

HTW-Gasification



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From SRF to Methanol - HTW-gasification in a 0.5 MWth pilot plant with downstream gas treatment and synthesis

Eric Langner, Jens Kaltenmorgen, C. Heinze, J. Ströhle, B. Eppe 27.04.2022



**Energy Systems &
Technology**
Prof. Dr.-Ing. B. Eppe
www.est.tu-darmstadt.de



Motivation

1

1

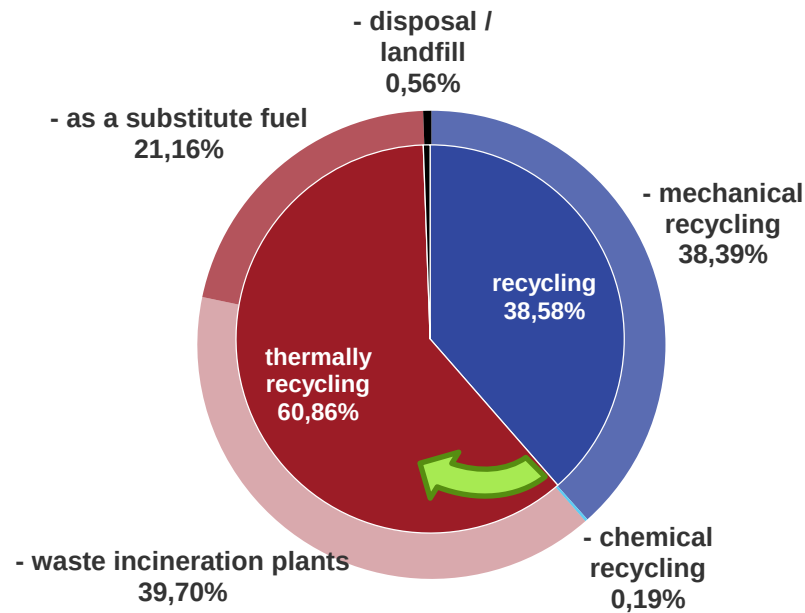
Gasification LIG2LIQ Motivation



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Post-Consumer plastic waste in Germany 2019



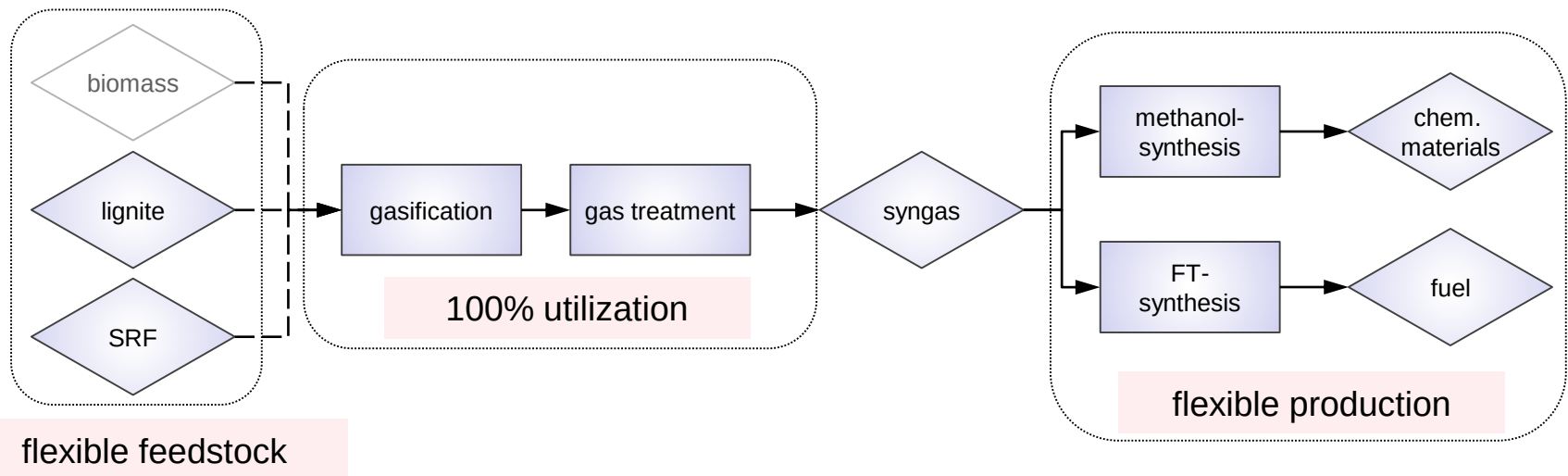
<https://www.nabu.de/umwelt-und-ressourcen/abfall-und-recycling/recycling/27543.html>



Process Overview

2

- Development of flexible plant utilization



- Entire process chain is demonstrated at pilot scale !

