



IEA Bioenergy
Technology Collaboration Programme



Country Report Germany

Task 33 Thermal Gasification of Biomass

Update

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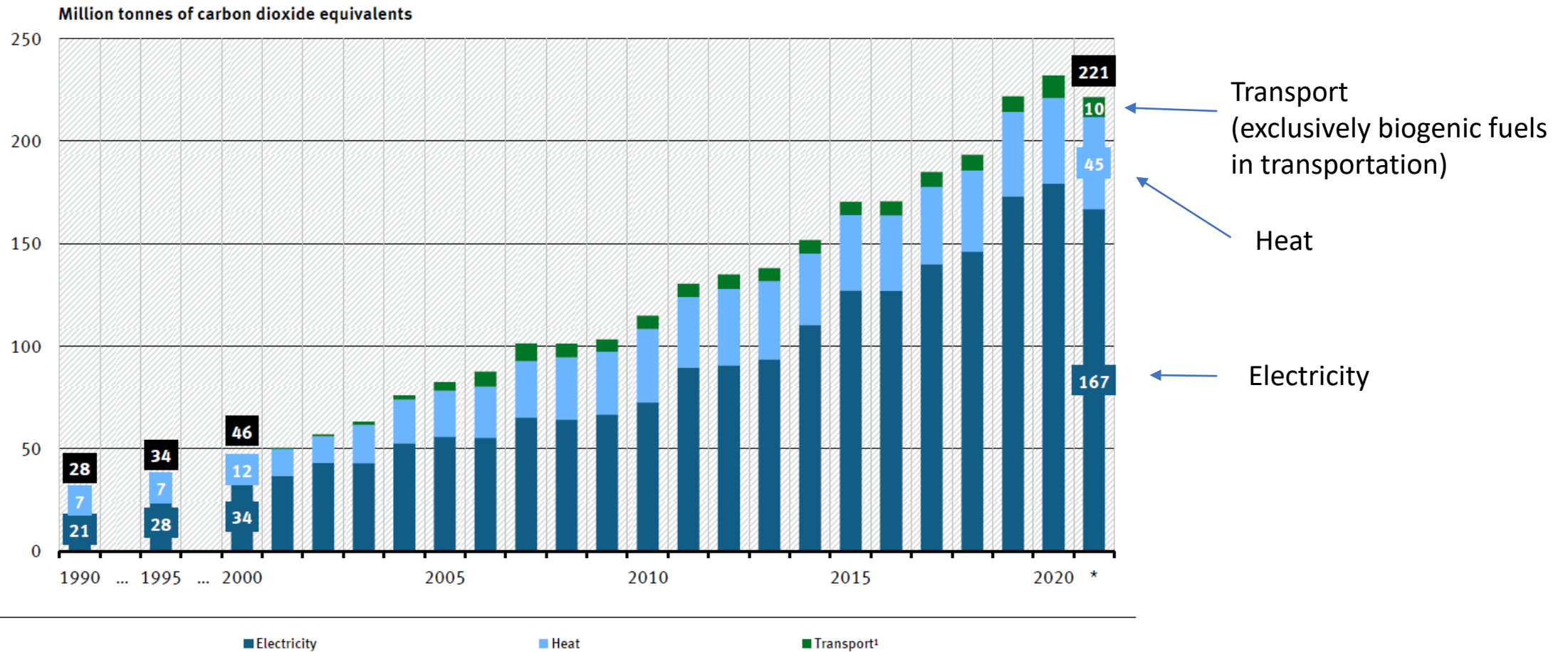
KIT - The Research University in the Helmholtz Association

ENGLER-BUNTE-INSTITUT Fuel Technology, EBI ceb
Institute for TECHNICAL CHEMISTRY, Gasification Technology, ITC vgt

Vienna, Oct 18, 2022

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Statistics: Greenhouse gas emissions avoided through the use of renewable energy sources (Germany)

