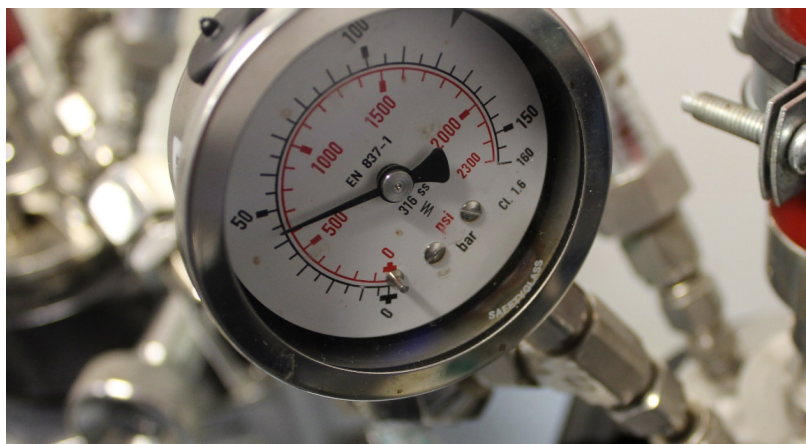




SynBioPTx to use synergies of the biobased and powerbased routes

Workshop | Task 39 and Task 44

"Role of biofuels production / biorefineries in grid balancing"

Franziska Müller-Langer, Kati Görsch, Lilli Sophia Röder
Nov 25, 2020

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Abstract

Due to increasing production of electricity from fluctuating renewable sources like wind and solar, the role of bioenergy in the electricity sector has to be more flexible for grid stabilisation and secure supply. On the other hand, surplus power can be used in biofuels production and biorefinery processes to increase conversion rates and fuels output. Several concepts to produce heat, electricity, fuels and other products in single high-efficiency processing plants are under development. The aim of this workshop is to provide an overview on the flexibility options, get insights into concepts for more flexible biofuel and biopower production, and discuss the challenges and success factors to implement these concepts in energy systems with high shares of renewables.



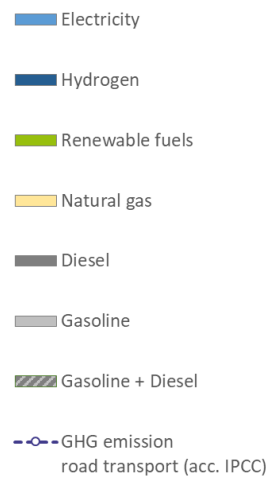
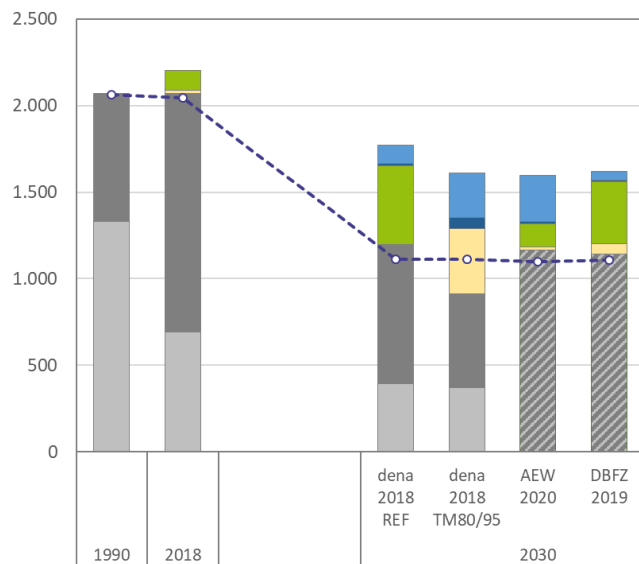
Agenda

