




BEST

Bioenergy and
Sustainable Technologies



 Bundesministerium
Digitalisierung und
Wirtschaftsstandort

 Bundesministerium
Klimaschutz, Umwelt,
Energie, Mobilität,
Innovation und Technologie



 Für die
Stadt Wien





Syngas as a core building block for C-based industries

The Syngas Platform Vienna

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

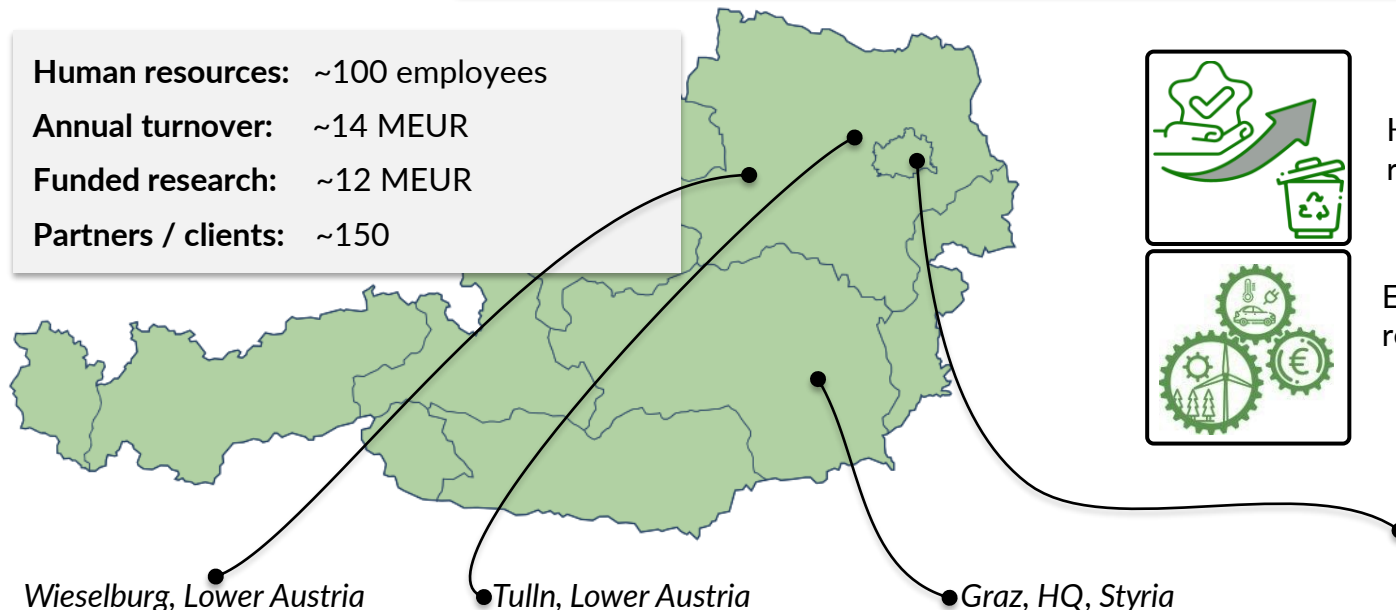


Human resources: ~100 employees

Annual turnover: ~14 MEUR

Funded research: ~12 MEUR

Partners / clients: ~150



Wieselburg, Lower Austria



Tulln, Lower Austria



Graz, HQ, Styria



High value products from residues and waste



Economic and efficient renewable energy systems



Vienna

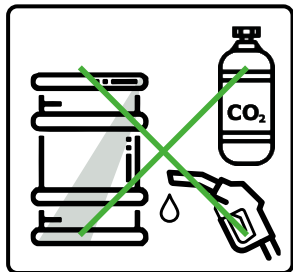




SHAPING the TRANSITION to a SUSTAINABLE and CLIMATE FRIENDLY BIOECONOMY

Strategic fields of action

(from the Centre's Strategic Roadmap)