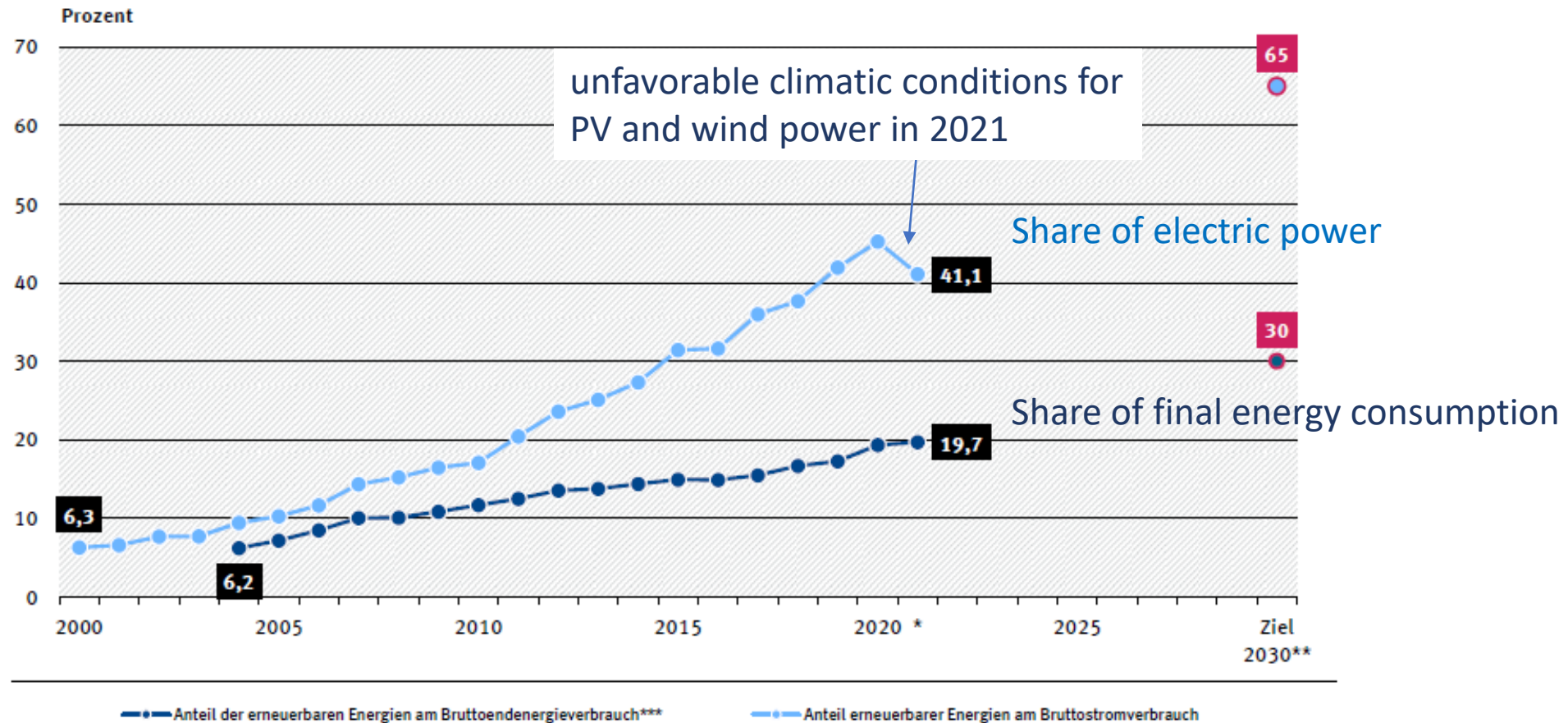


¹ exclusively biogenic fuels in transportation (without agriculture, forestry, construction and military).
 Calculation based on preliminary data by Federal Office for Agriculture and Food (BLE) for year 2020
 and fossil base values according to § 3 and § 10 of the 38. BImSchV
 * Preliminary figures

Source: German Environment Agency, Emissionsbilanz
 erneuerbarer Energieträger using data from AGEE-Stat, as
 of 03/2022

Statistics: Ratio of renewable energy for electric power consumption and final energy consumption

Anteil erneuerbarer Energien am Bruttostromverbrauch und am Bruttoendenergieverbrauch



* vorläufig

** Quellen Zielwerte 2030: Anteil am Bruttoendenergieverbrauch: Erneuerbare Energien Gesetz (EEG) 2021; Anteil am Bruttostromverbrauch 2030: Integrierter Nationaler Energie- und Klimaplan

*** Anteil am Bruttoendenergieverbrauch berechnet nach Berechnungsregeln gemäß EU-Richtlinie 2009/28/EG

Quelle: Umweltbundesamt auf Basis Arbeitsgruppe Erneuerbare Energien-Statistik (AGEE-Stat), Stand 03/2022