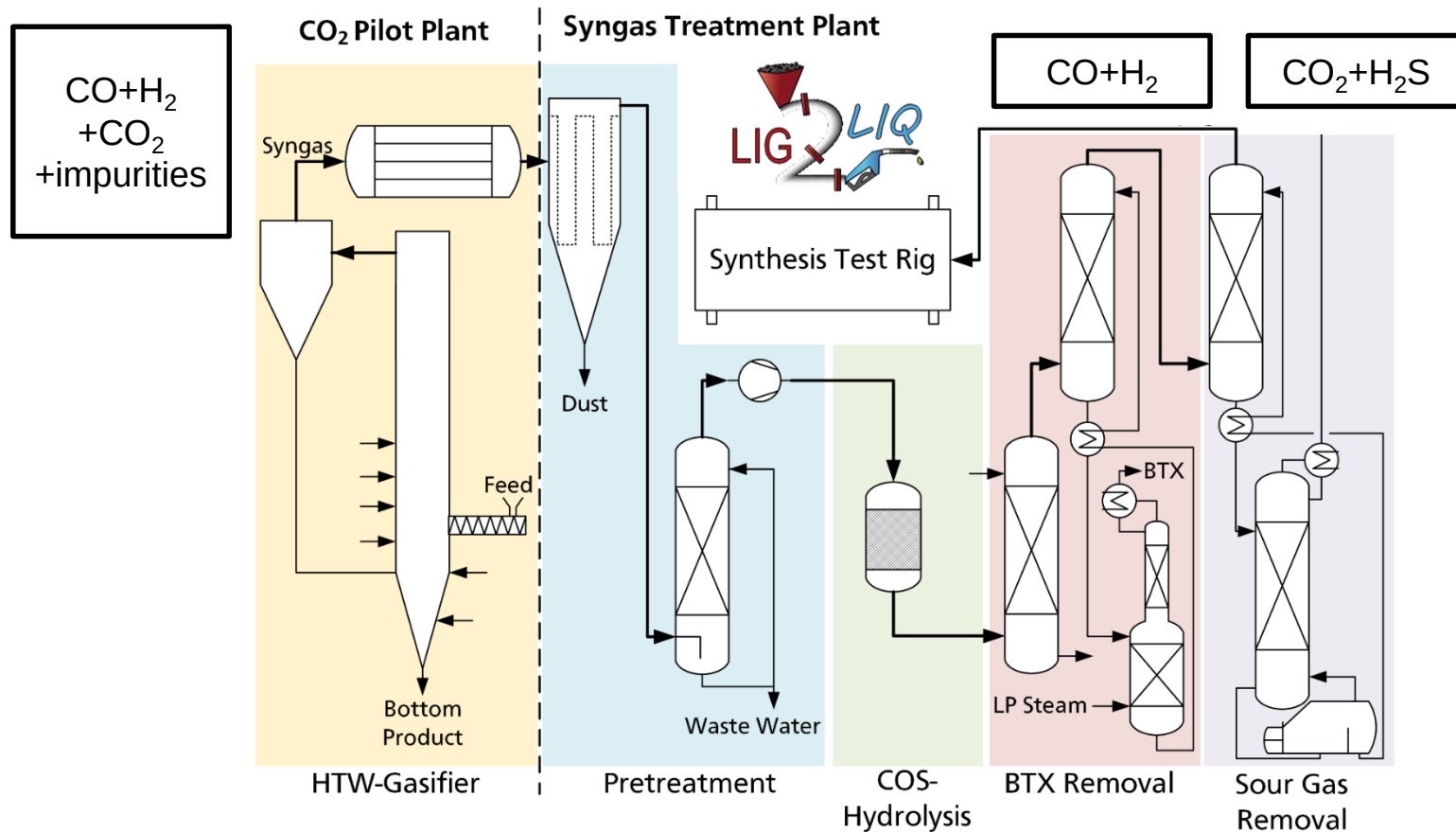
$0.5 \text{ MW}_{\text{th}} \rightarrow \text{ca. } 70\text{-}80 \text{ kg/h feedstock} \rightarrow 200 \text{ m}^3/\text{h syngas} \rightarrow \text{Catalyst test rig}$

