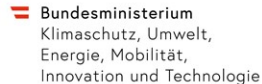




BEST

Bioenergy and
Sustainable Technologies



BEST Syngas Platform Vienna

Making a concept into reality

**Target**

Production of syngas from biomass and waste and downstream synthesis

Scale

1 MW **DUAL FLUID** gasification
250 kW Fischer-Tropsch synthesis

Operation

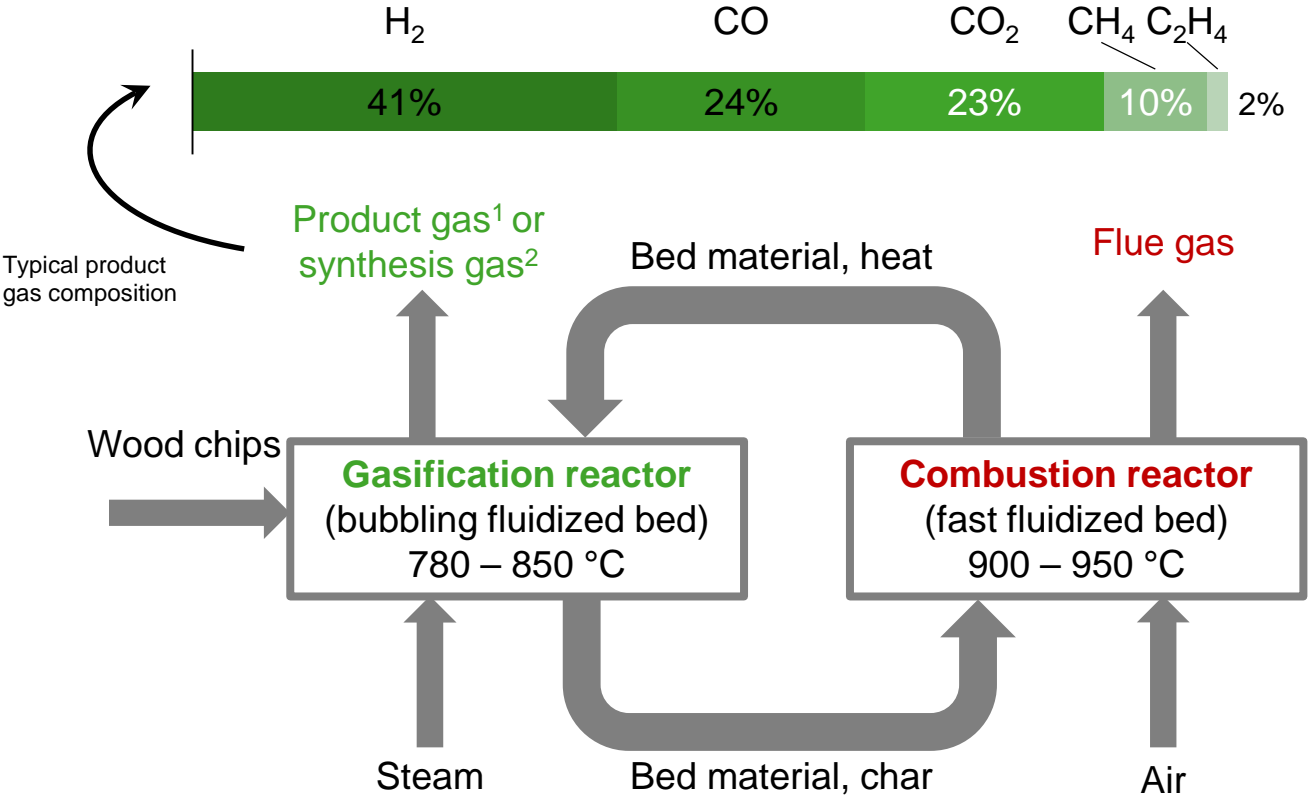
Campaigns for research operation

Fuel

wood chips, sewage sludge, plastic waste, sorted waste, agricultural residues



Syngas from DFB gasification