1. Background
2. SynBioPTx approaches
3. Project examples
 - PTG-HEFA for SAF
 - Pilot-SBG for Bio-LNG
4. Summary

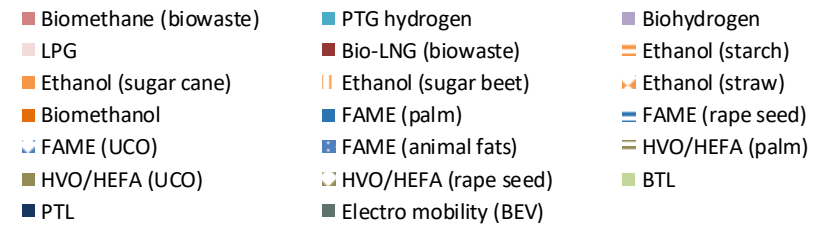
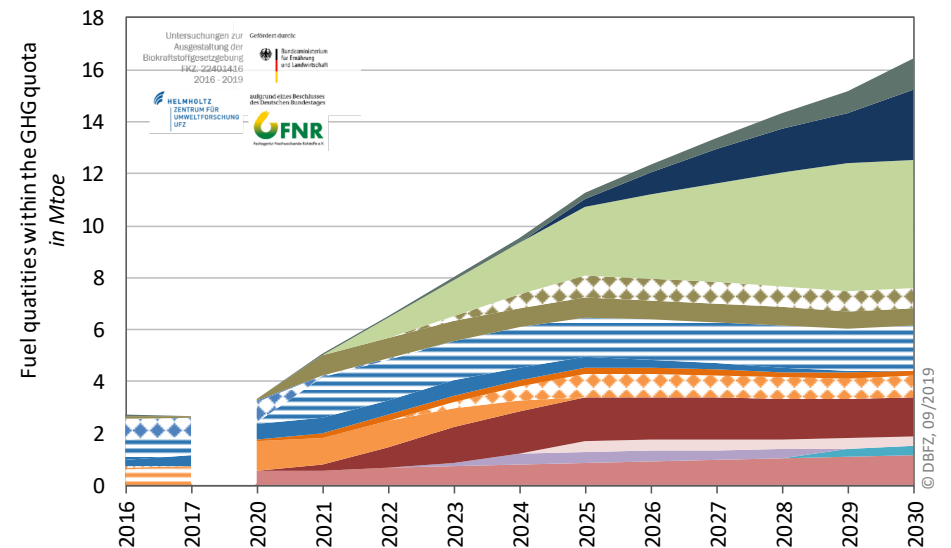
Background