Politics

Financial relief of private customers:

- 5 % increase of CO₂ tax postponed by 1 year until beginning of 2024
→ cost reduction of natural gas, fuel, heating oil
- Cancellation of renewable energy surcharge since July 1, 2022
- Temporary reduction of value-added tax for natural gas from 19 to 7 % till Feb 28, 2024

Gas commission: Experts suggest relief of gas customers in two steps:

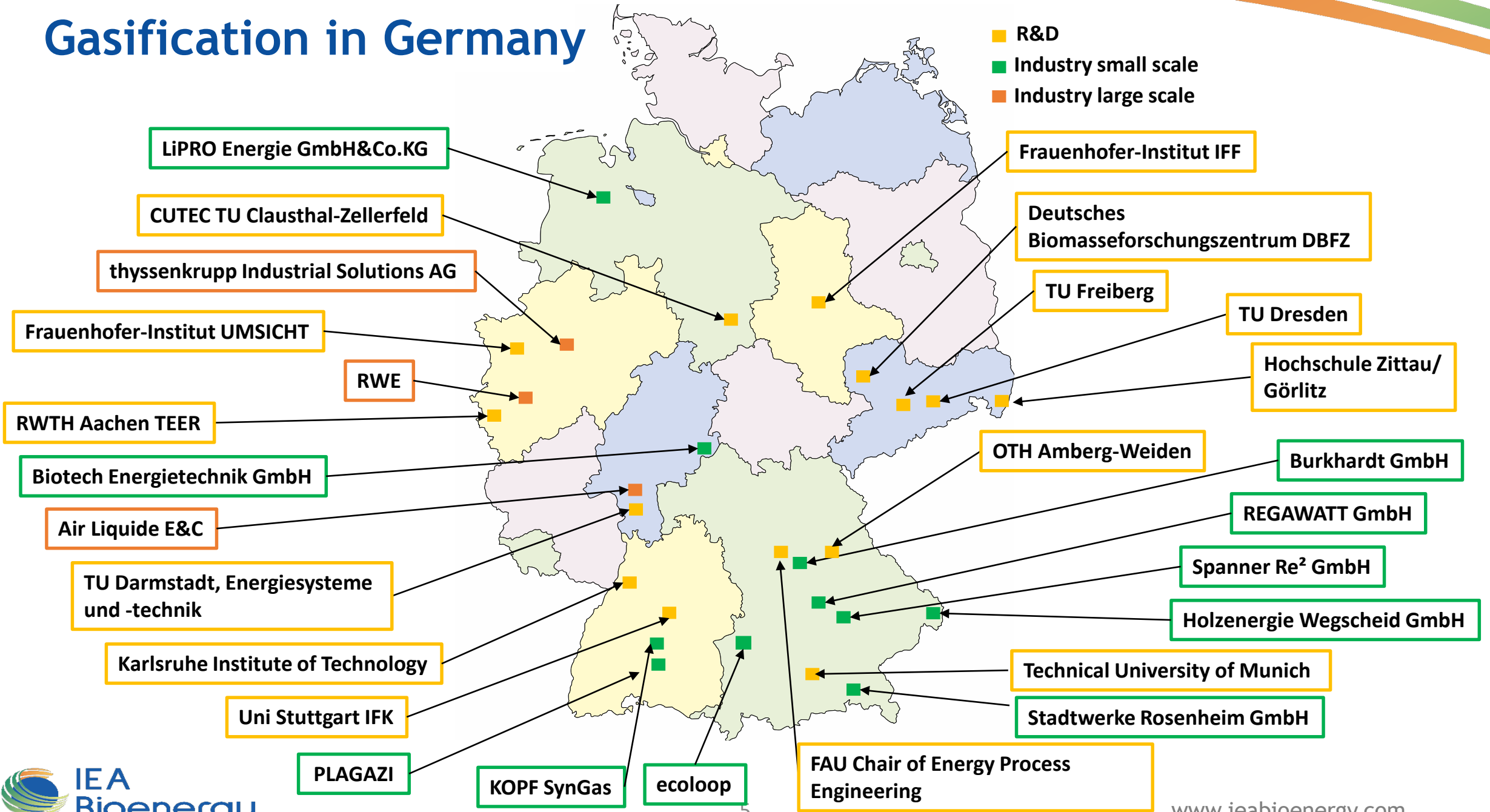
- Advance payment for gas and long distance heating payed by the state for December 2022
- “Gas- und Wärmepreisbremse” - March 23 till April 24: guaranteed price for basic amount of natural gas or long-distance heating corresponding to 80 % of consumption (12 cent/kWh for gas / 9.5 cent/kWh for long-distance heating)

