



Collaborative actions to bring novel **BIO**fuels **THE**rmochemical **RO**utes into industrial **S**cale



Bringing thermochemical routes into industrial scale



Demonstration of full process chain at the Syngas Platform Vienna

Gerald Weber, BEST

Nationaler Vernetzungsworkshop "Biokraftstoffe zur Dekarbonisierung des Verkehrs"

06. Juni 2024



The BioTheRoS Project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No. 101122212.

Agenda

▶ BEST

▶ Syngas Plattform Vienna

▶ BioTheRoS

Agenda

BEST

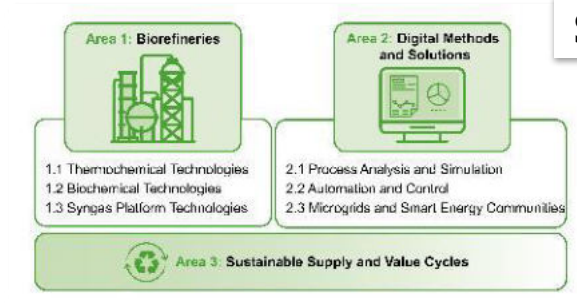
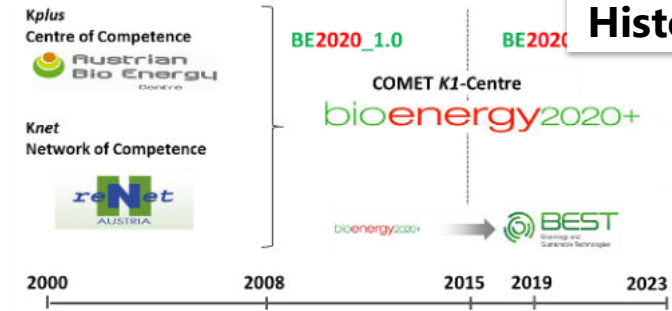
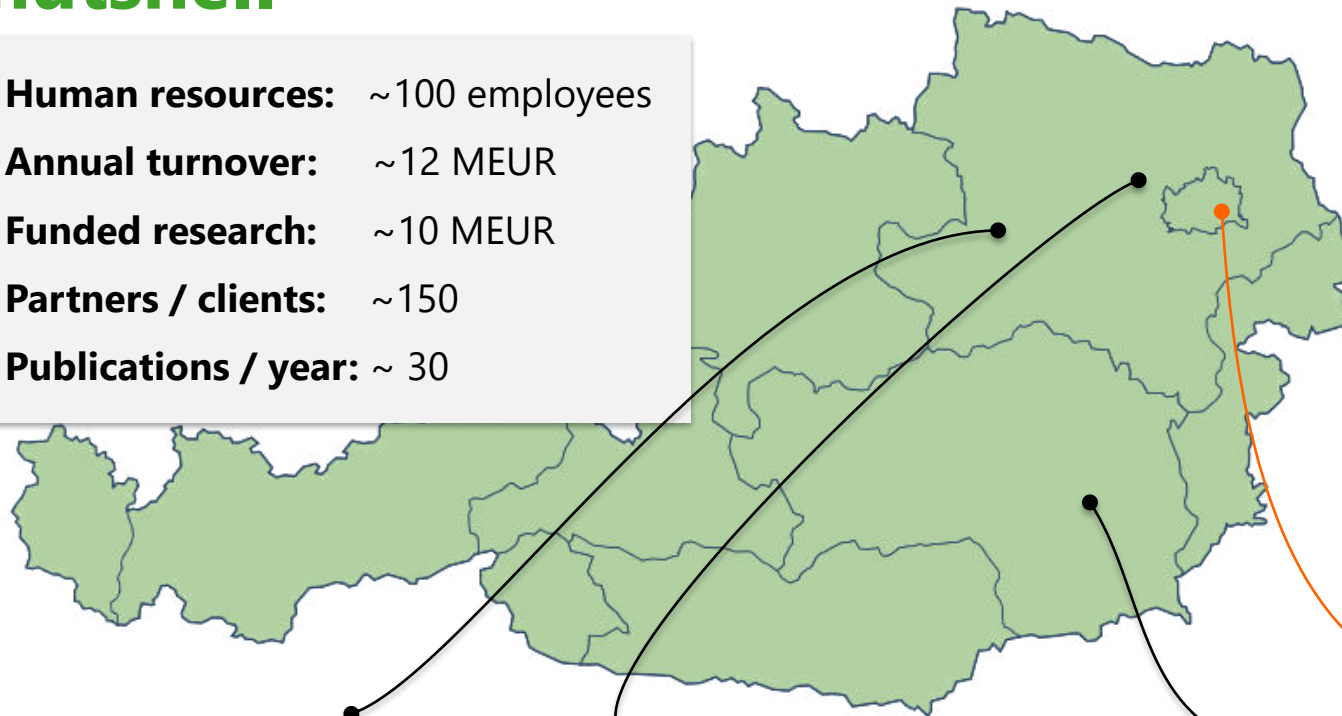
- ▶ Syngas Plattform Vienna
- ▶ BioTheRoS