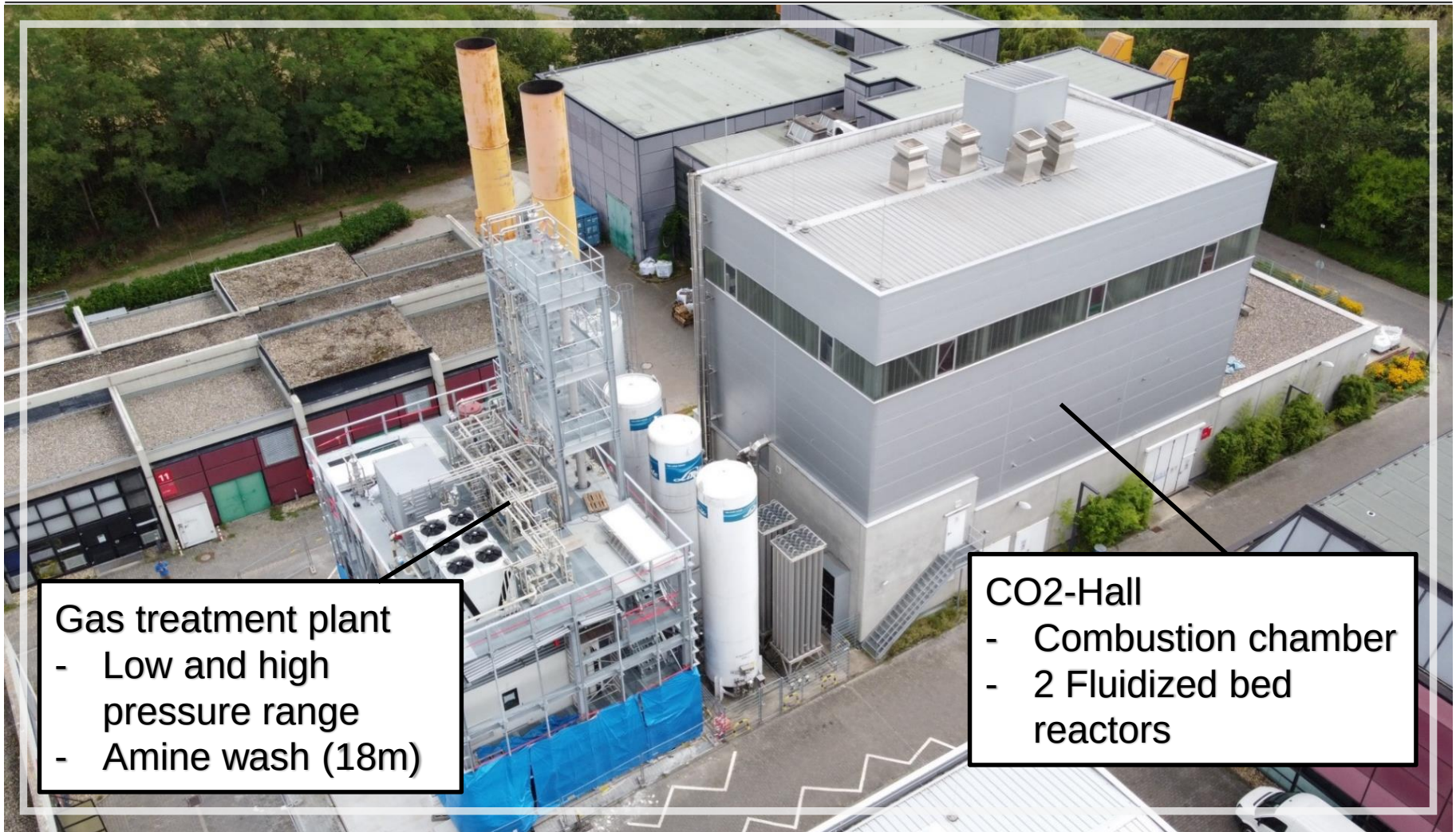
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Gasification LIG2LIQ Gas treatment plant