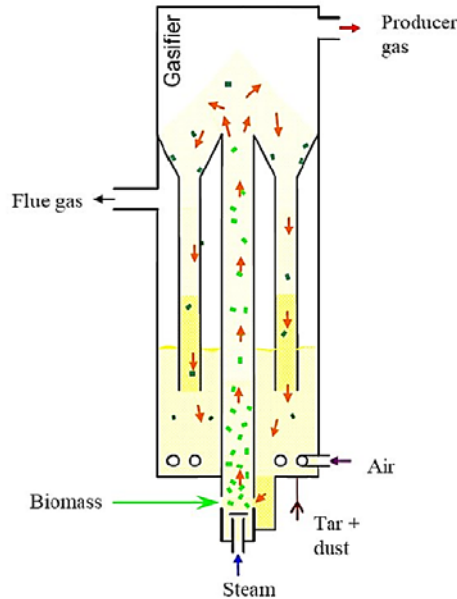
1 e.g. tar (incl. BTEX): 20-30g/m³, H₂S ~100 ppm for biomass fuel before any gas cleaning for downstream processing

2 Synthesis gas = cleaned from impurities

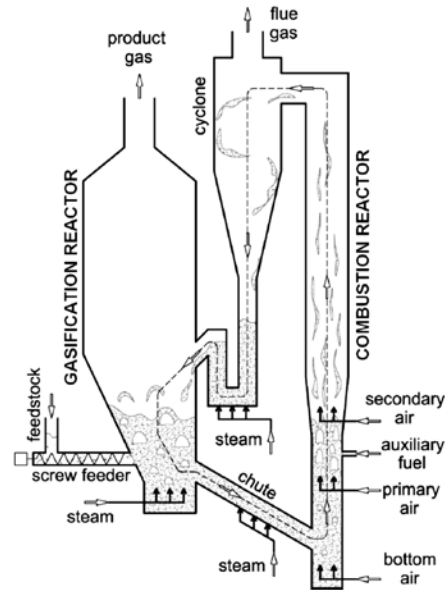


Dual fluidized beds

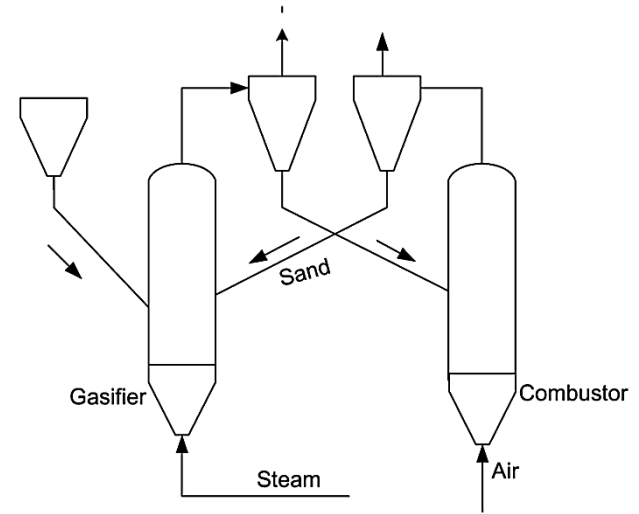
Milena



DFB (dual fluidized bed)



Ferco

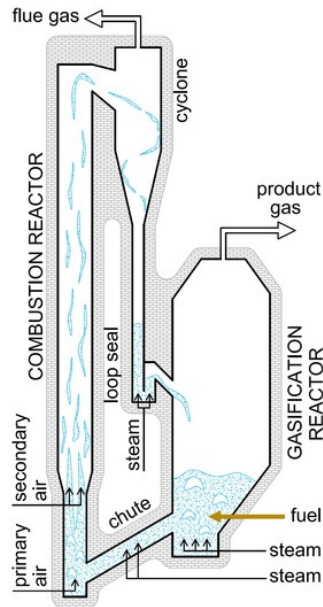




DFB: Woody biomass as input

1st reactor design

DFB Design 1. Roll-out



Gasification Reactor: bubbling fluidized bed with freeboard above.