BEST in a nutshell

Bridging the gap between fundamental research and industrial deployment with RTD services to shape the transition to a sustainable and climate friendly bioeconomy



Human resources: ~100 employees
Annual turnover: ~12 MEUR
Funded research: ~10 MEUR
Partners / clients: ~150
Publications / year: ~ 30



Vienna

Wieselburg, Lower Austria



Tulln, Lower Austria



Graz, HQ, Styria



Agenda

▶ BEST

Syngas Platform Vienna

▶ BioTheRoS



SYNGAS PLATFORM VIENNA

A **research hub** featuring a Waste2Value process chain: 1 MW **DFB gasification** + 250 kW **Fischer-Tropsch** synthesis demo

A connected **laboratory** supplied **with real syngas** for gas cleaning and upgrading

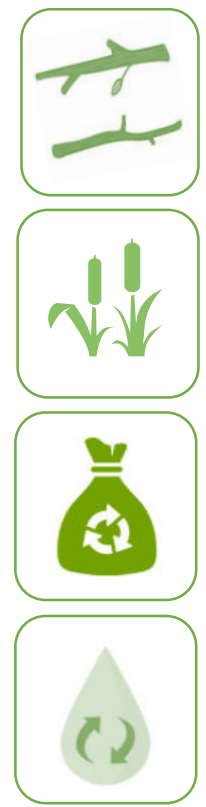
Syngas Platform Vienna





Technologies Process Overview

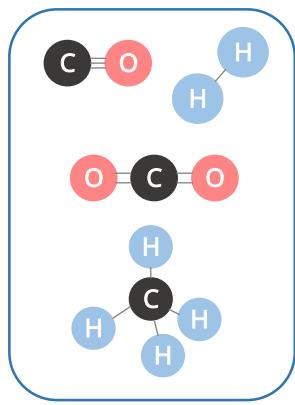
Residues
forestry,
agriculture,
industry
and WWT