Scenarios for climate protection in 2030 in Germany

DE | Final energy demand
road transport in PJ

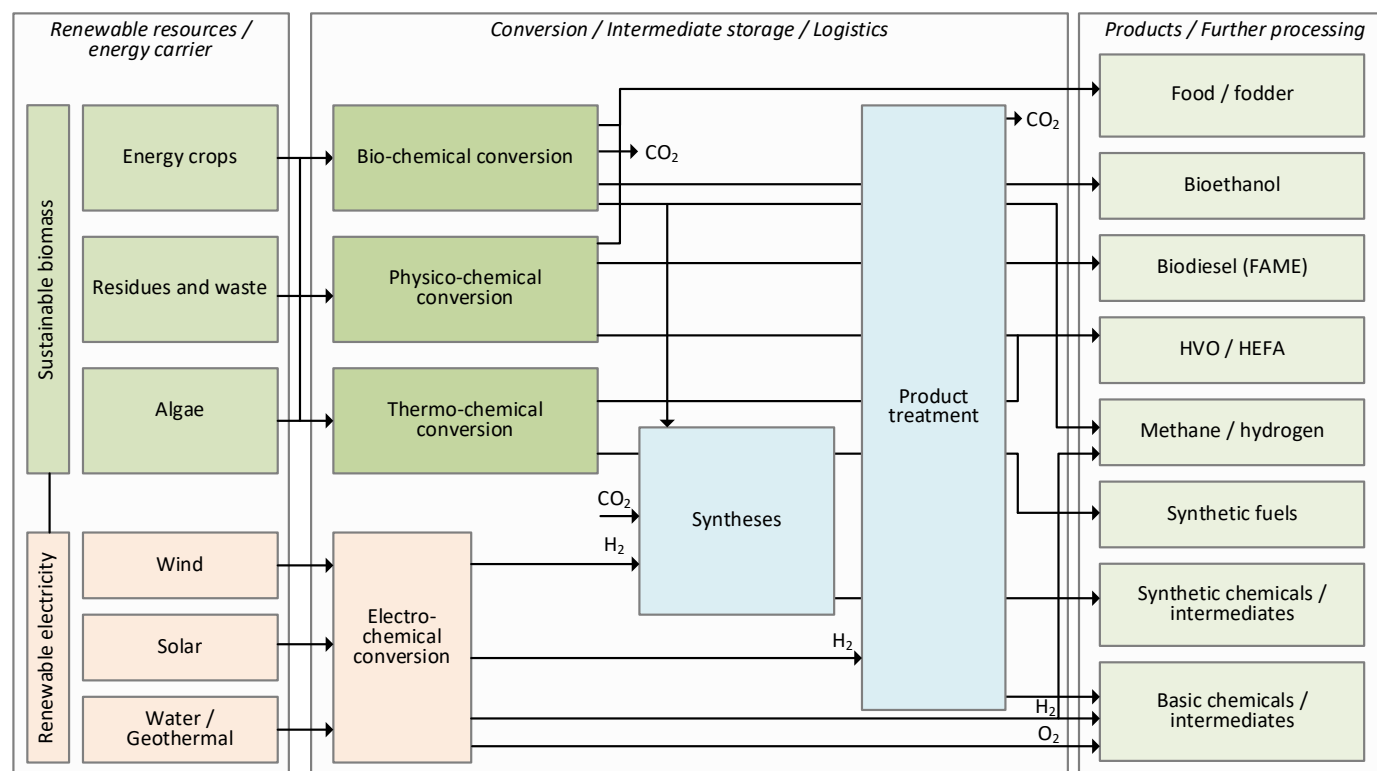


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SynBioPTx approach

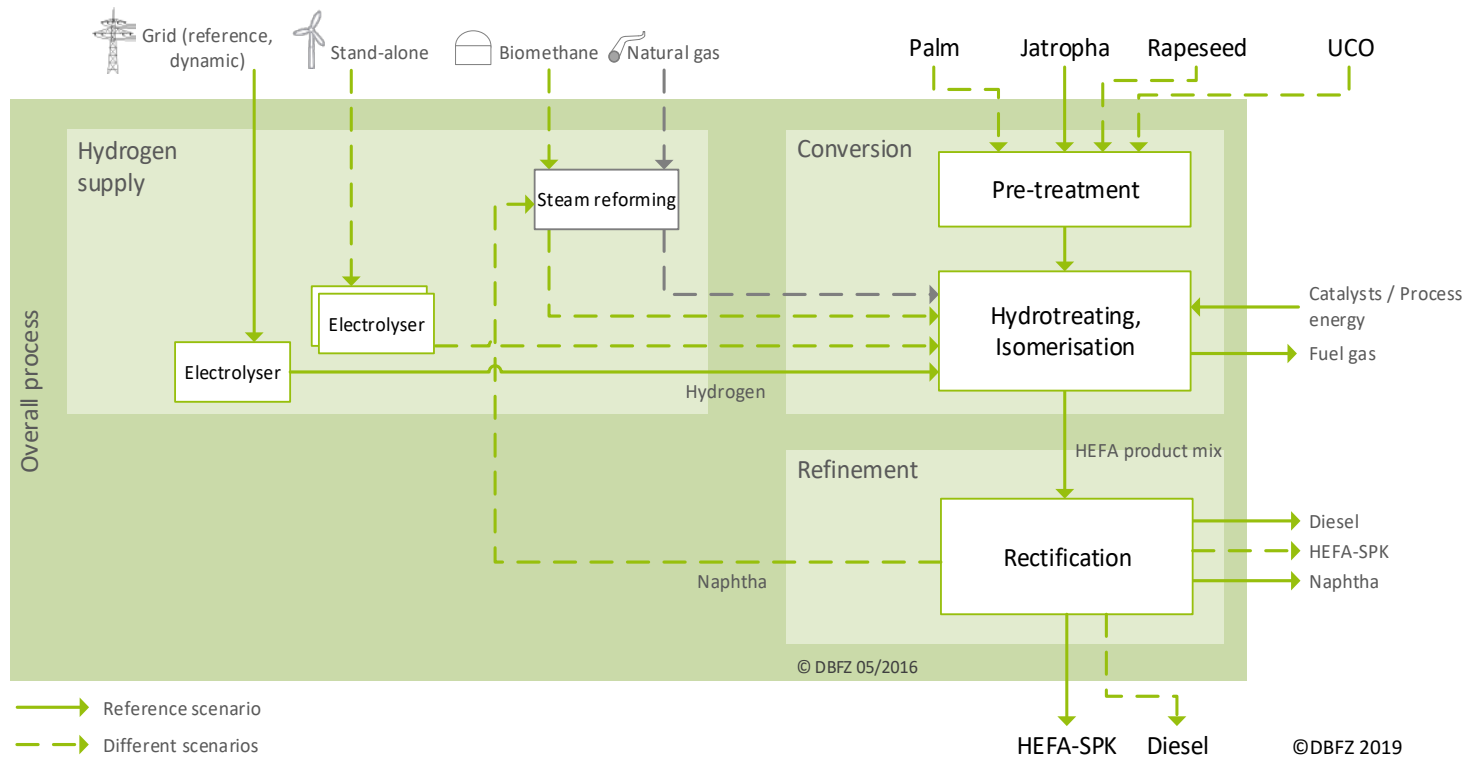
Technology options



SynBioPTx © DBFZ 08/2016 (w/o entitlement of completeness)
 B/PTG – Biomass-/Power-to-Gas, B/PTL – Biomass-/Power-to-Liquids, DDGS - Dried Distillers Grains with Solubles, FAME – Fatty acid methyl ester