Sources:

<https://www.bundesregierung.de/breg-de/themen/entlastungen-im-ueberblick/entlastung-energieabgaben-2125006>

<https://www.tagesschau.de/inland/energiekrise-expertenkommission-101.html>

Gasification in Germany



Industry Activities

Sülzle Kopf Syngas

Prozessdetails

Fließbild zweistufige Gaserzeugung



Fluidized Bed Gasifier for Sewage Sludge with CHP via Gas Engine

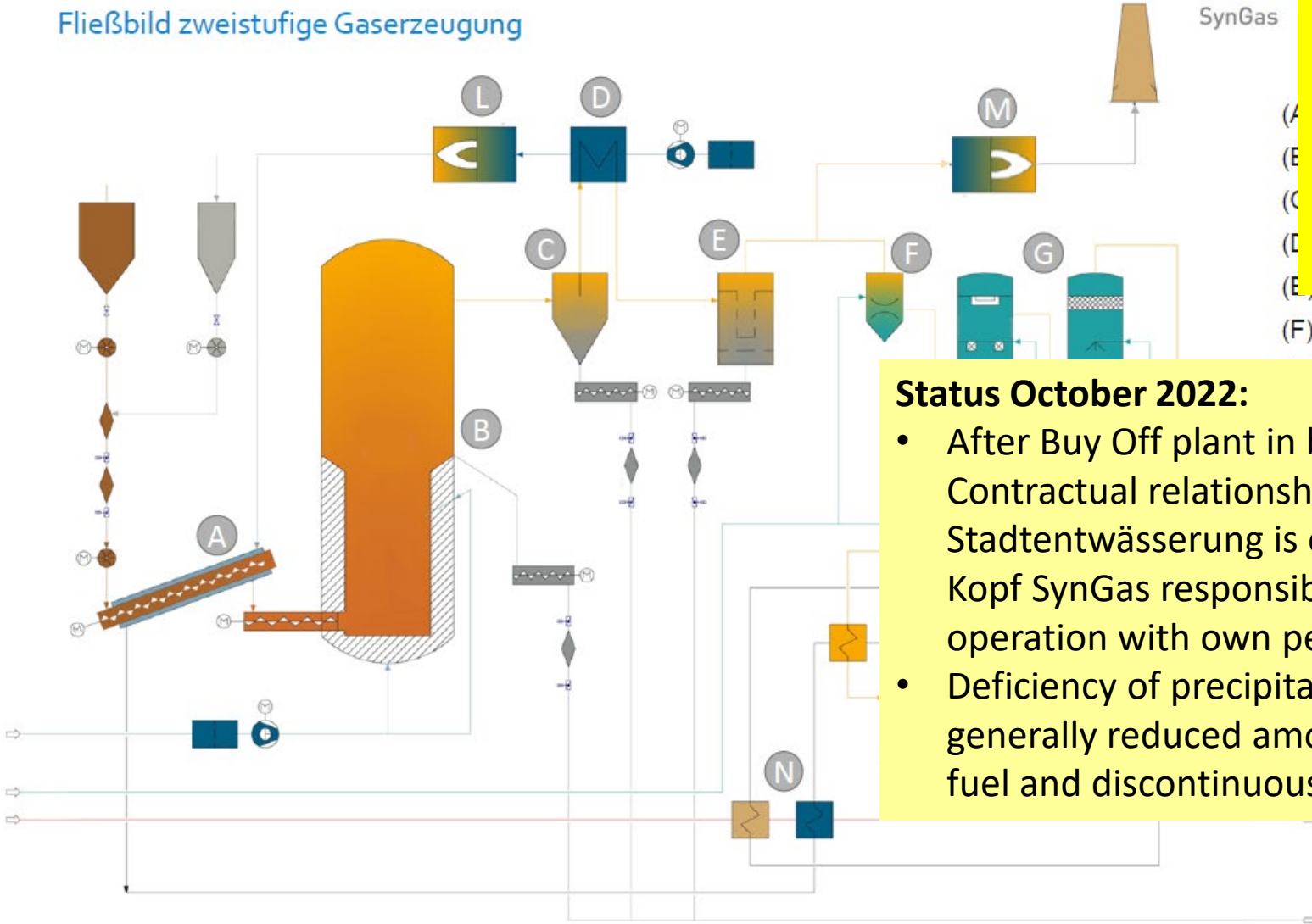
Commercial plant for Sewage Sludge in Koblenz