**DUAL FLUID
Gasification**



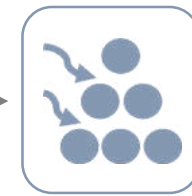
Product gas



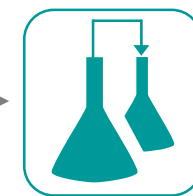
Coarse gas
cleaning



Fine gas
cleaning to
obtain
H₂-rich
synthesis gas



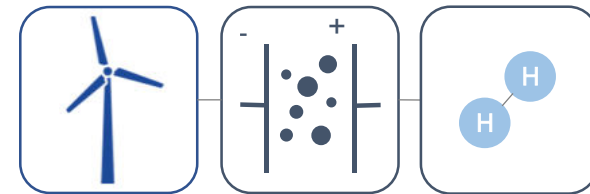
Downstream
synthesis



**Sustainable
(bio)refinery
products -
SNG, H₂
transportation fuels,
chemicals,...**



Possible sector
coupling with
external H₂

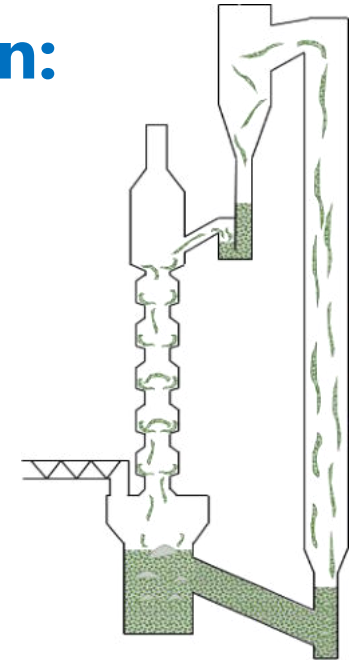


Syngas Platform Vienna: experimental equipment



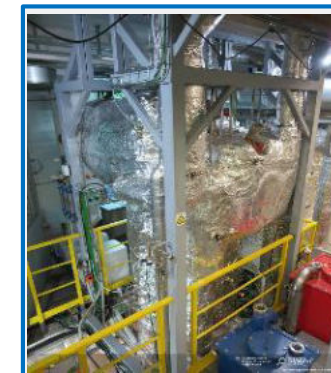
Dual fluidized bed (DFB) gasification:

- 1 MW demonstration-scale plant for long-term campaigns of multiple weeks continuous operation
- Advanced DFB gasification (aDFB) reactor design upscaled from 100 kW



Typical syngas composition

H ₂	CO	CO ₂	CH ₄	C ₂ H ₄
41%	24%	23%	10%	



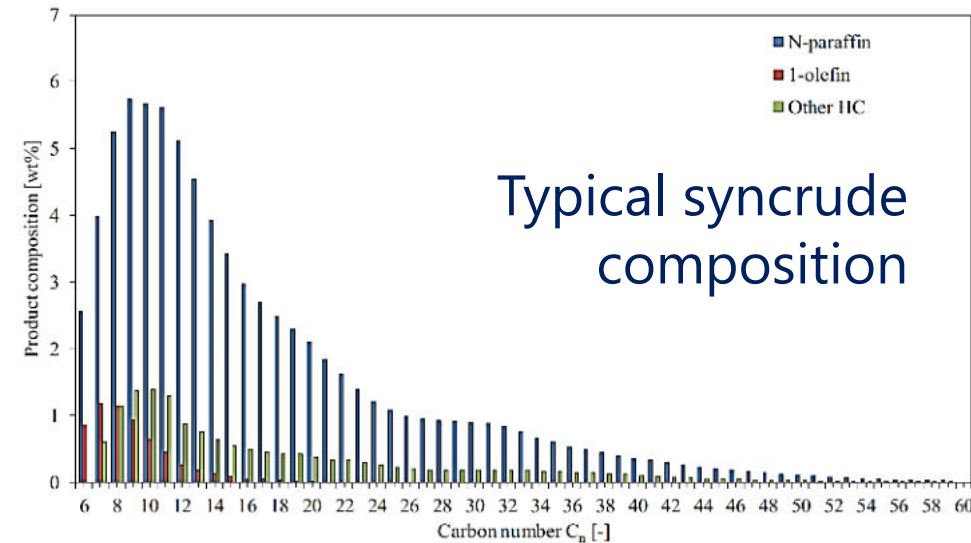
Based on a
100 kW DFB
plant
at TU Wien

Syngas Platform Vienna: experimental equipment



Slurry-Bubble-Column-Reactor (SBCR):

- 250 kW pilot-scale Fischer-Tropsch plant for long-term campaigns of multiple weeks continuous operation
- Gas cleaning includes hot filtration, a quench, solvent scrubbers, activated carbon filters and ZnO filters



Agenda

▶ BEST

▶ Syngas Plattform Vienna

BioTheRoS



BioTheRoS - At a glance

Collaborative actions to bring novel **BIO**fuels **THE**rmochemical **RO**utes into industrial Scale