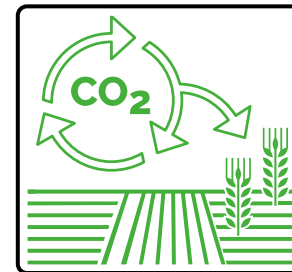
fossil carbon free
heat, power, gas
and transportation
fuels



low value feedstock
to high value
products



economic and
efficient renewable
energy systems



CO₂-negative
technologies



Digitalization as enabling technology for competitiveness



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

Supported by **advanced automation** as well **model- and simulation-based scale up**



Research Location: Syngas Platform Vienna

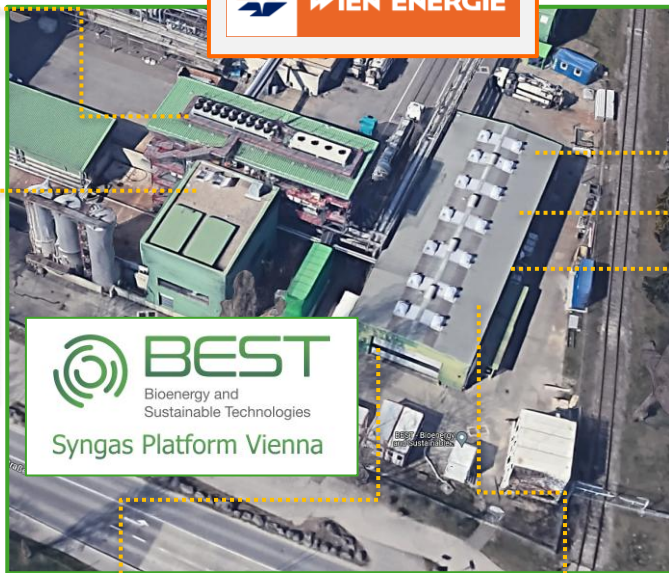
(~15 minutes from airport)



Syngas Platform Vienna



DFB Gasification demo



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Fischer-Tropsch pilot



Fischer-Tropsch



Aqueous phase reforming



Feedstock containers



Analytics lab



T-swing adsorption

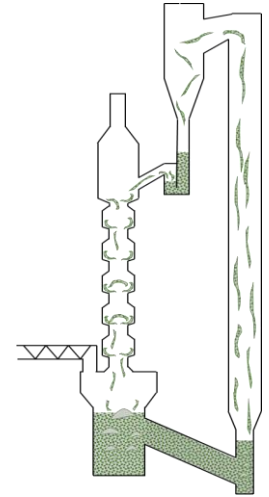
Syngas Platform Vienna: experimental equipment



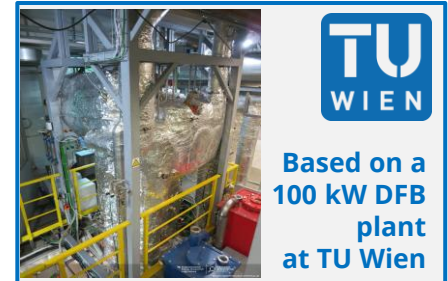
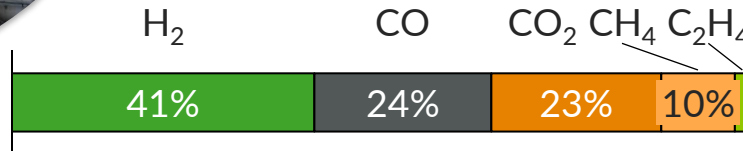
Dual fluidized bed (DFB) gasification:

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

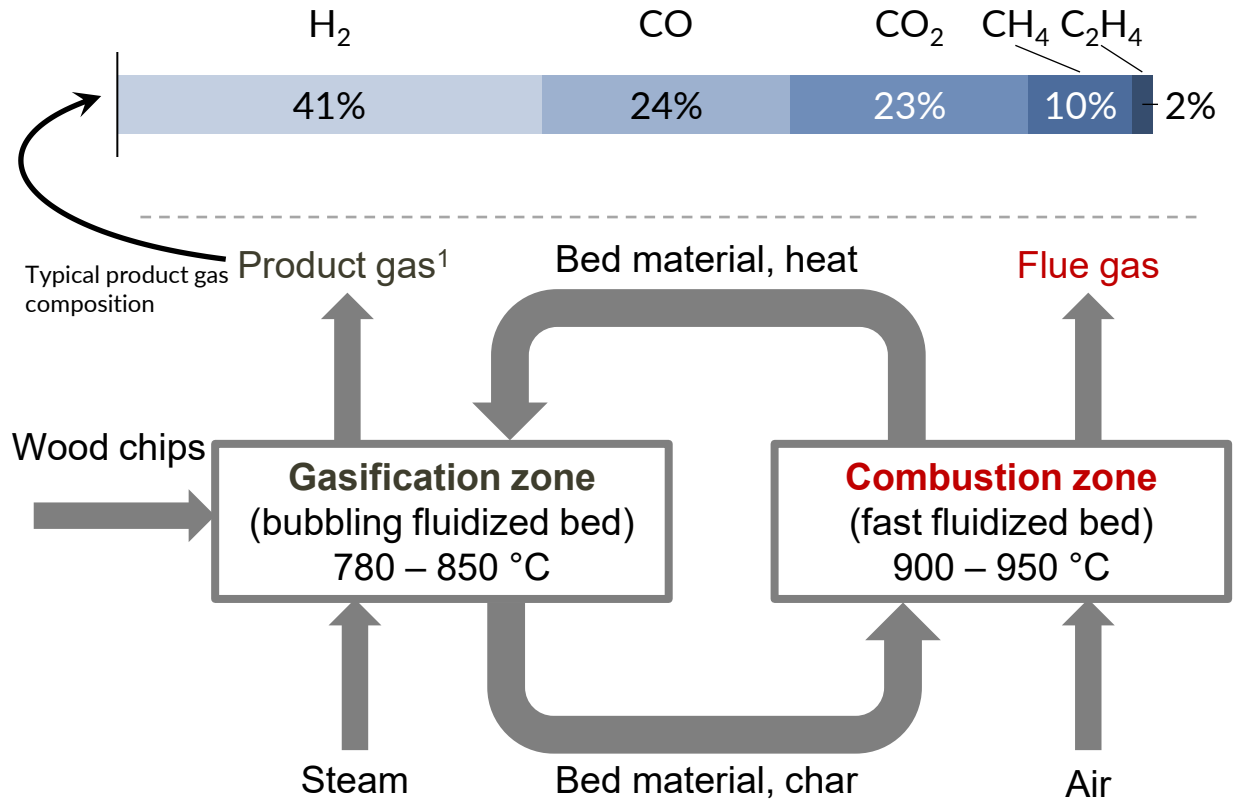


Dual fluidized bed (DFB) steam gasification



Biomass / waste is converted into mostly hydrogen and carbon monoxide – a so-called **synthesis gas** (or product gas) via **Dual Fluidized Bed Steam Gasification (DFB-SG)**.

Synthesis gas is the starting point for a number of downstream conversion processes, like H_2 or SNG production.