- 525 kW heat
- 440 kW power

(F) Venturi

Status October 2022:

- After Buy Off plant in batch operation.
Contractual relationship:
Stadtentwässerung is owner of the plant
Kopf SynGas responsible for maintenance, service and plant operation with own personnel
- Deficiency of precipitant as consequence of Ukraine crisis and generally reduced amount of sewage sludge lead to deficiency of fuel and discontinuous operation.



Industry Activities

Blue Energy CHP

Up date 2022

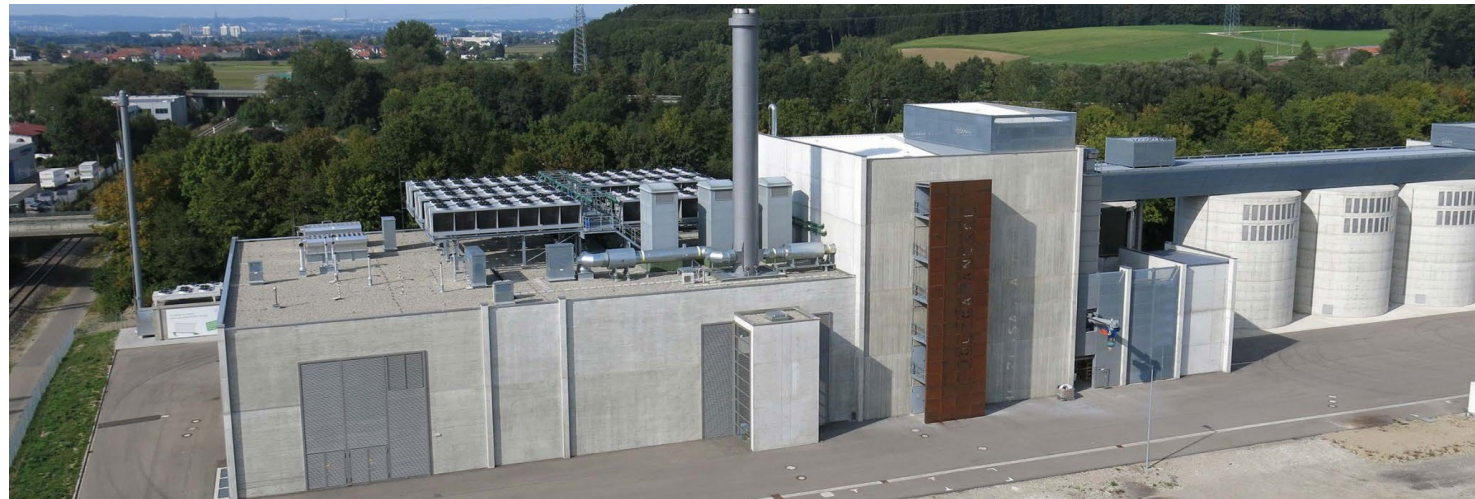
Blue Energy Europe Holzgas-Heizkraftwerk Senden

Wood gas cogeneration plant to be converted into an advanced bio-energy park

Future Products:

- Heat and Power
- Bio-oil
- Hydrogen

- Plant out of operation due to lack of approval from licensing authority
- Wood oil was initially classified by the authorities as waste, approval according to waste law demanded
- Currently: Submission of new permit application outside waste regime
- **Still no progress in 10-2022**