Coordinator

CERTH
CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

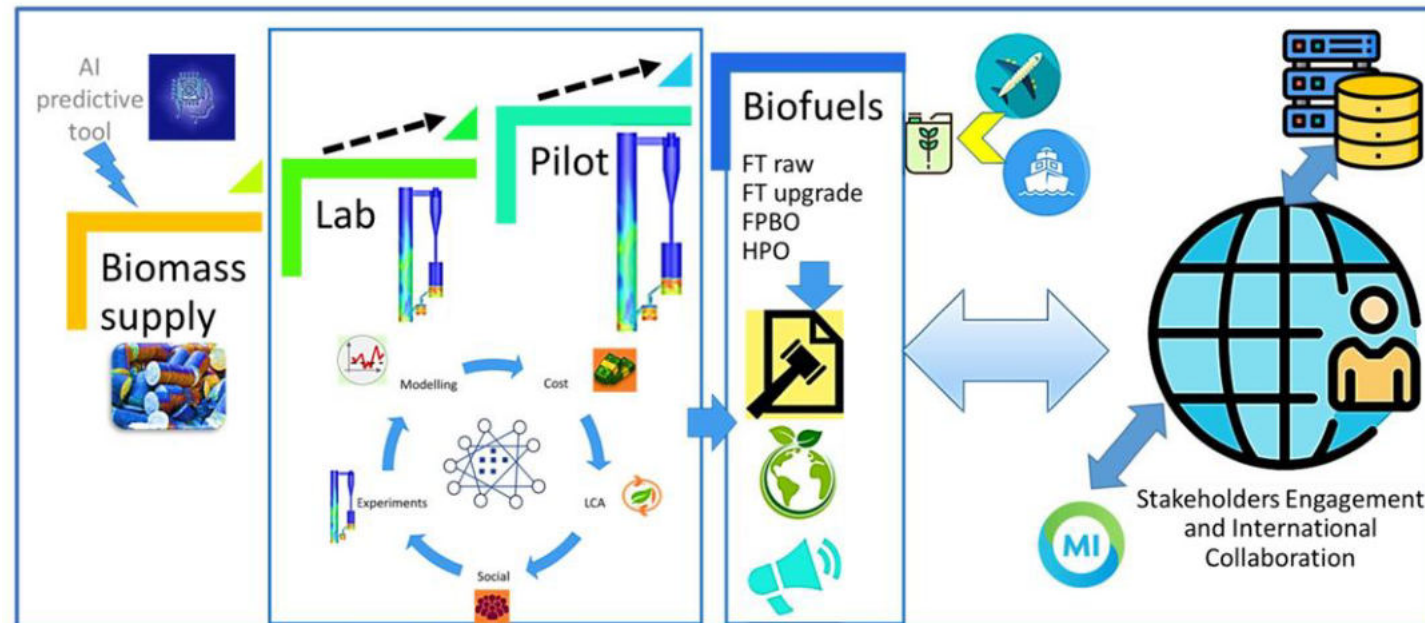
circe

btg
biomass technology group

BEST
Bioenergy and Sustainable Technologies

WIP RENEWABLE ENERGIES

MOTOR OIL

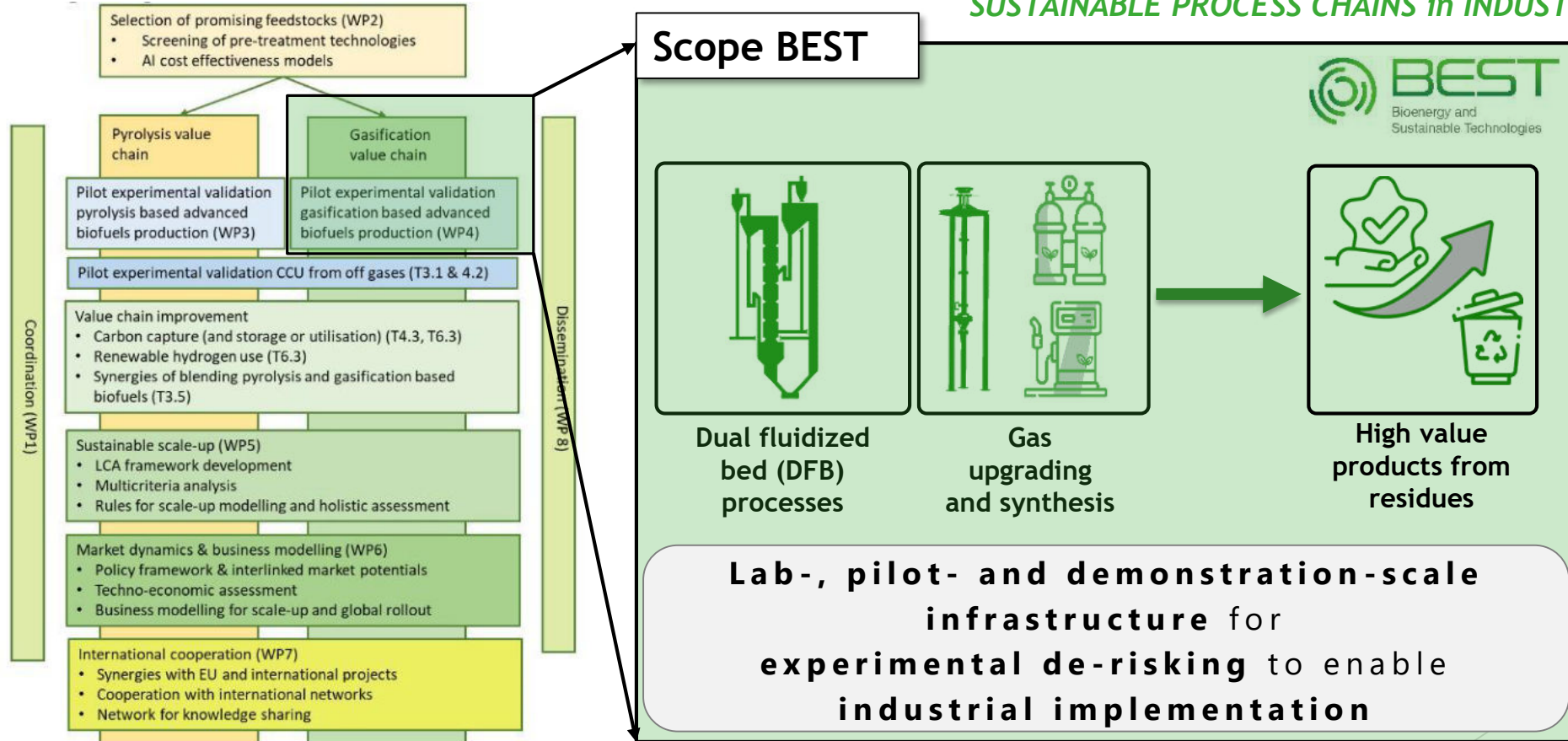




BioTheRoS - At a glance

Collaborative actions to bring novel **BIO**fuels **THE**rmochemical **RO**utes into industrial Scale

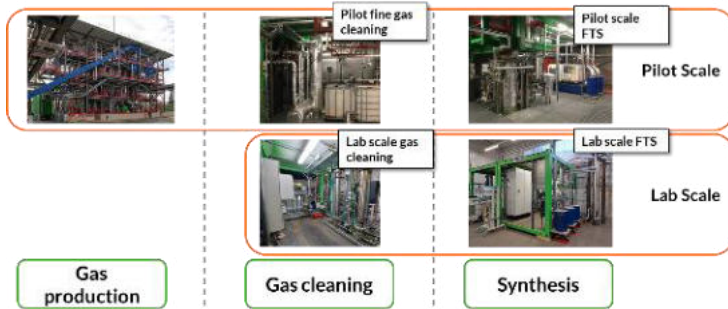
*TECHNOLOGY DEVELOPMENT enabling
SUSTAINABLE PROCESS CHAINS in INDUSTRIES*





BioTheRoS - Gasification value chain

Collaborative actions to bring novel **BIO**fuels **THE**rmochemical **RO**utes into industrial Scale



Main activities



- Gasification of biogenic waste feedstock
- Screening on gas impurities and gas cleaning strategies
- Operation of full process chain and production of FT raw product