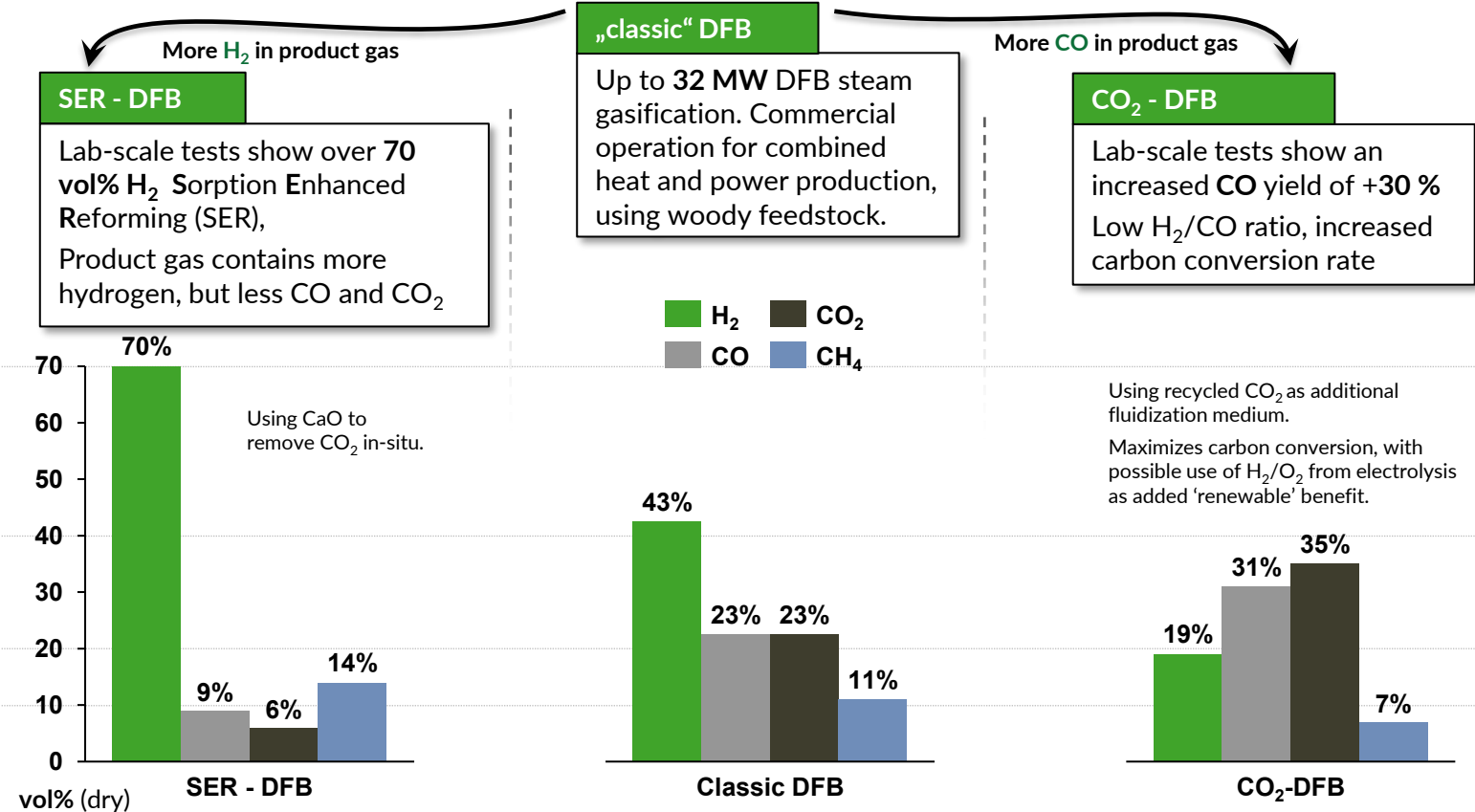


¹ Tar (incl. BTEX): 20-30g/m³, H₂S ~100 ppm for biomass fuel before any gas cleaning for downstream processing



Technologies :: Gasification

Versatile operation in DFB system



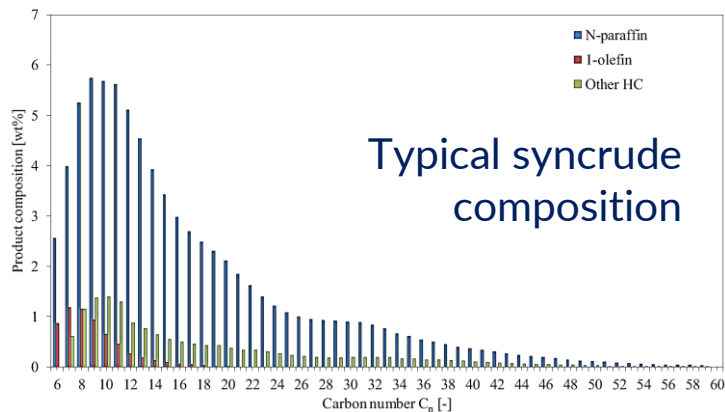
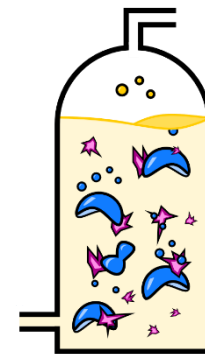
Syngas Platform Vienna: experimental equipment



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



Syngas Platform Vienna: experimental equipment



Test-rigs for gas cleaning and upgrading

Lab-scale Fischer-Tropsch
Aqueous phase reforming
Temperature swing adsorption
Syngas storage system
Syngas fermentation (planned)
...and more to come...