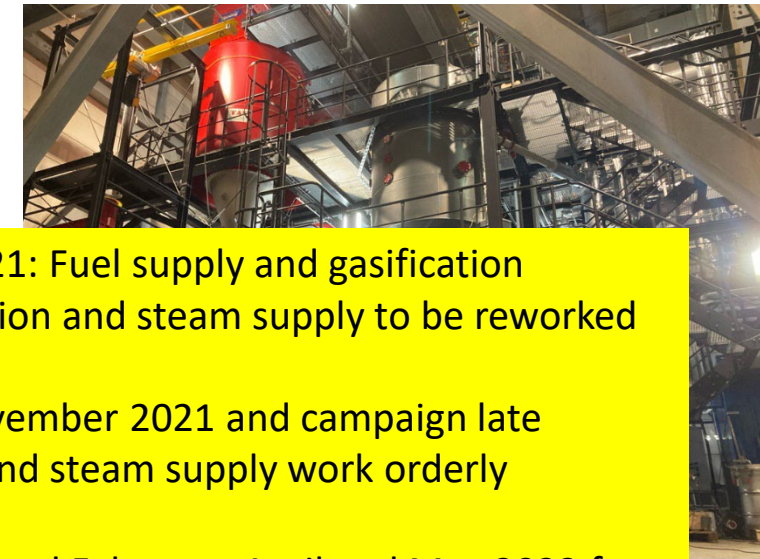
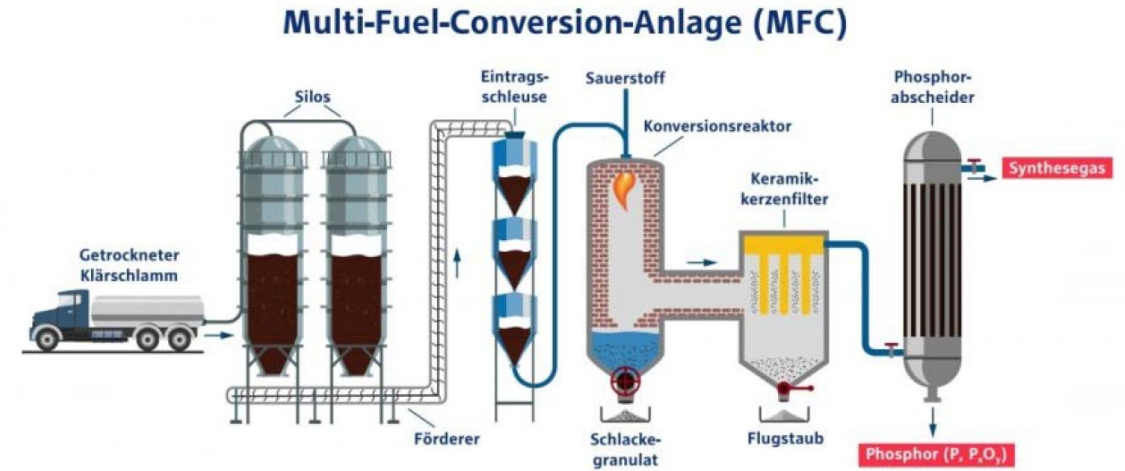


Source: BlueEnergy: <https://blue-energy-group.de/bioenergiepark-senden/>

RWE Phosphorus from Sewage Sludge

MFC (Multi Fuel Conversion) within ITZ-CC (Virtuelles Innovations- und Technologiezentrum Carbon Conversion)

- Pilot plant in Niederaußem
- Atmospheric entrained flow gasifier
- Three-component fuel mixing, refractory lining, dip quench, liquid ash discharge
- Fuels: Sewage Sludge, Sewage Sludge Ash, Lignite (ca. 130 kg/h, max 800 kW_{th})
- Temperature ~1,500°C
- Objective: Prove recovery of phosphorus from sewage sludge / sewage sludge ash
- Erection in 2020, Funding provided by State of North Rhine-Westphalia
Total project budget (incl. cost for plant operation) 10.5 million Euro
- Partners: Fraunhofer UMSICHT, Ruhr Universität Bochum
- Perspective: Waste gasification



- First Startup-Campaign in June 2021: Fuel supply and gasification operated successfully, dust extraction and steam supply to be reworked
- Second Startup-Campaign late November 2021 and campaign late December 2021: Dust extraction and steam supply work orderly
- Further campaigns with coal executed February, April and May 2022 for optimization of operation
- **No news in October 2022**