Main activities



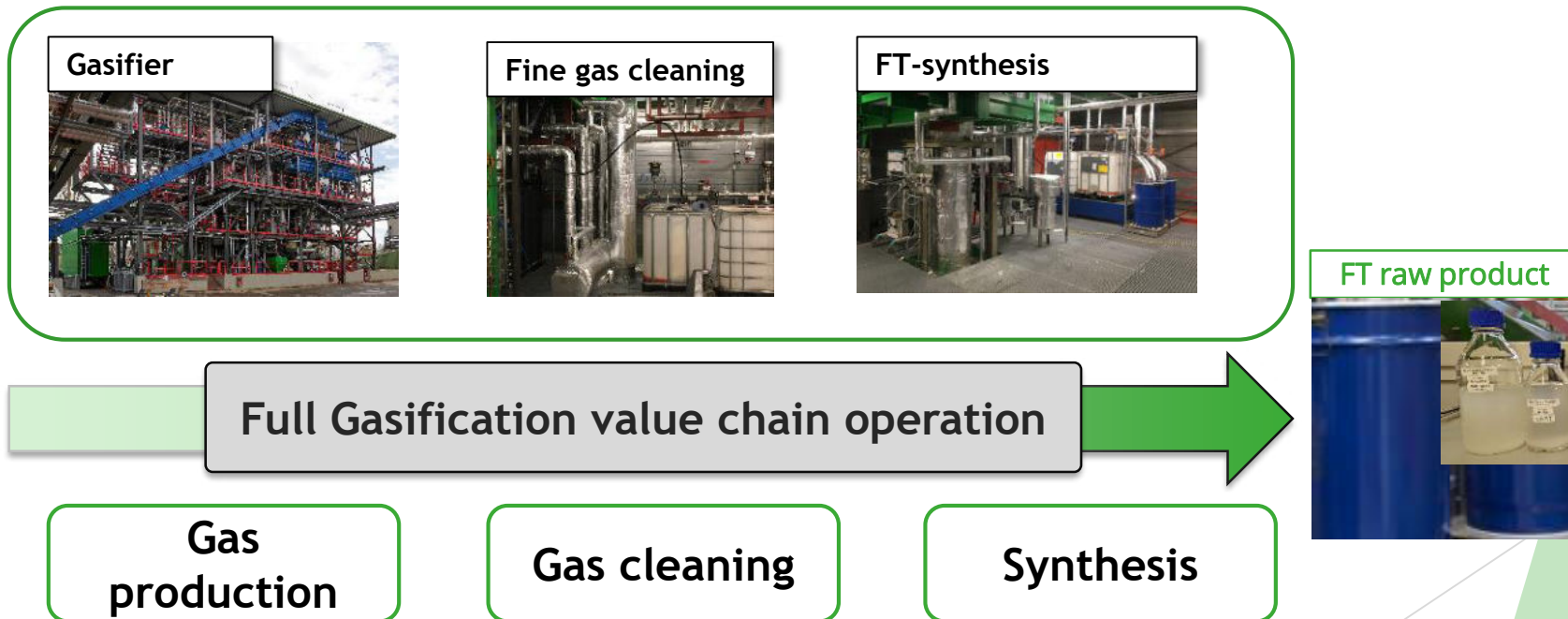
- Hydrocracking of FT raw product
- Integration of carbon capture technology into thermochemical processes
- Simulation and modelling for scale-up of gasification process



BioTheRoS - Gasification value chain

Collaborative actions to bring novel BIOfuels THERmochemical ROUTes into industrial Scale

Identification of operational boundaries through lab/pilot tests





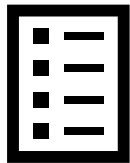
BioTheRoS - Summary

Collaborative actions to bring novel **BIO**fuels **THE**rmochemical **RO**utes into industrial Scale



Aim:

Investigation of biogenic waste feedstocks for gasification value chain for the production of advanced biofuels



Work:

- ▶ **Full process chain demonstration using biogenic waste feedstock at the Syngas Platform Vienna**
 1. Investigation on gas cleaning strategies and characterization of gas impurities
 2. Production of FT raw products
 3. Production of SAF from FT raw products



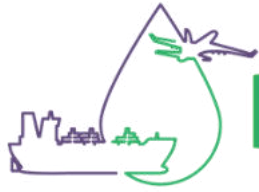
BioTheRoS - Summary

Collaborative actions to bring novel **BIO**fuels **THE**rmochemical **RO**utes into industrial Scale



Outcome:

- ▶ Approved usage of waste feedstock to improve economics
- ▶ Operational knowledge on the usage of biogenic waste feedstocks (e.g. feedstock supply,..)
- ▶ Knowledge on increased impurities amount on gas cleaning
- ▶ Investigations on the further scale-up
- ▶ Valuable input for techno-economic (TEA) and life cycle analysis (LCA)



BioTheRoS - Outlook

Collaborative actions to bring novel **BIO**fuels **THE**rmochemical **RO**utes into industrial Scale

*BioTheRoS will develop best practices and concepts along the entire value chain for accelerating **the scaleup of sustainable biofuels worldwide.***

ANNOUNCEMENT:

Expert workshop at Syngas Platform Vienna

Spring 2025

Date to be defined



Thank you!