All lab-scale test-rigs can be supplied with real product gas from the 1 MW DFB gasification demo-plant!

Syngas Platform Vienna: experimental equipment



Analytics and sample preparation:

On-site laboratory
Online-GC- measurements
Sample preparation
etc.



Interdisciplinary cooperation

Additionally, BEST has an internal laboratory for measurements of tar and inorganic components



https://www.best-research.eu/en/infrastructure/technical_equipment



A NEW GENERATION OF DFB GASIFICATION

Based on over 150,000 hours of industrial-scale operation from the 1st generation of DFB gasification plants, the 2nd generation is currently being upscaled and tested for long-term stability

A transition from combined heat and power (CHP) to **Waste2Value (W2V)**

Demonstration and industrial reference projects based on DFB steam gasification from 2002 – 2022: woody biomass



1st gen
CHP



8 MW
Güssing

1st gen
CHP



8.5 MW
Oberwart

1st gen
CHP



14 MW
Villach

1st gen
CHP



15 MW
Senden/Ui
m

32 MW
GoBiGas



3.8 MW Nong Bua
(Thailand)



0.5 MW
GAYA /
Engie



1 MW
Syngas Platform Vienna



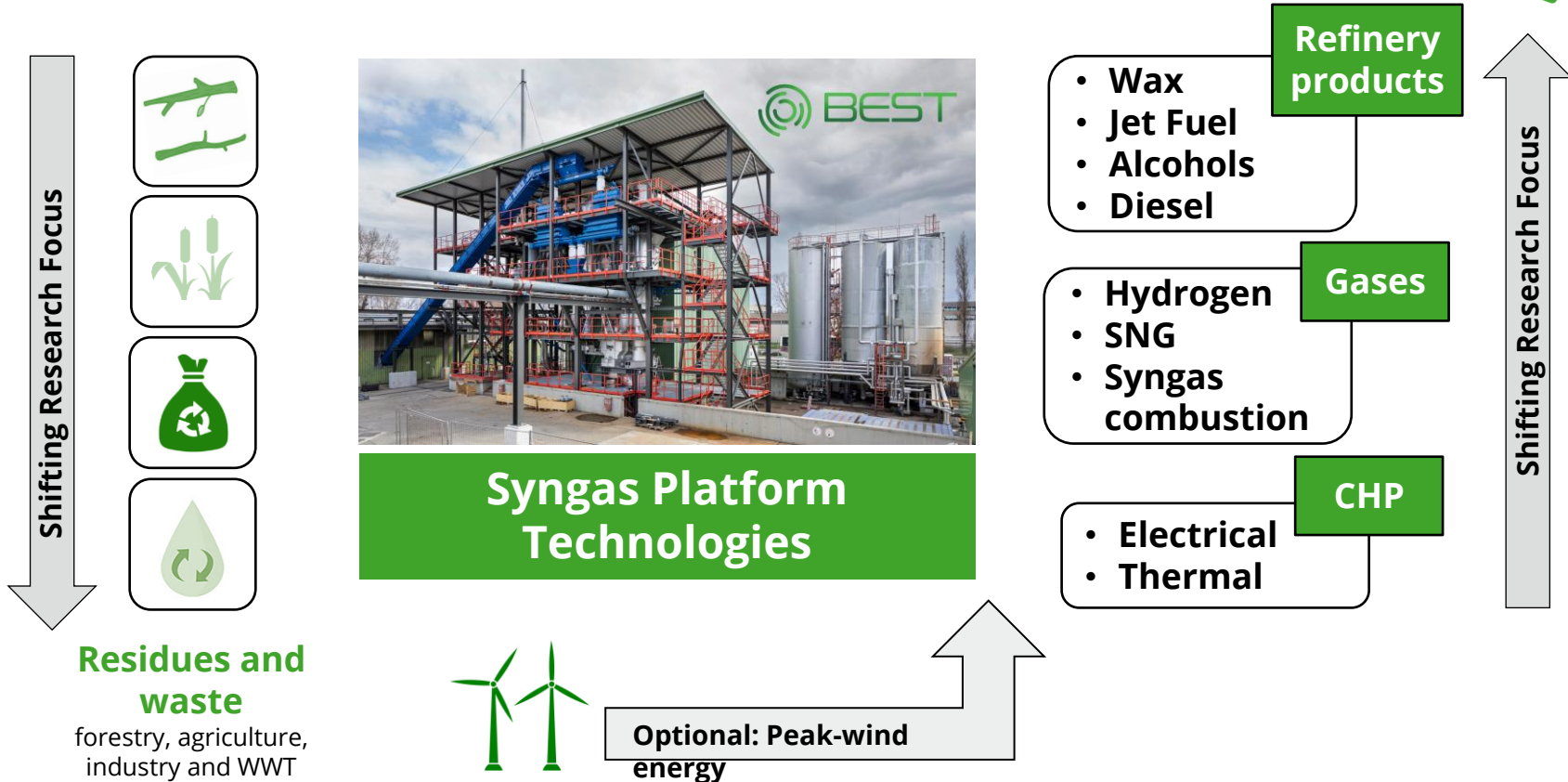
1st gen
bioSNG

1st gen
CHP

Adapted 1st gen
bioSNG

