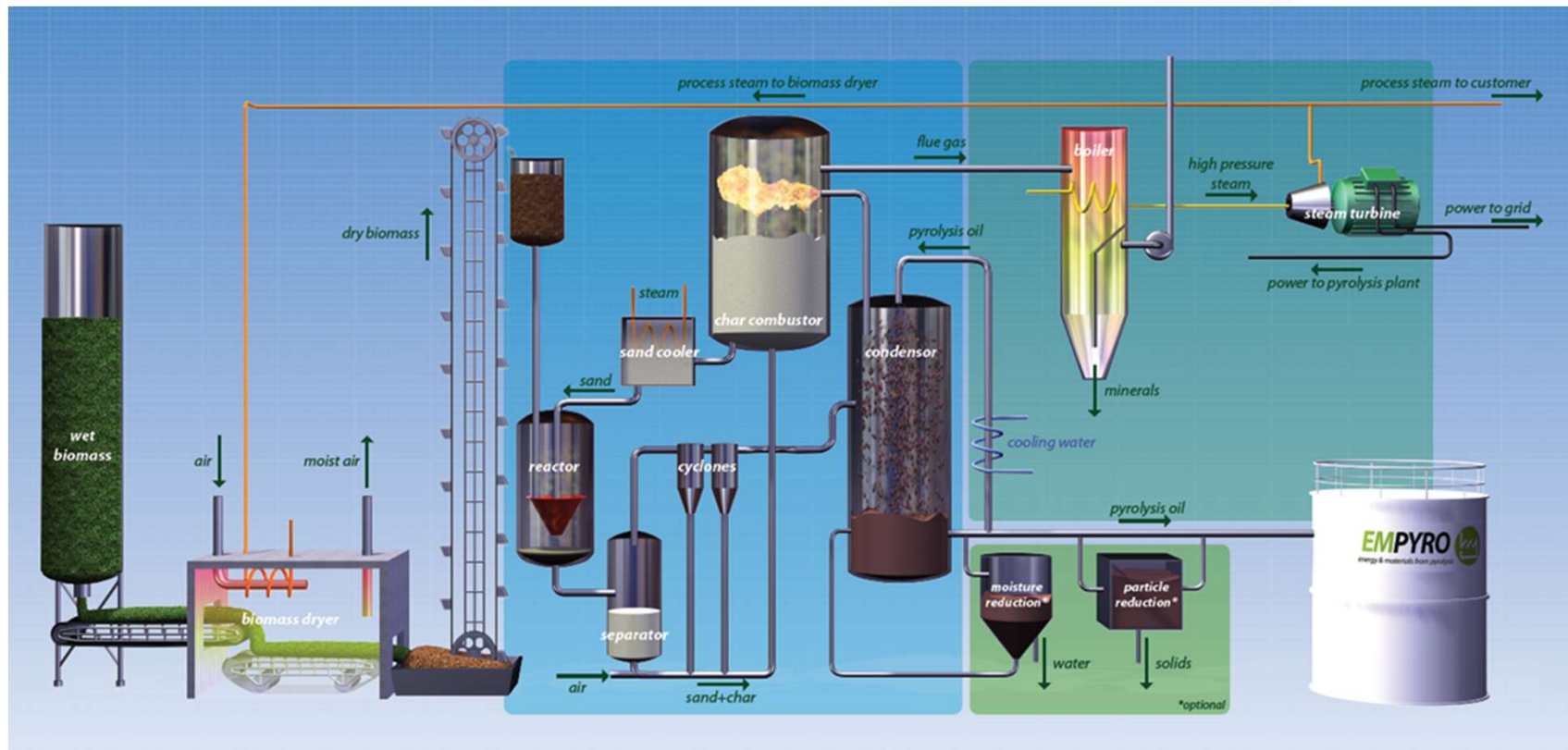
Our technology



Fast pyrolysis technology

- **Thermochemical decomposition** of biomass residues through rapid heating (450-600 °C) in absence of oxygen.
- Different types of biomass residues can be converted into homogeneous energy carrier: **Fast Pyrolysis Bio Oil (FPBO)**.
- By products are **heat** (steam) and **power** (electricity)

Our process from biomass to FPBO



Empyro

The Netherlands

In 24/7 operation since 2015

First commercial FPBO plant in the world at Twence/Empyro in the Netherlands, in 24/7 operation since 2015. Empyro is sold to Twence at the beginning of 2019.