Light material and volatiles are not in well contact with bed material and cannot be intermixed in the fluidized bed

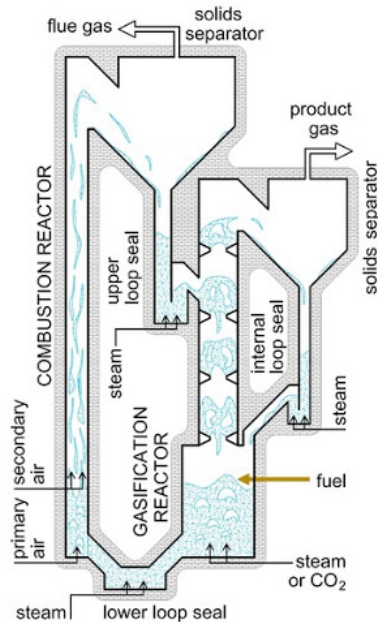
Low conversion, high amounts of undesired tars in the product gas.



DFB: Residues and waste as input

2nd reactor design

DFB Improved Design 2. Roll-out



Gasification Reactor: Bubbling fluidized bed with counter-current flow column above.

Light material and volatiles are now in well contact with bed material as they are forced to be in contact in the counter-current flow column.

Higher conversion, lower amounts of undesired tars in the product gas.



Location Overview

Vienna, City Center

Syngas platform
Location

The demo plant (waste to liquid fuel & green gases) is located in the city of Vienna, halfway between the airport and the city center.

Vienna is the capital of Austria in Central Europe and currently has a population of ~1.9 Mio.