2nd gen
Fischer-Tropsch

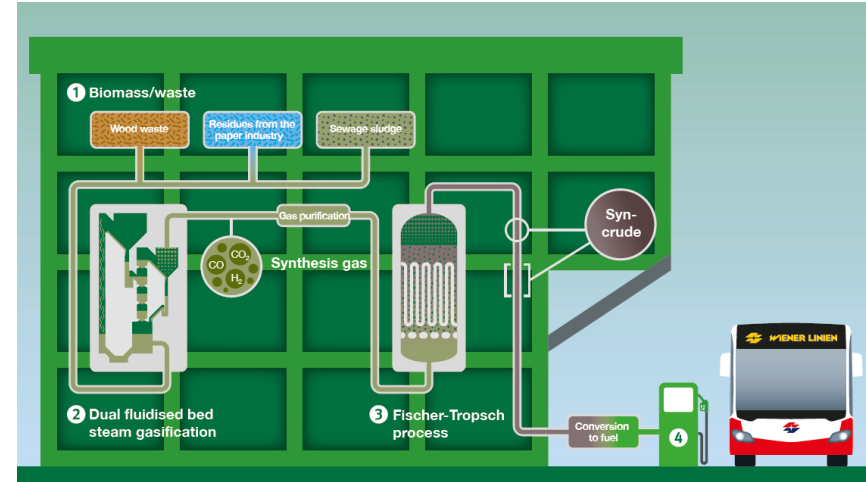
Shifting research focus in 2nd generation DFB



Reference 1: Fuel for Vienna's public transport busses



- Feedstock: woody biomass
- Production of syncrude at **BEST**
- Logistics and operation support by **Wien Energie**
- Upgrading of syncrude by **OMV** (refinery)
- Test of fuel blends in public transport bus on test-stand by **Wiener Linien**



Media echo:



Reference 2: Sustainable aviation fuel for Indonesia



- Feedstock: coconut shells
- Production of syncrude at **BEST**
- Logistics and operation support by **Wien Energie**
- Further analysis of syncrude by **Pertamina** (refinery)
- Upgrading of syncrude to SAF by **KIT Karlsruhe**
- Prefeasibility study for large-scale coconut-to-fuel plant in Indonesia



Media echo:



Reference 3: Chemical recycling for automotive industry



- Feedstock: automotive shredder residues
- Production of syncrude at **BEST**
- Upgrading of syncrude into intermediate by **BASF SE**
- Conversion of intermediate into car parts (steering wheels)
- Full circular economy demo



Media echo:



A team with hands-on experience



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