- Biomass feedstock – wood residue
- Biomass input – 36.000 ton/year
- FPBO output – 24.000 ton/year
- Steam output – 80.000 ton/year
- Electricity output – 2.200 MWh/year



Front view of Empyro plant including bulk silo

Empyro and more



December 2020
Start commercial
production !



Empyro Twence, Hengelo
The Netherlands - 2015

March 2015
Start commercial
production !



Pyrocell Setra, Gävle
Sweden - 2021

September 2021
Start commercial
production !

Pyrocell (Sweden) from sawdust to tank

- Joint Venture of Setra and Preem
- **FPBO from sawdust – started up in September 2021**
- Turn-key EPC delivery by TechnipEnergies
- FPBO production: 24,000 tonnes/year
- GHG reduction of 80-90%
- **Preem Lysekil refinery is co-processing FPBO at the moment to produce advanced biofuels**
- In compliance with EU REDII-Annex 9

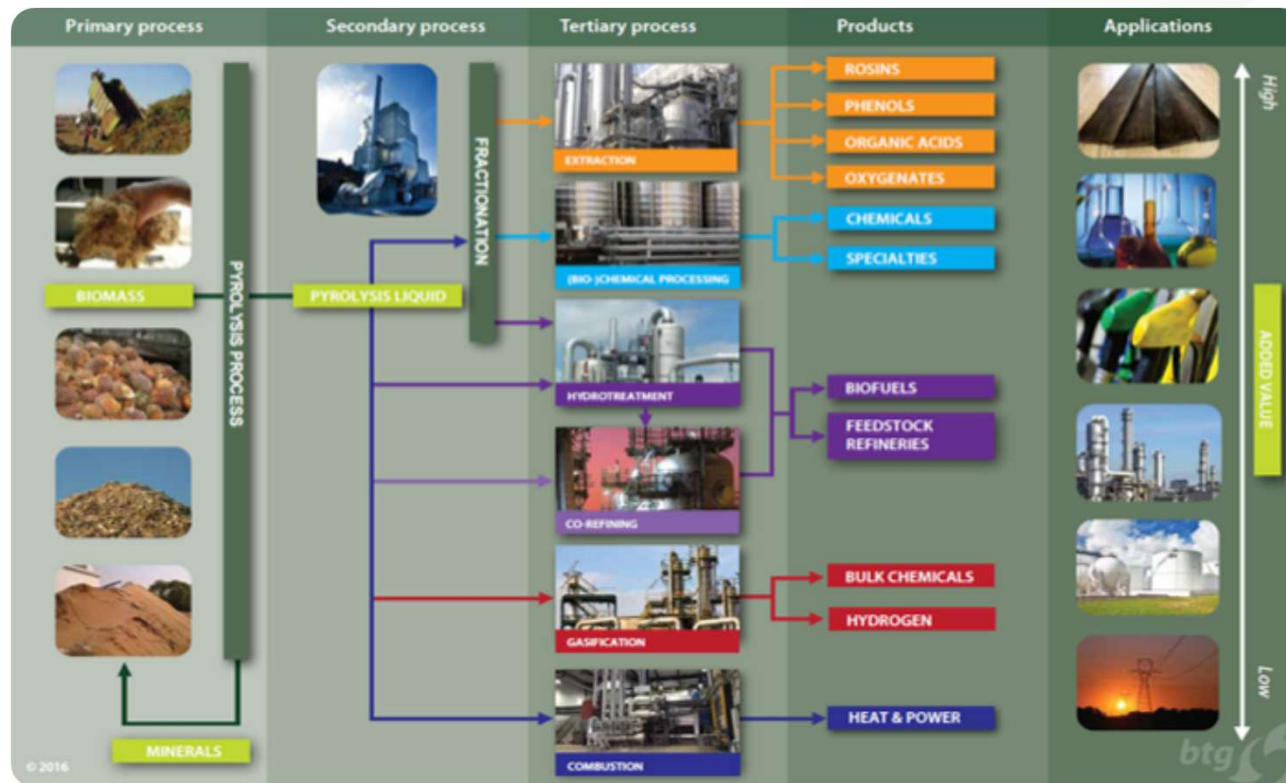




Fast pyrolysis bio oil key markets

- Sustainable transport fuels - comply with e.g. RED II
- Biobased chemicals – renewable materials
- Heat application – e.g. district heating or peak shaving
- FPBO can replace crude oil in all these sectors
- Our strategy is on the further development of the biorefinery concept