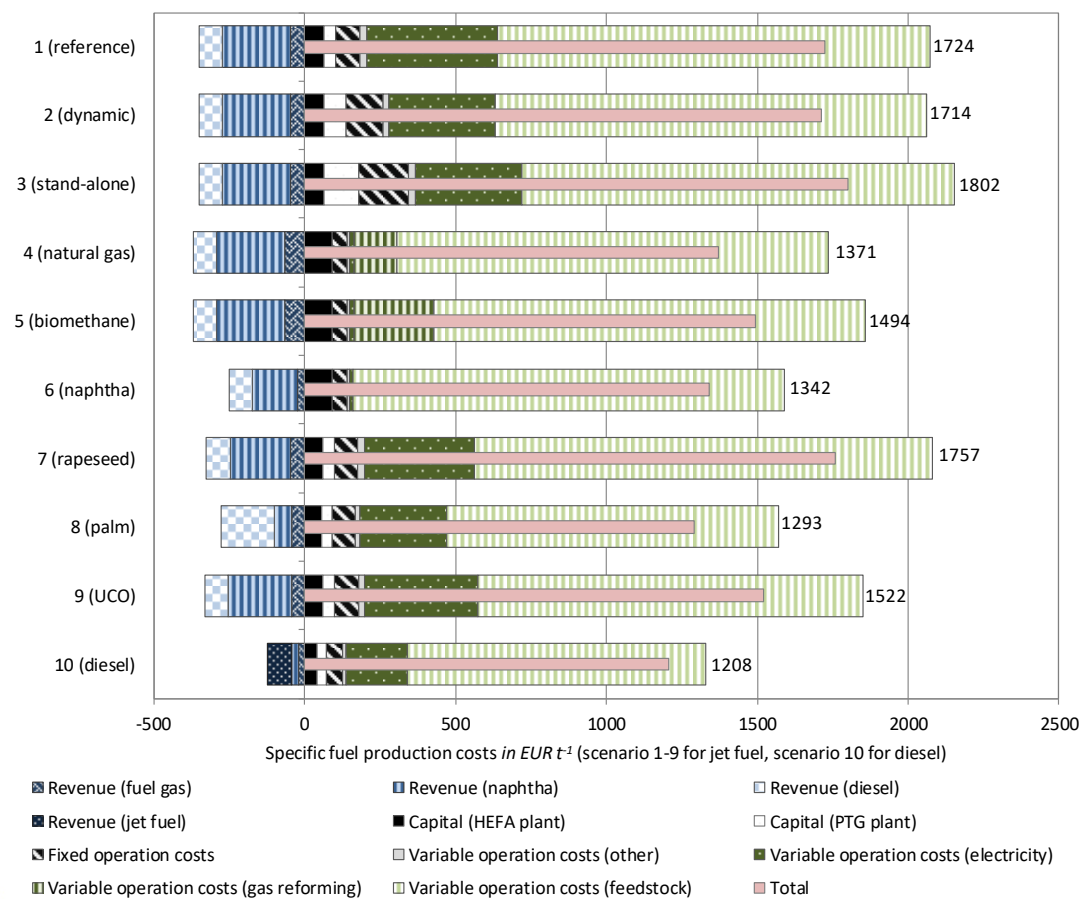
Project examples | PTG-HEFA for SAF

Approach of a hybrid refinery for SAF

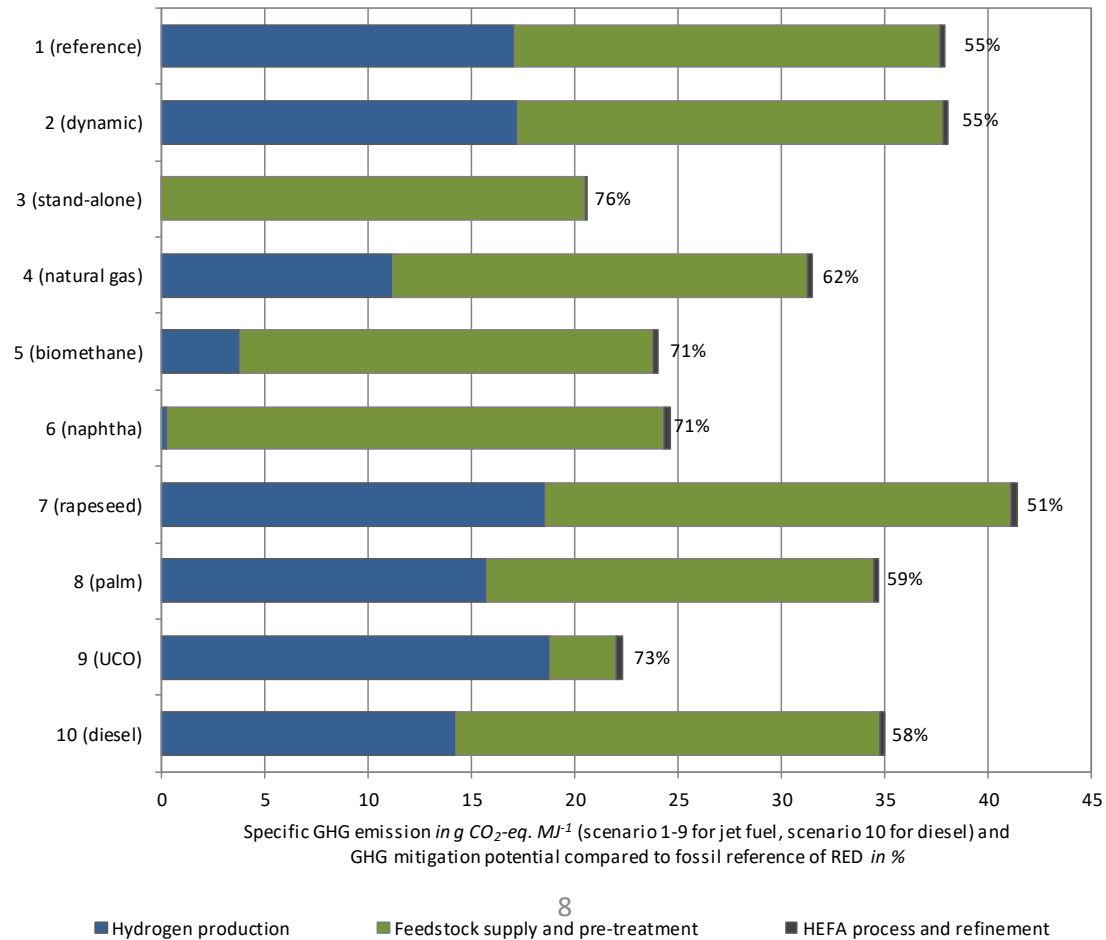


Project examples | PTG-HEFA for SAF

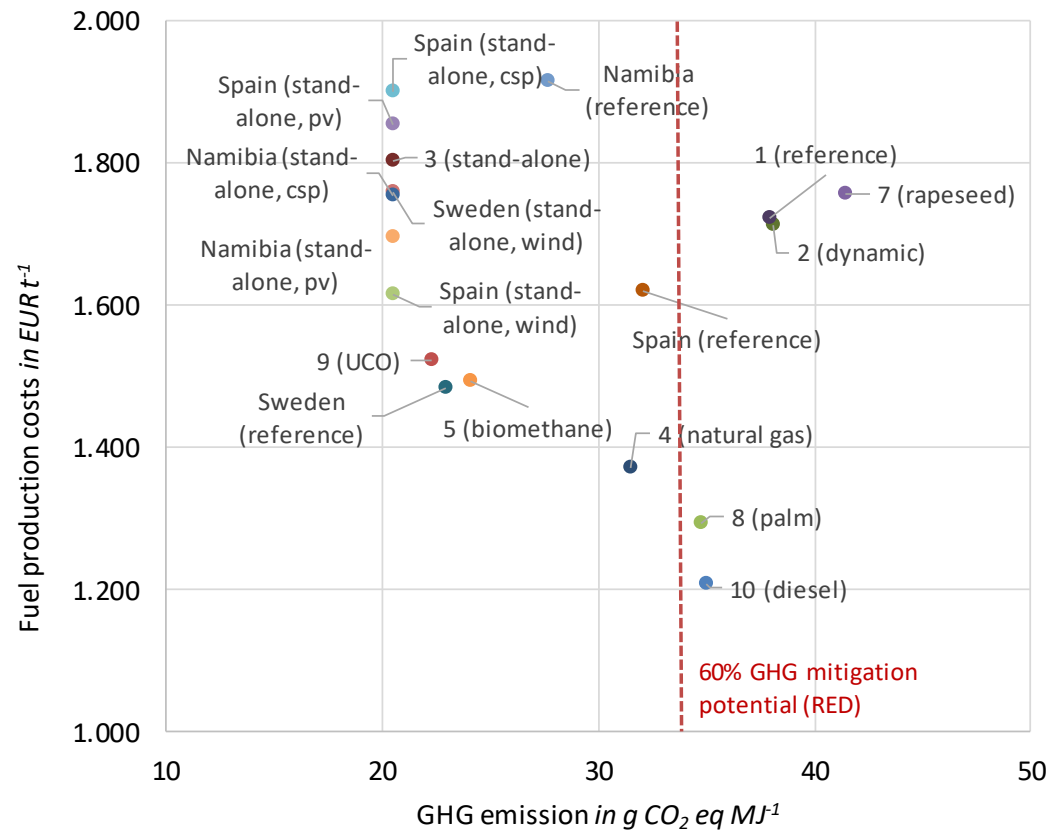
Costs



Project examples | PTG-HEFA for SAF GHG



Project examples | PTG-HEFA for SAF Excursion on favourable regions



Project examples | Pilot-SBG for Bio-LNG

Excursion on favourable regions



Development and realisation of a SynBioPTx approach with the objective of reducing GHG emissions and providing renewable LNG as advanced fuel in the transport sector:

- Anaerobic fermentation of biomass residues and by-products to biogas
- Methanation of biogenic CO₂ from the biogas process and electrolytically generated hydrogen with electricity from renewable sources to biomethane

Project scope

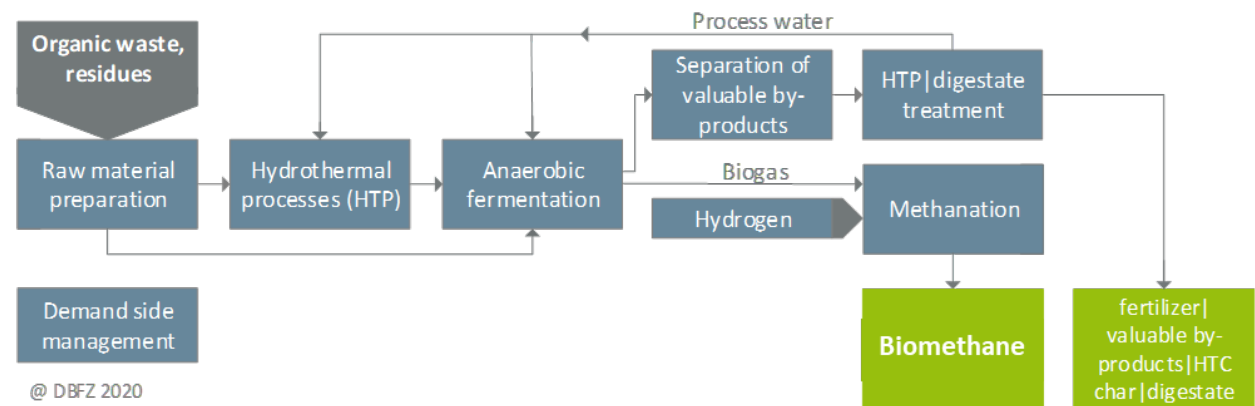
Evaluation of resource potentials

Technology development for optimization the methane yield and expansion of the product range

Construction and operation of a pilot plant as technology platform

Feasibility and pre-design of a commercial plant

Phase 1a 2018-2021

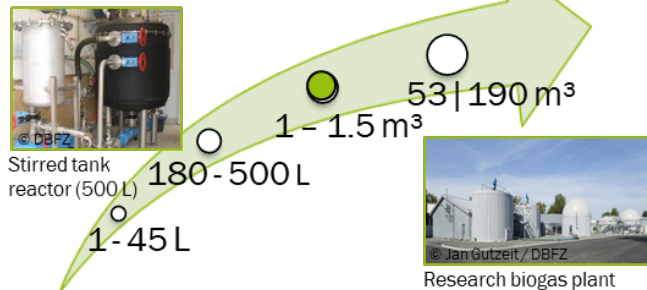


Project examples | Pilot-SBG

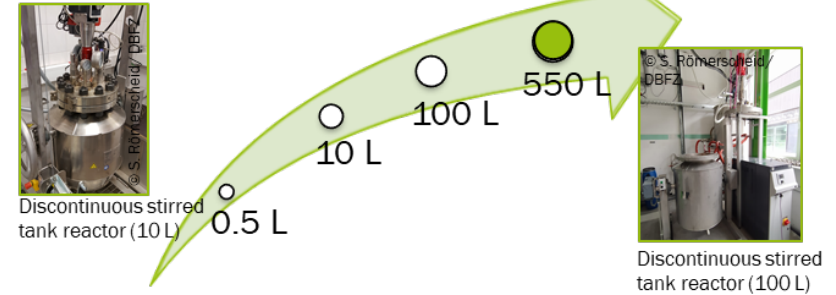
Scaling within DBFZ R&D infrastructure



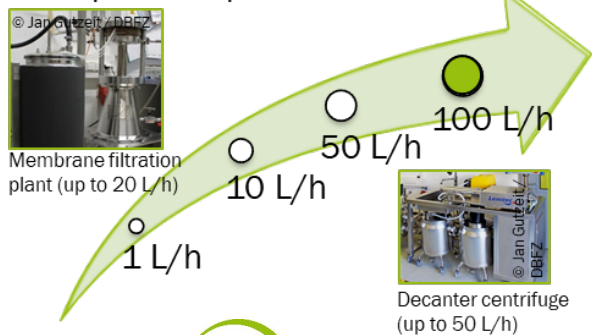
» Anaerobic fermentation:



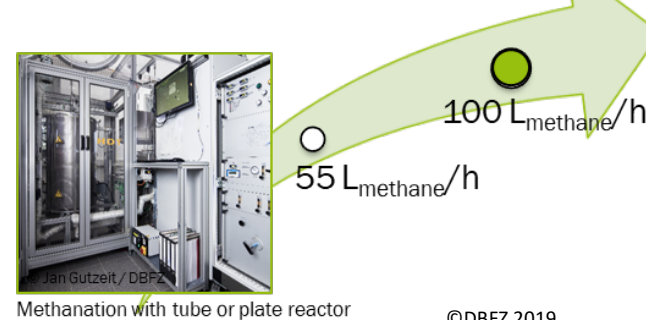
» HTP processes:



» Separation processes:

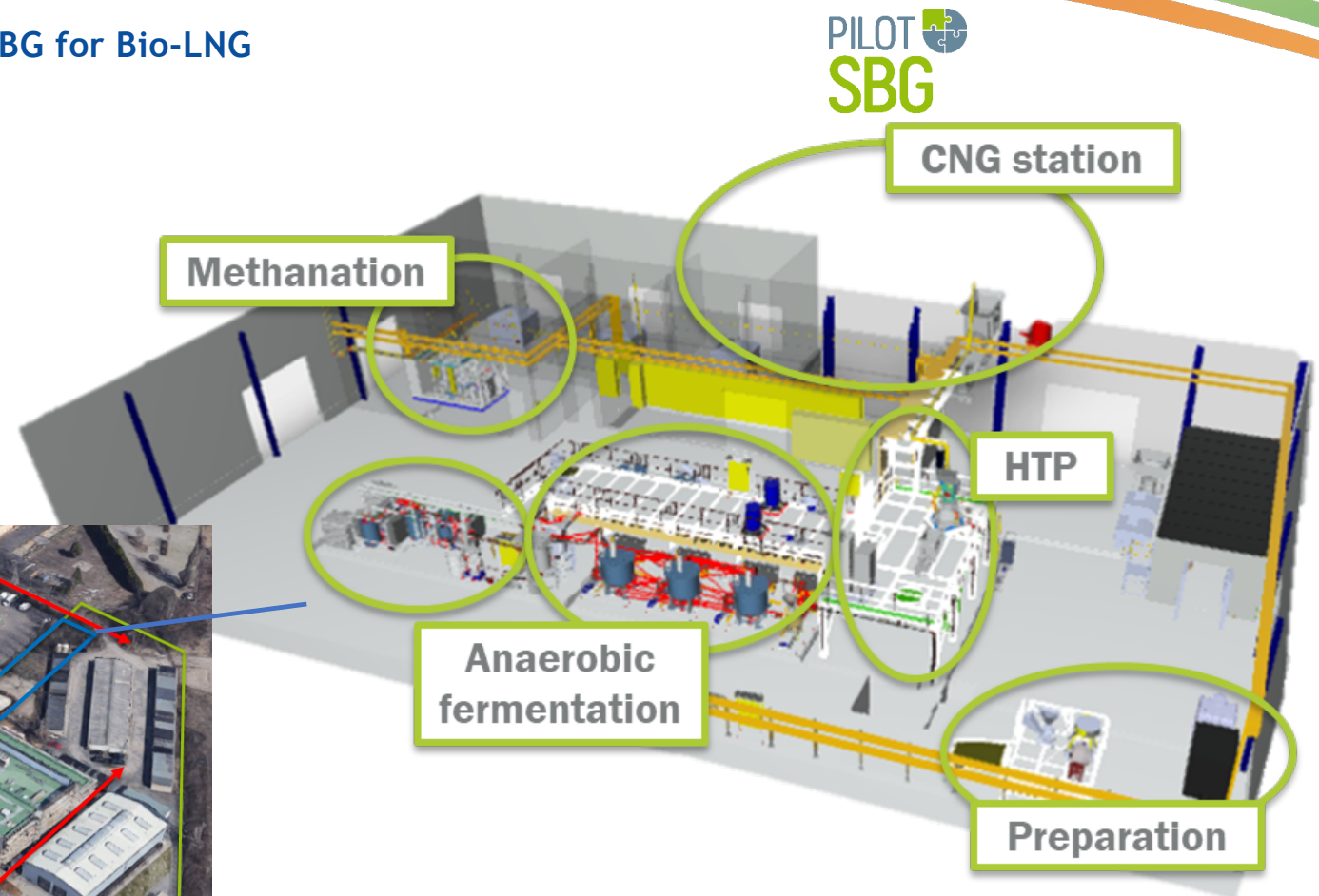
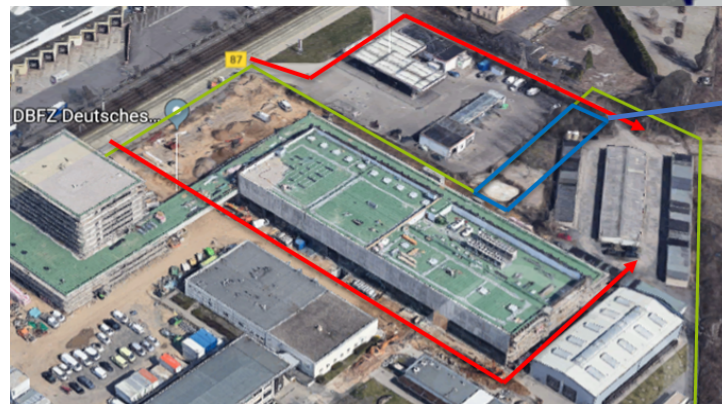