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Gas treatment plant

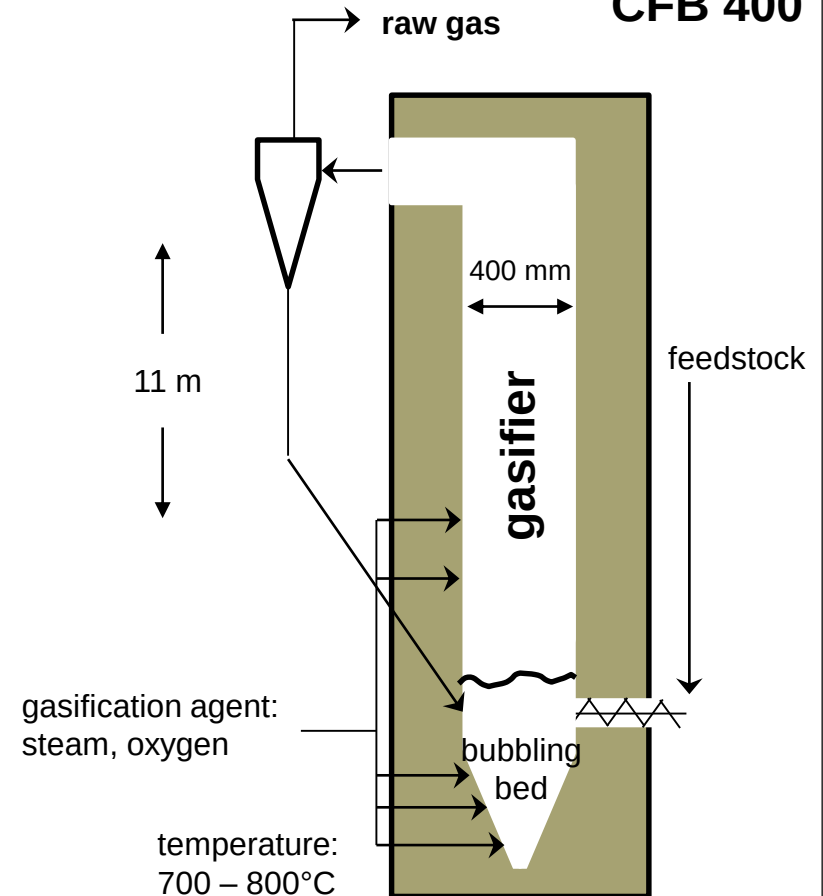
- Low and high pressure range
- Amine wash (18m)

CO₂-Hall

- Combustion chamber
- 2 Fluidized bed reactors

Gasification LIG2LIQ

0,5 MW_{th} HTW - gasification

CFB 400**CFB 400**

Gasification LIG2LIQ

0,5 MW_{th} HTW - gasification

CFB 400



Free board

No particles (dust load)

1. Creaking higher hydrocarbons (pyrolysis products)
2. Methane reforming
→ increase syngas quality

Temperature: > ash softening point
(up to 950°C)