FPBO applications



The FPBO supply chain

Biomass conversion

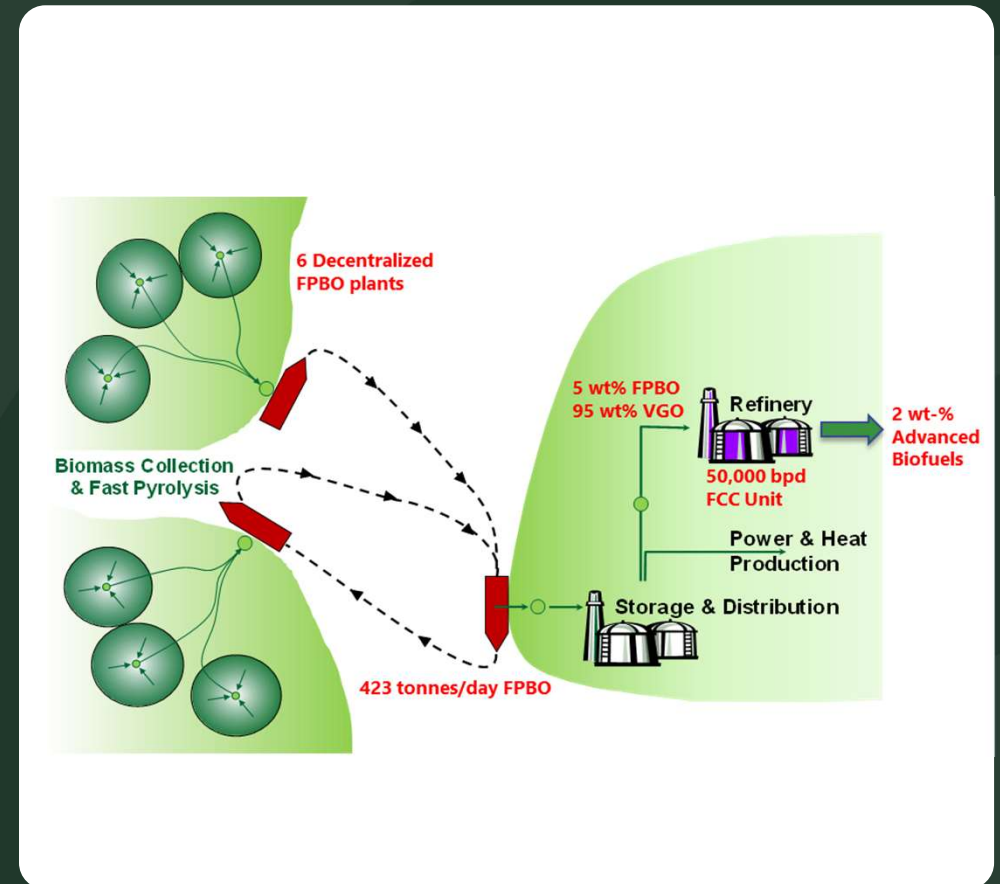
- Local processing of biomass residue
- Returning minerals to the soil

FPBO transportation

- Biomass liquified
- 10x denser than solid biomass

FPBO (co-)processing

- Centralized location
- Make use of existing infrastructure





Summary and perspectives

- Fast pyrolysis is proven at commercial scale, worldwide capacity is expanding
- Current FPBO application is as renewable heating oil (e.g. replacing natural gas)
- High interest in co-processing crude FPBO in FCC units as this is a low CAPEX option to comply with RED II in Europe
- First co-processing refinery customer starting 2021
- More applications of pyrolysis oil under development, pyrolysis as starting point of bio liquids refinery



BTG Bioliquids

**we replace fossil
fuels**

Thank you

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