Plagazi

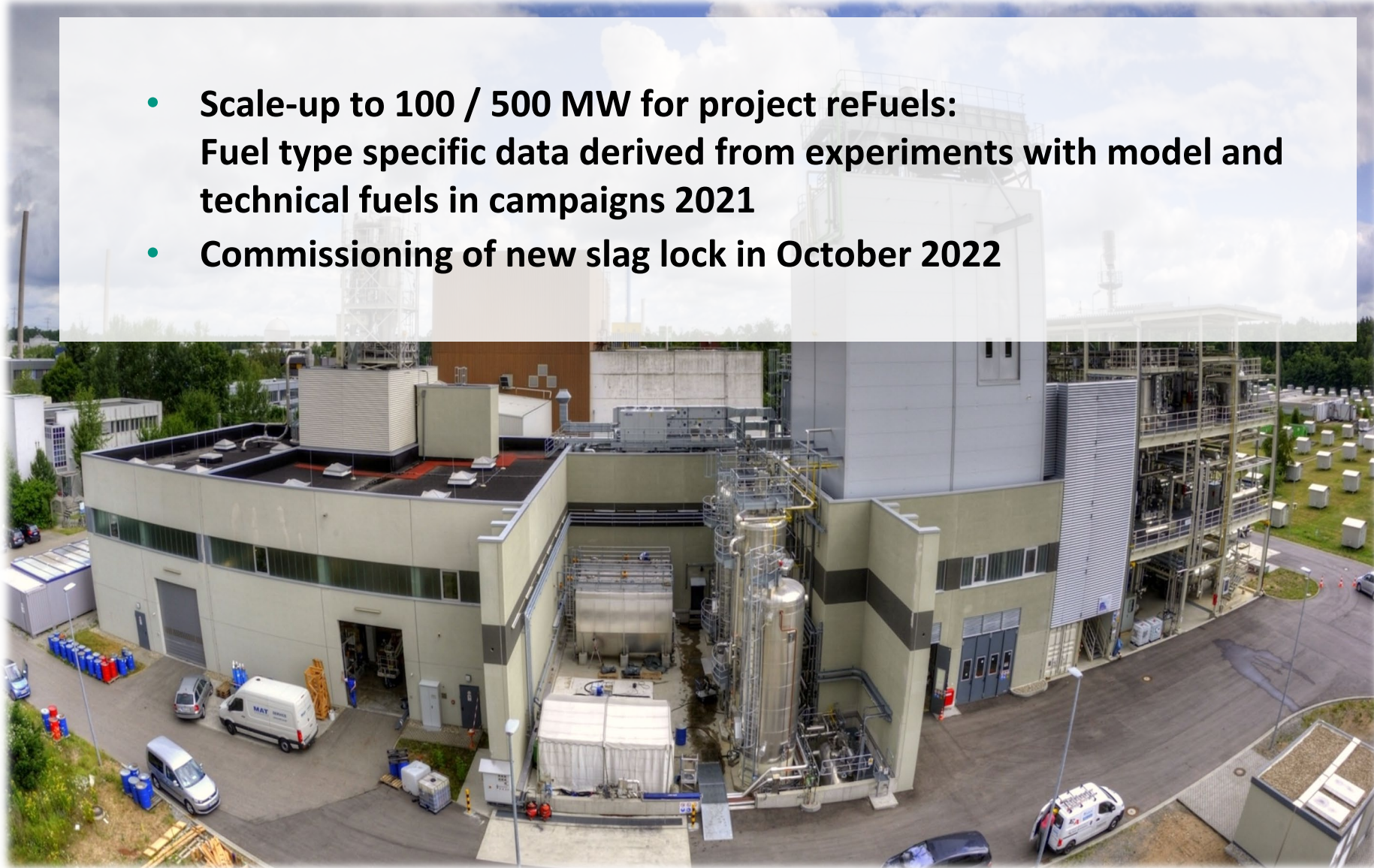
PLAGAZI

GREEN HYDROGEN FROM WASTE

- **Neue Energie Premnitz: Plagazi AB and Richter Recycling GmbH have entered an agreement to conduct a pre-study for constructing a Plagazi waste-to-hydrogen plant in Potsdam. The aim of the project team is to have the plant up and in operation by 2023.**
- **Dillinger GmbH have entered an agreement to conduct a pre-study for constructing a Plagazi waste-to-hydrogen plant.
The pre-study will highlight the feasibility to include a Plagazi plant at their steel mill facility in Dillingen, Saar.**
- **CH: Feasibility study for Automotive Shredder Residue (ASR) Recycling in Switzerland**

www.plagazi.com

- **Scale-up to 100 / 500 MW for project reFuels:
Fuel type specific data derived from experiments with model and technical fuels in campaigns 2021**
- **Commissioning of new slag lock in October 2022**