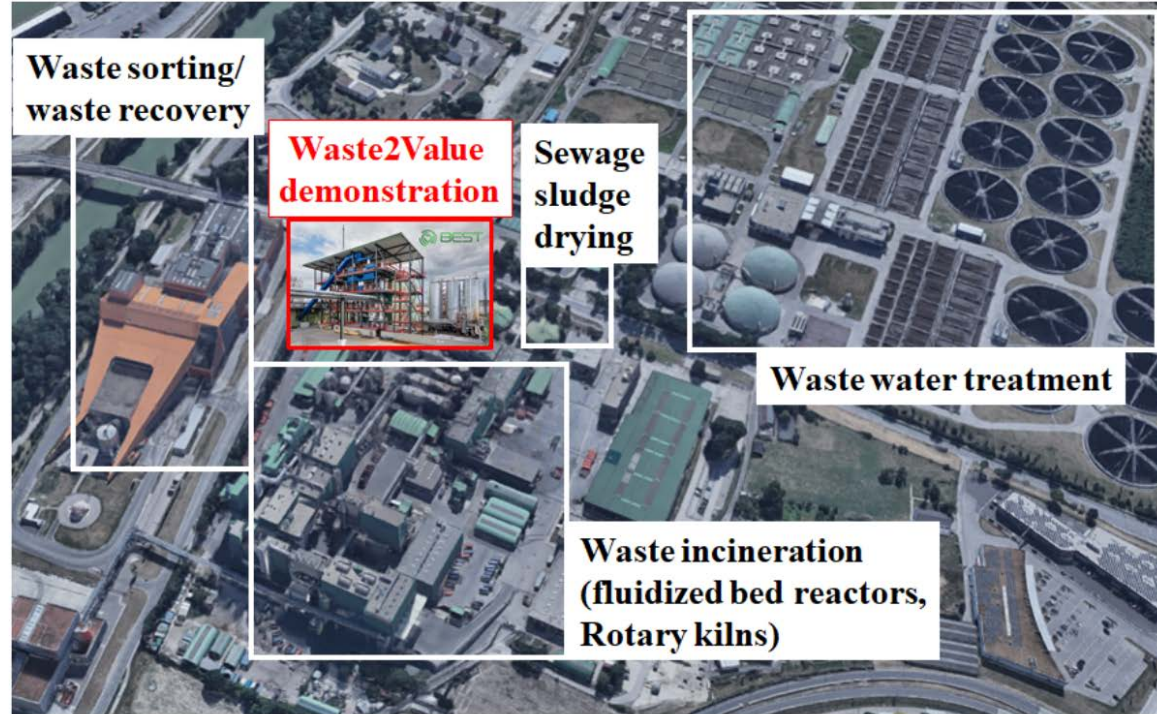


Airport VIE



Creating a versatile research location

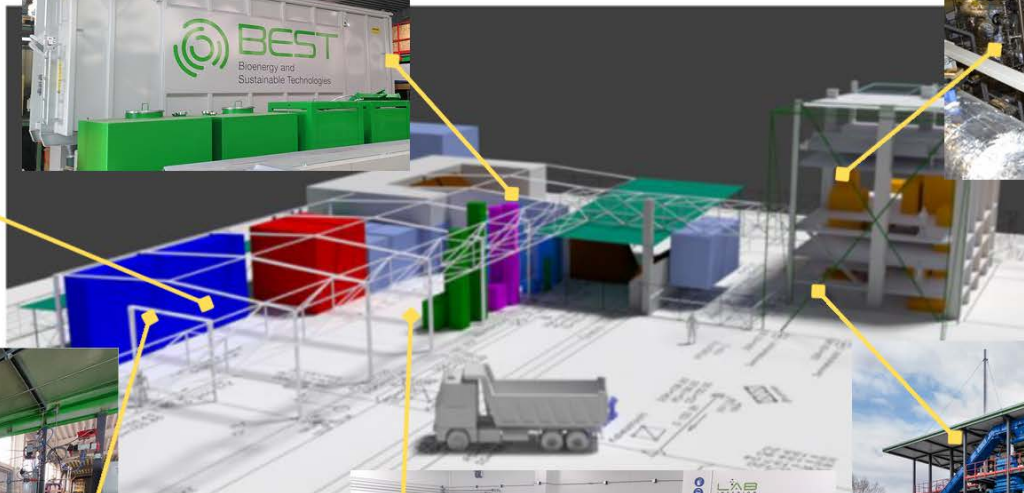
Part 1





Creating a versatile research location

Part 2



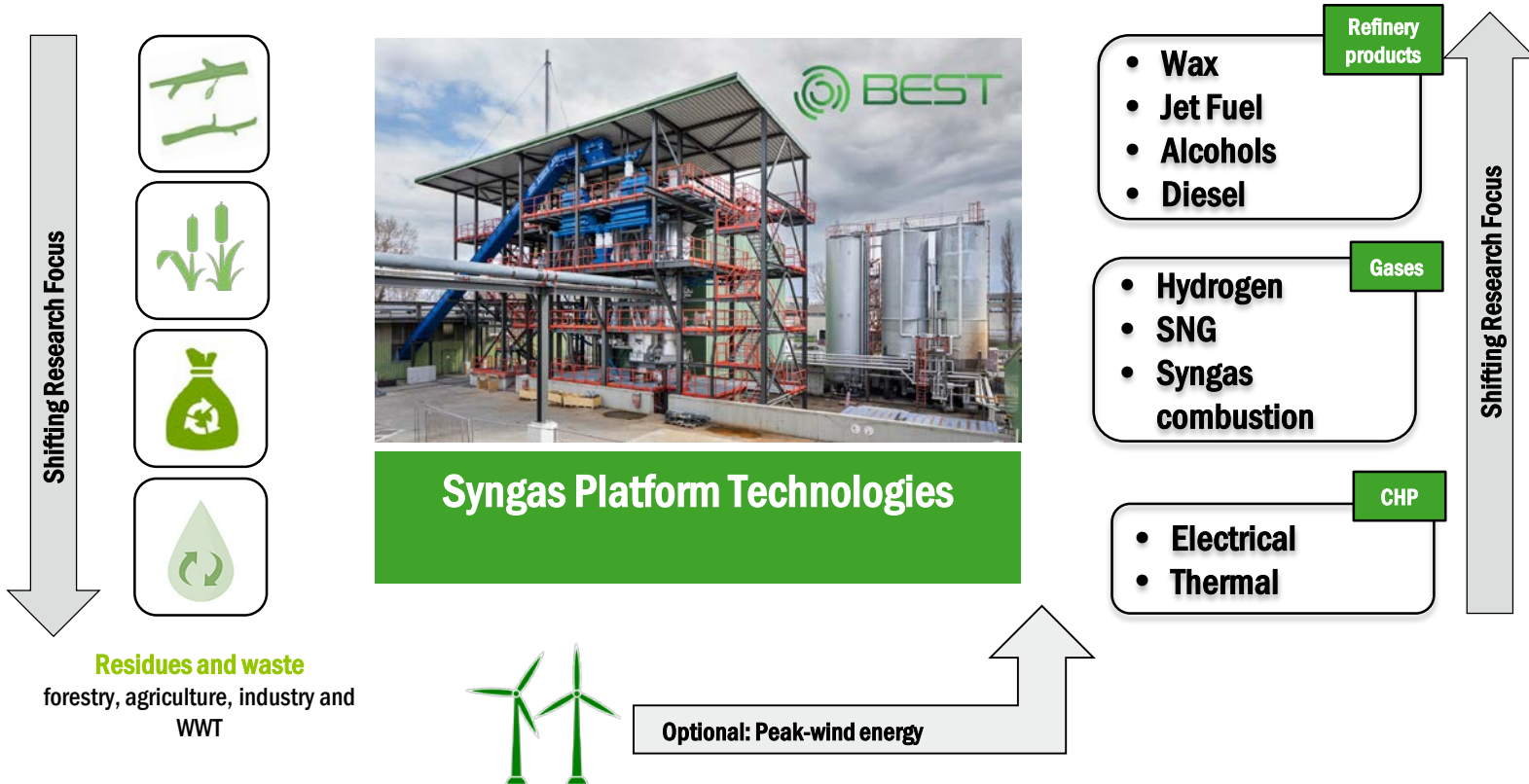


Creating a versatile research location

Part 3



Syngas Platform Vienna



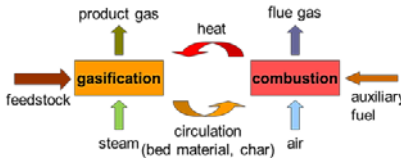
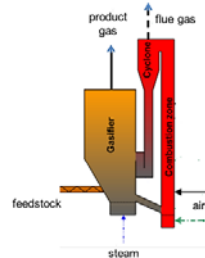
Dual Fluidized Bed – Steam Gasification ...in a nutshell



Technology Overview

Product gas:

H₂: 40-45 %
CO: 20-25 %
CO₂: 20-25 %
CH₄: 10-12 %



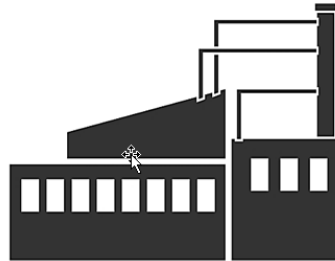
CHP Plants



Value Chain & End Use



**(Bio-)waste,
residues**



Gasification



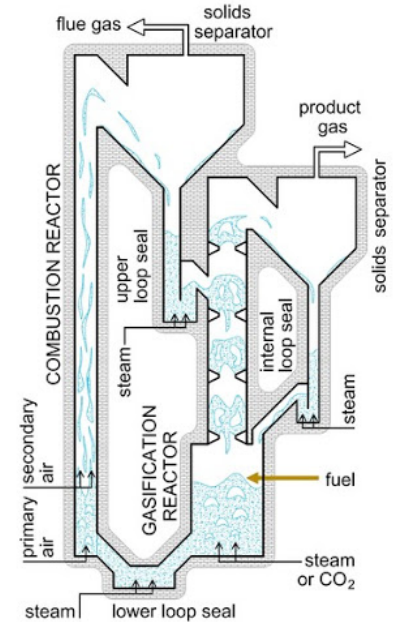
**Gas upgrading
+ synthesis**



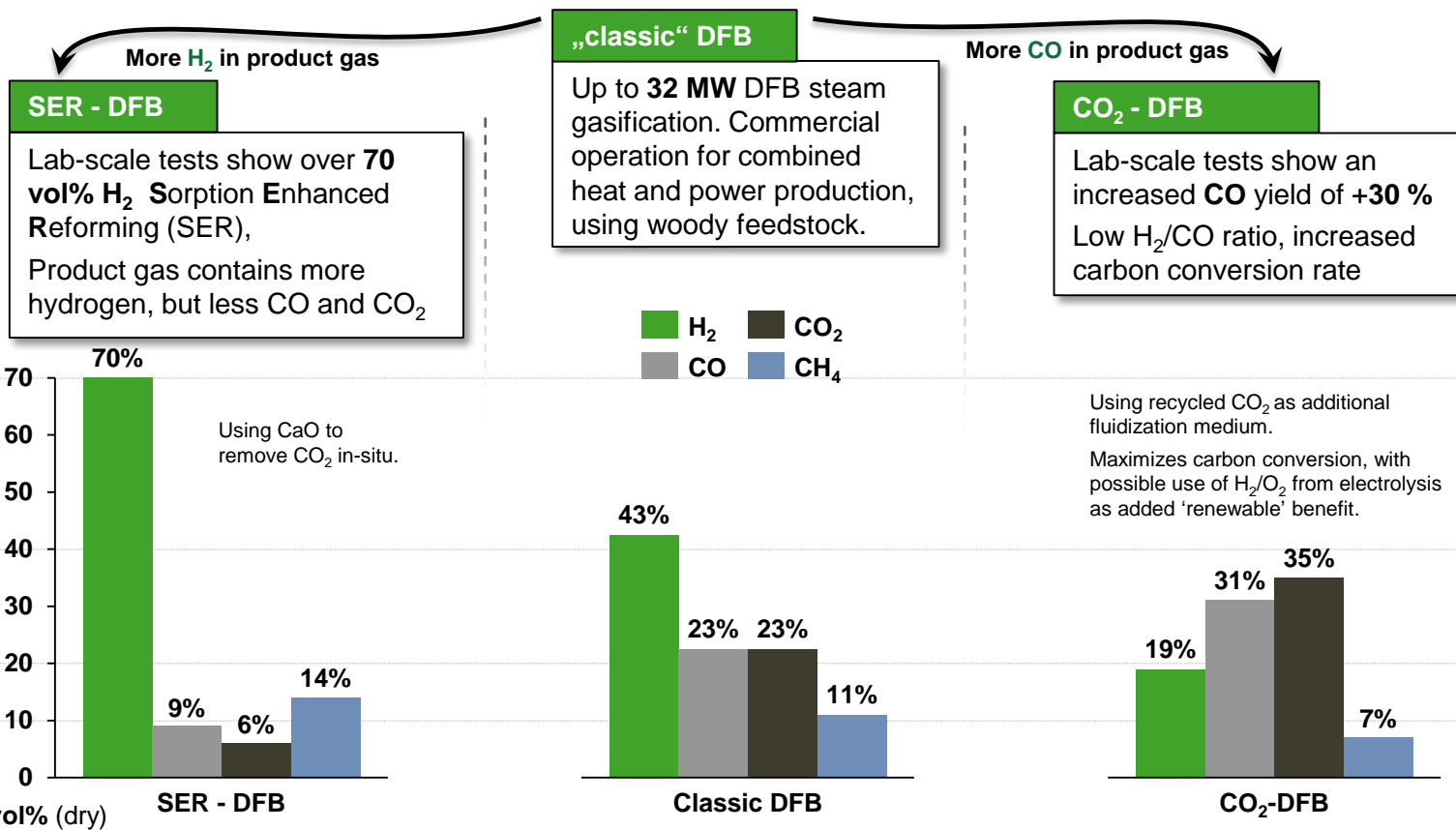
**Valuable
products**



Fuels already tested in 100 kW DFB pilot plant at TU Wien



Versatile operation in DFB system



Fischer-Tropsch synthesis



Goal: complete process chain from gasification to synthesis

First experiment: end of 2022

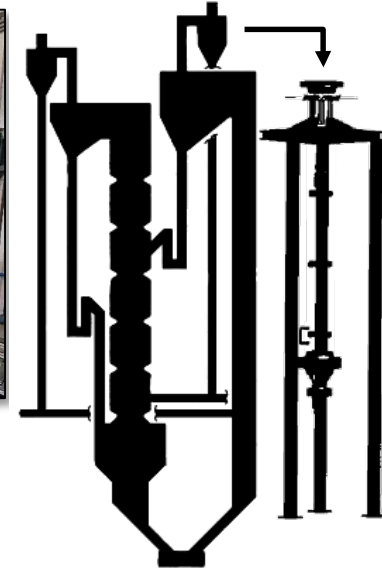


1 MW DFB gasifier



250 kW Fischer-Tropsch synthesis

Experiment: Full process chain

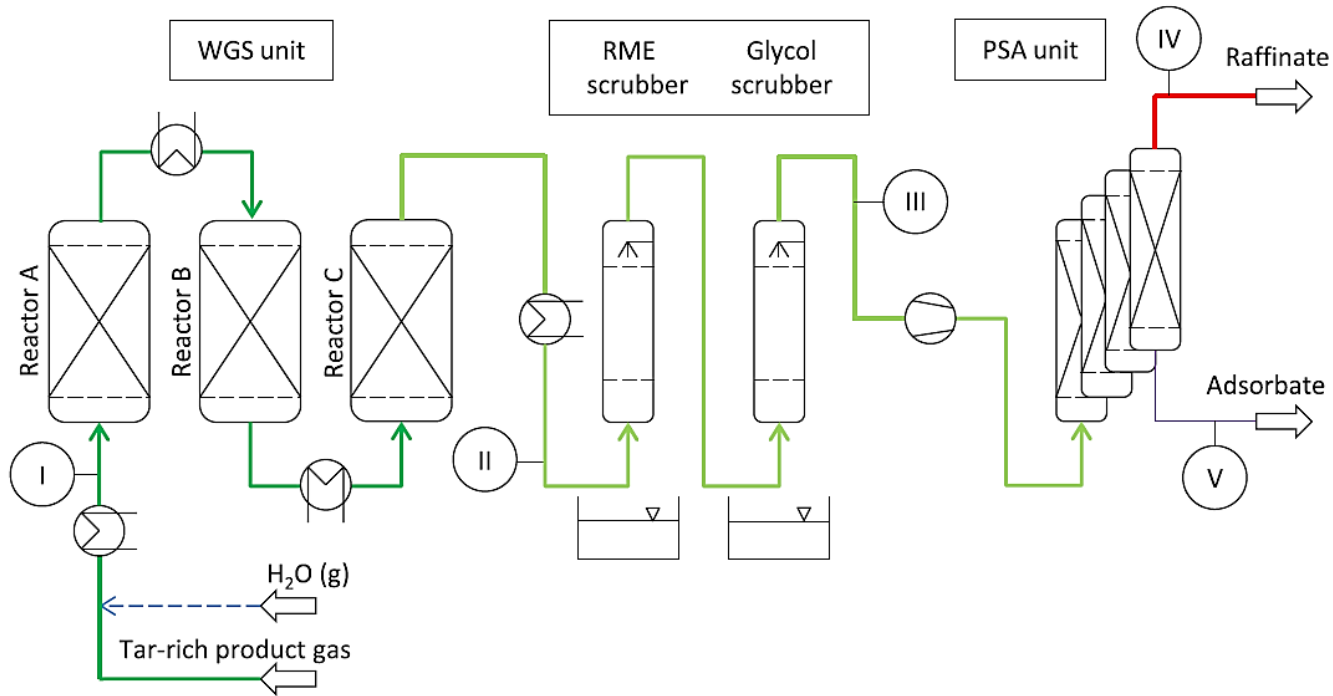


Target	Production of syngas from biomass and waste, ash handling, gas cleaning, operation stability PLUS fine gas cleaning, Fischer-Tropsch synthesis and analysis of syncrude
Scale	1 MW DFB gasification + 250 kW Fischer-Tropsch synthesis
Set-up	Long-term operation to minimize risk in industrial scale
Operation	Campaigns for research operation (3-4 weeks)

H₂ production



Process chain for syngas conversion to hydrogen





Container-size hydrogen process chain

Container for Research Facilities
at the Oberwart CHP Plant



Container-size hydrogen process chain



**Target**

Production of syngas from biomass and waste and downstream synthesis

Scale

1 MW **DUAL FLUID** gasification
250 kW Fischer-Tropsch synthesis

Operation

Campaigns for research operation

Fuel

wood chips, sewage sludge, plastic waste, sorted waste, agricultural residues

The BEST TEAM