Matthias Binder

Lead expert

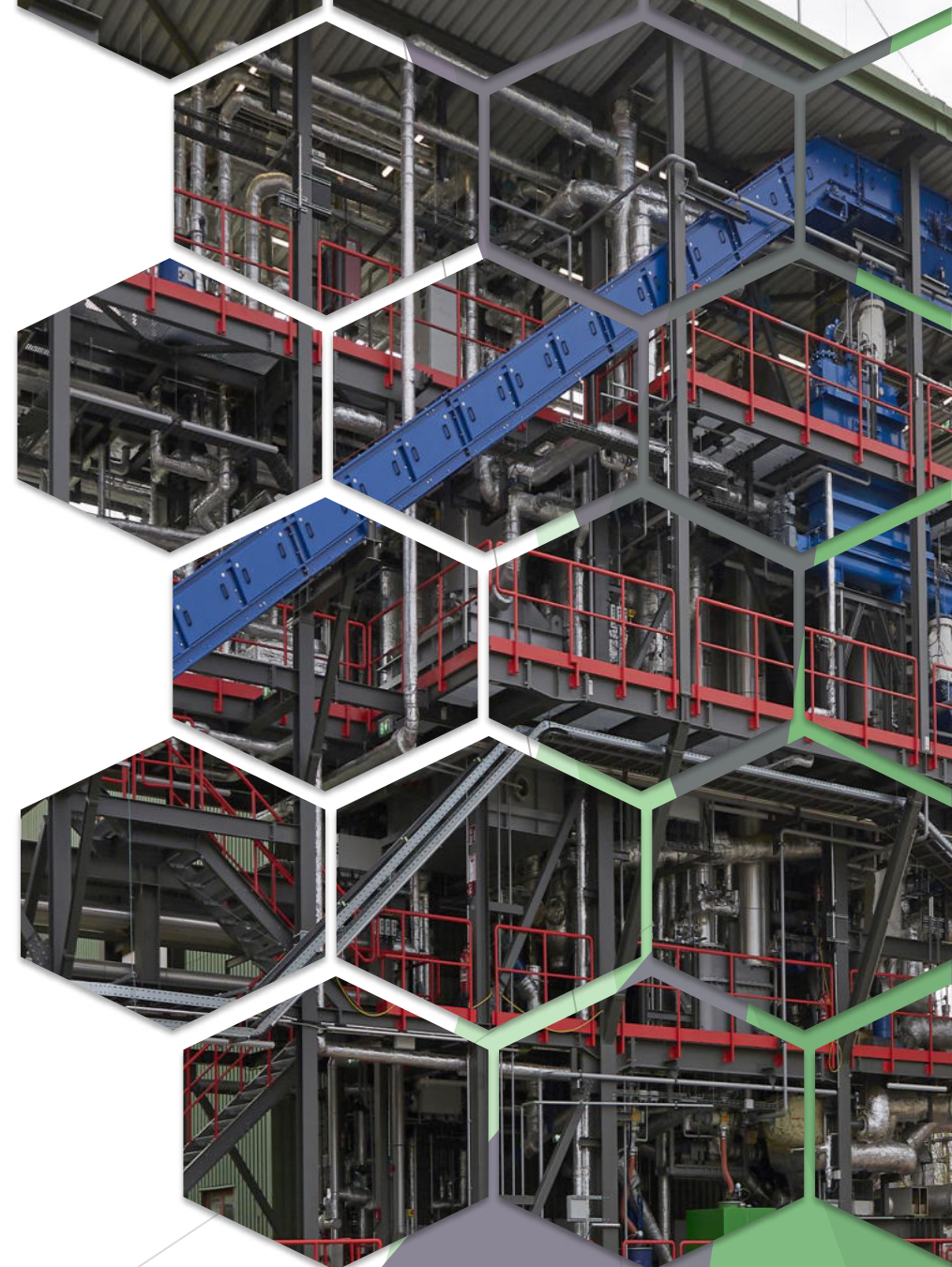
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<https://www.biotheros.eu/de/startseite/>



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