reFuels project

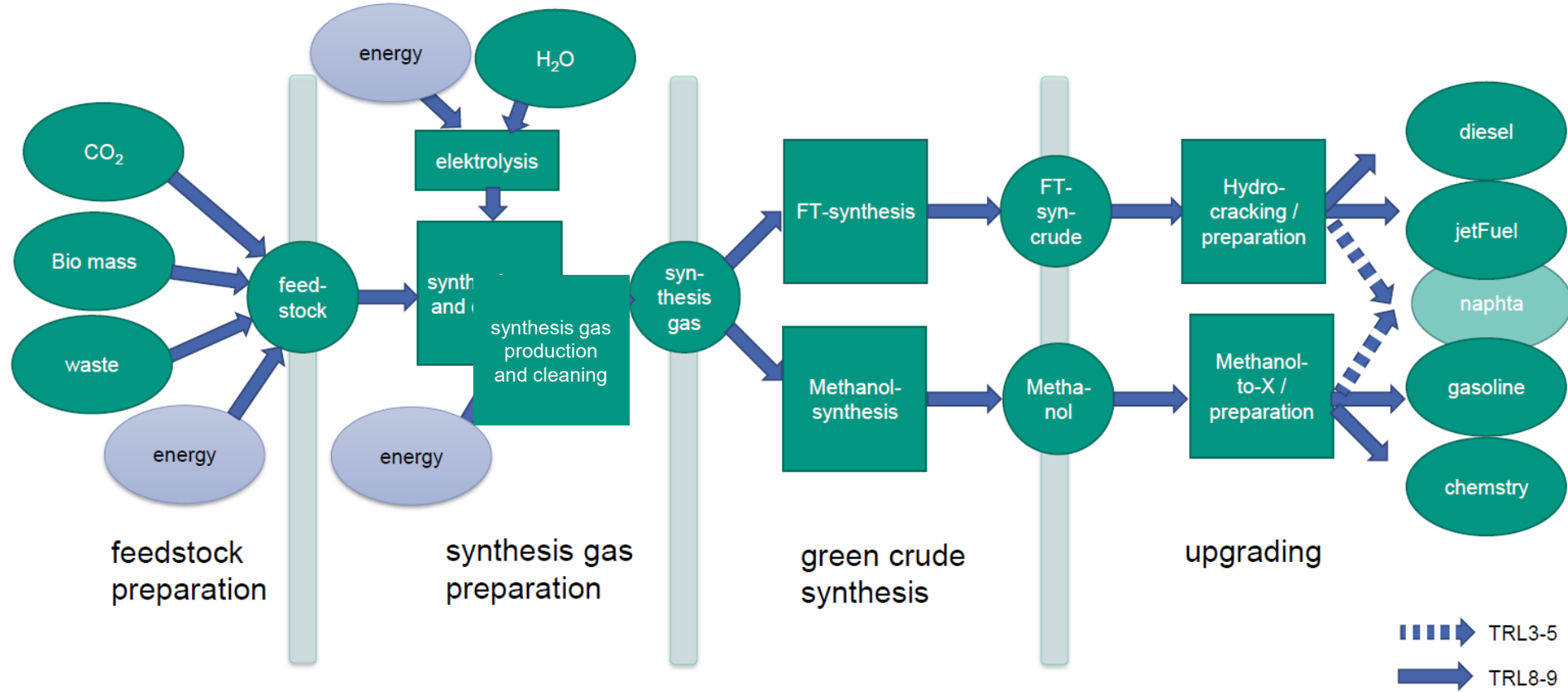
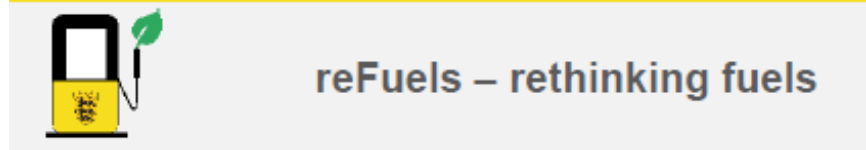
- reFuels
 - produced on the basis of non-fossil carbon and CO₂ sources
 - including advanced 2nd and 3rd generation biofuels
 - in particular hydrocarbons, which are produced applying regeneratively produced hydrogen
- reFuels
a building block of CO₂ neutral mobility



reFuels project

reFuels

Steps to a green refinery





Thanks for your attention!