» Methanation:



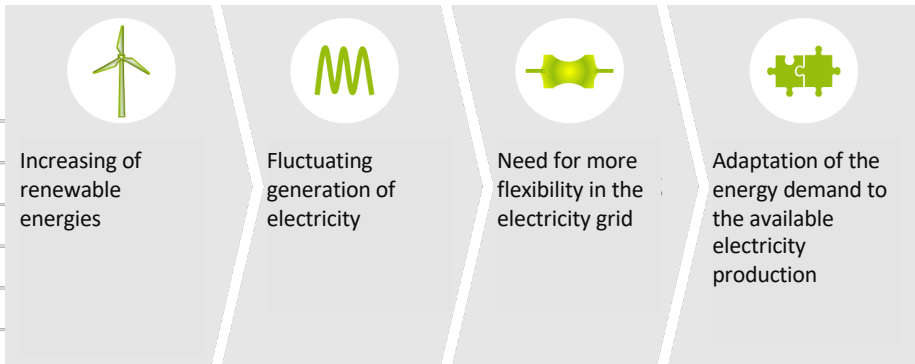
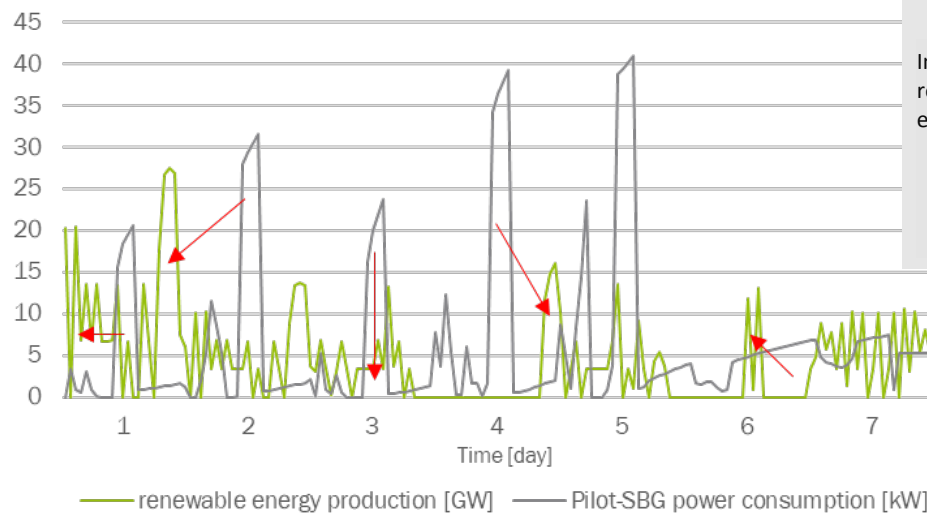
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Project examples | Pilot-SBG for Bio-LNG Pilot plant



Project examples | Pilot-SBG for Bio-LNG Demand side management

- DSM for optimization of the power use
- Analysis of individual aggregates in the process chain
- Consideration of the electricity cost fluctuations



Summary



- Strong demand on renewable fuels for energy and climate transition in Germany, esp. in transport
- SynBioPTx approaches as part of smart bioenergy support using technical synergies for demand oriented multiproduct (bio-)refineries
- DBFZ project examples as starting point for further projects and collaborations

Smart Bioenergy - Innovations for a sustainable future.

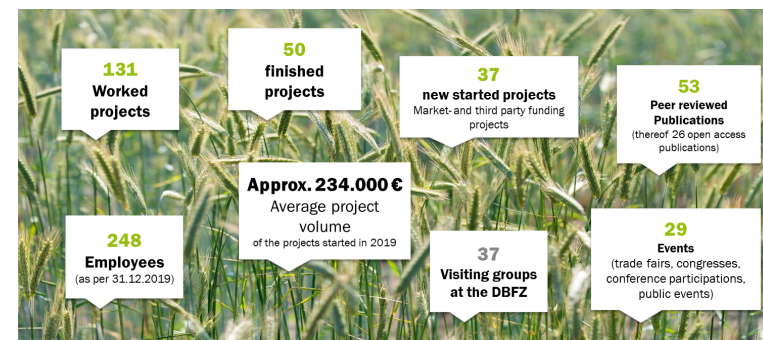
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Paper on PTG-HEFA |
<https://www.mdpi.com/2076-3417/9/19/4047>

Project info on Pilot-SBG |
<https://www.dbfz.de/en/projects/pilot-sbg>



Department Biorefineries 12/2019