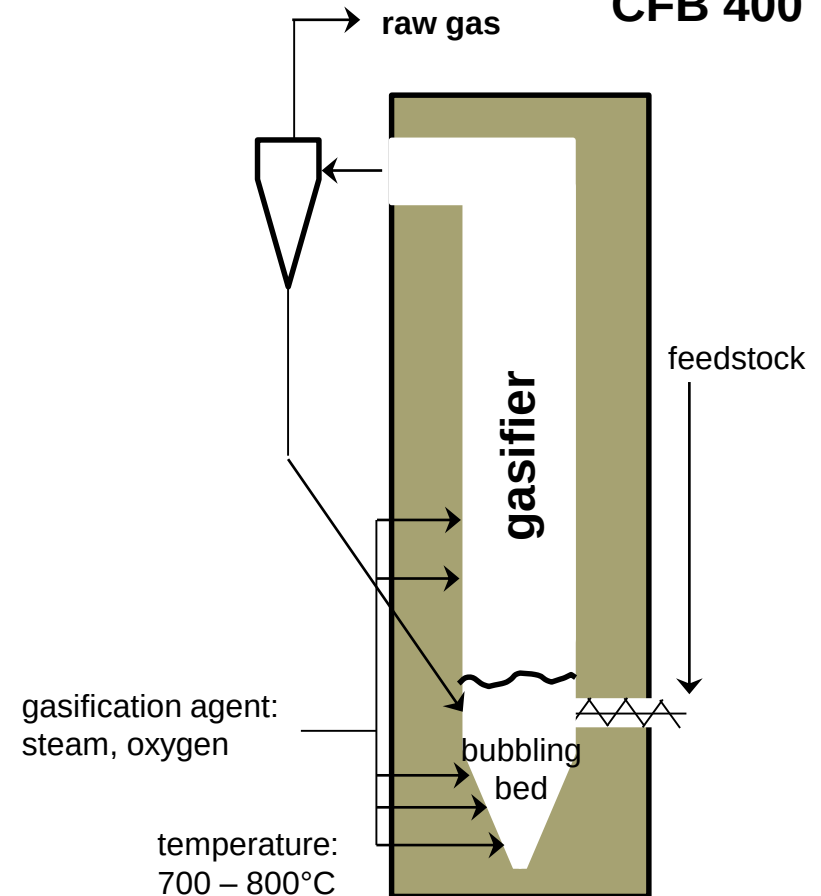
Dense phase

Fluidization: bubbling bed

1. pyrolysis of volatiles
2. conversion of fixed carbon

Temperature: < ash softening point
(~750°C)

CFB 400



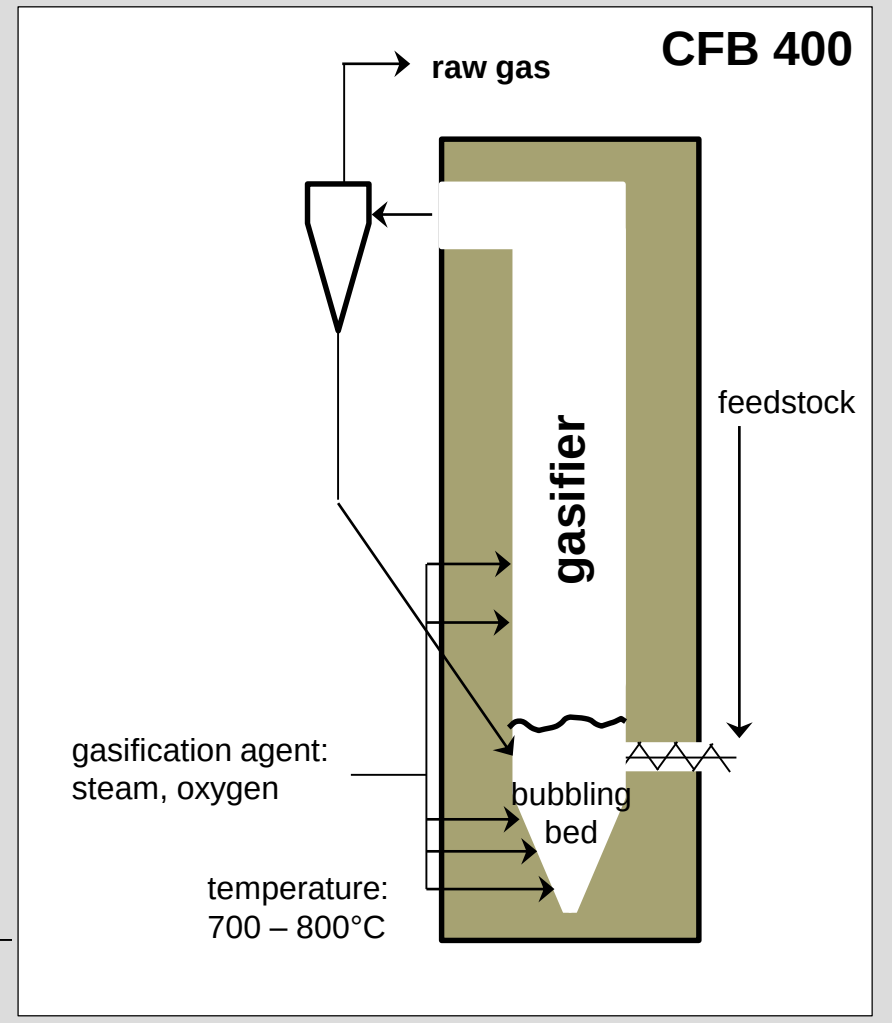
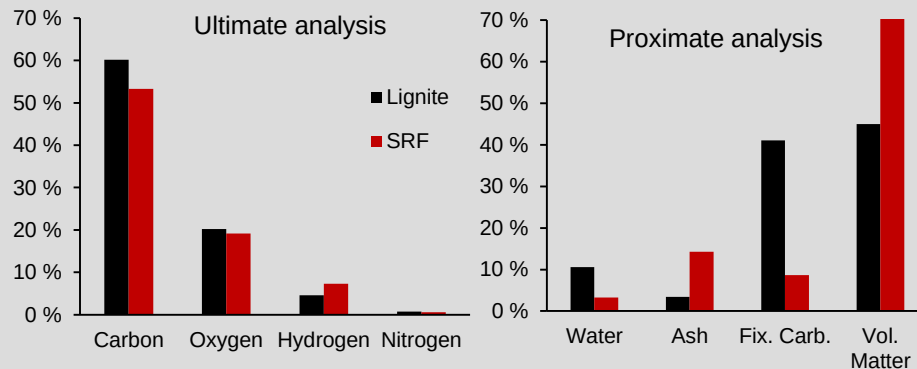
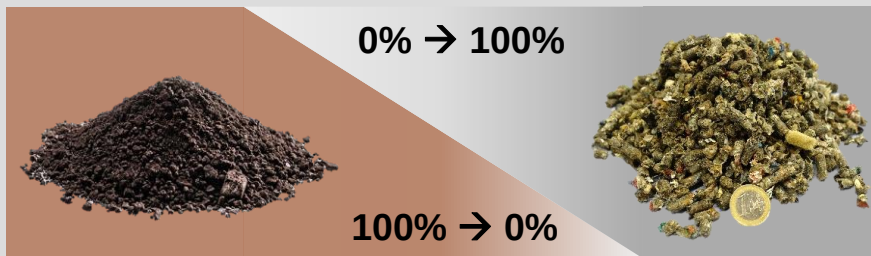
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Gasification LIG2LIQ Experiments



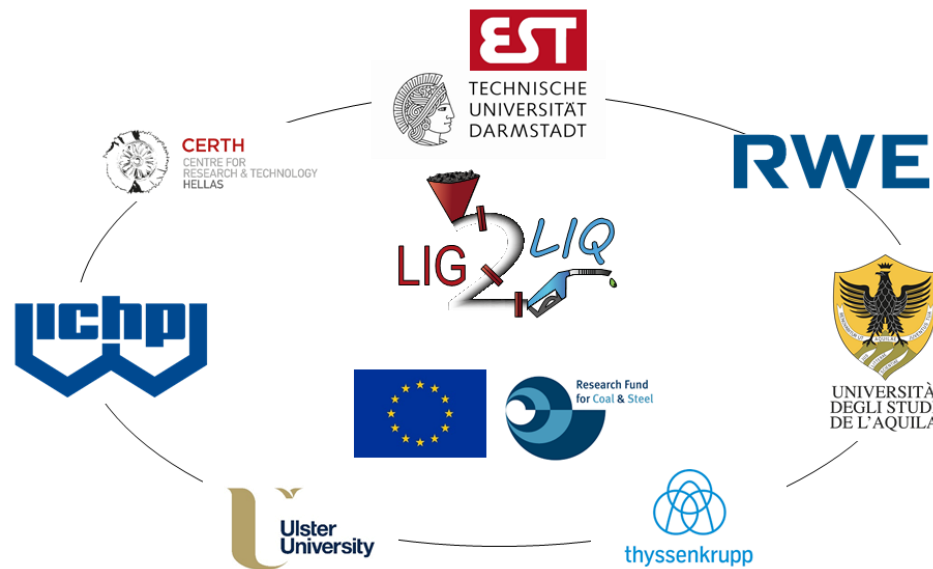
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- Lignite for fluidized bed LEG („Lignite Energy Grained“)
- Substitute fuel SRF



Cost Effective Conversion of Lignite and Waste to Liquid Fuels

01.08.2018 – 31.01.2022



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process:	bubbling bed	chemical looping	bubbling bed / chemical looping	chemical looping
type:	gasification	gasification	gasification	combustion
thermal load:	0.5 MW	1.3 MW	0.5 MW / 1.0 MW	1.3 MW
feedstock:	lignite / SRF	biomass (wood/straw)	residuals (sewage sludge, fermentation residues...)	SRF
product:	FT - products / methanol	FT - products	methanol	heat
experimental status:	completed	half completed	in progress	in preparation

Thank you!



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