

Concepts for biomethane production

Technological approaches for the provision of methane from biomass

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- Background
- Biomethane pathways
 - Basics
 - Production concept
 - State of the art
- Conclusions and outlook

Political frame conditions



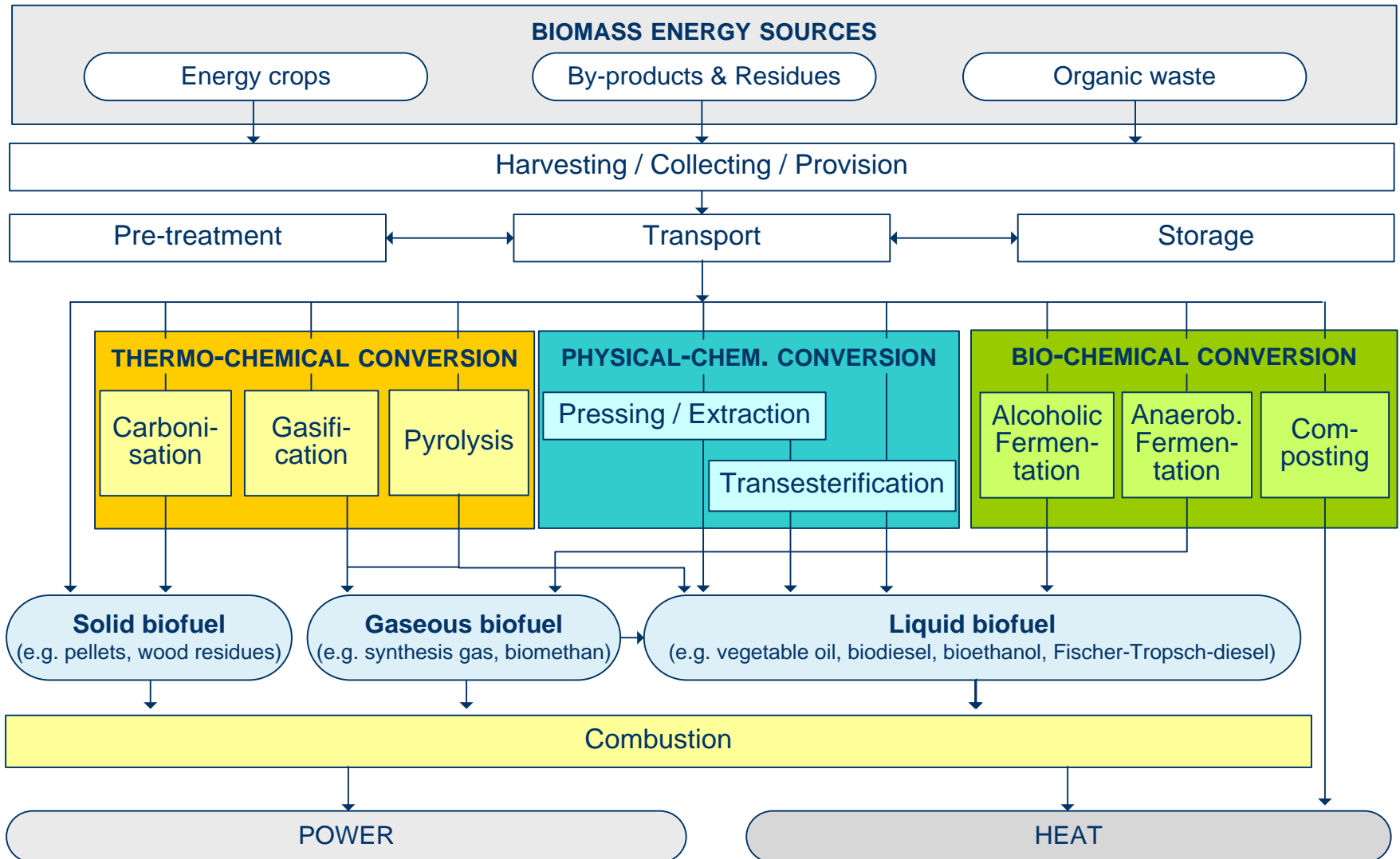
- Arrangements of the EU for the implementation of the Kyoto protocol
- EU wide CO₂-control for passenger cars and light duty vehicles
- Exhaust standards passenger cars and duty vehicles
- Reduction of particles and NO_x-emissions (Euro 5/6)
- National fuel strategy of selected governments
- GHG emission reduction; biomethane can be added to natural gas
- Integrated climate and energy programme
- Self commitment of the gas utilities

Advantages biomethane

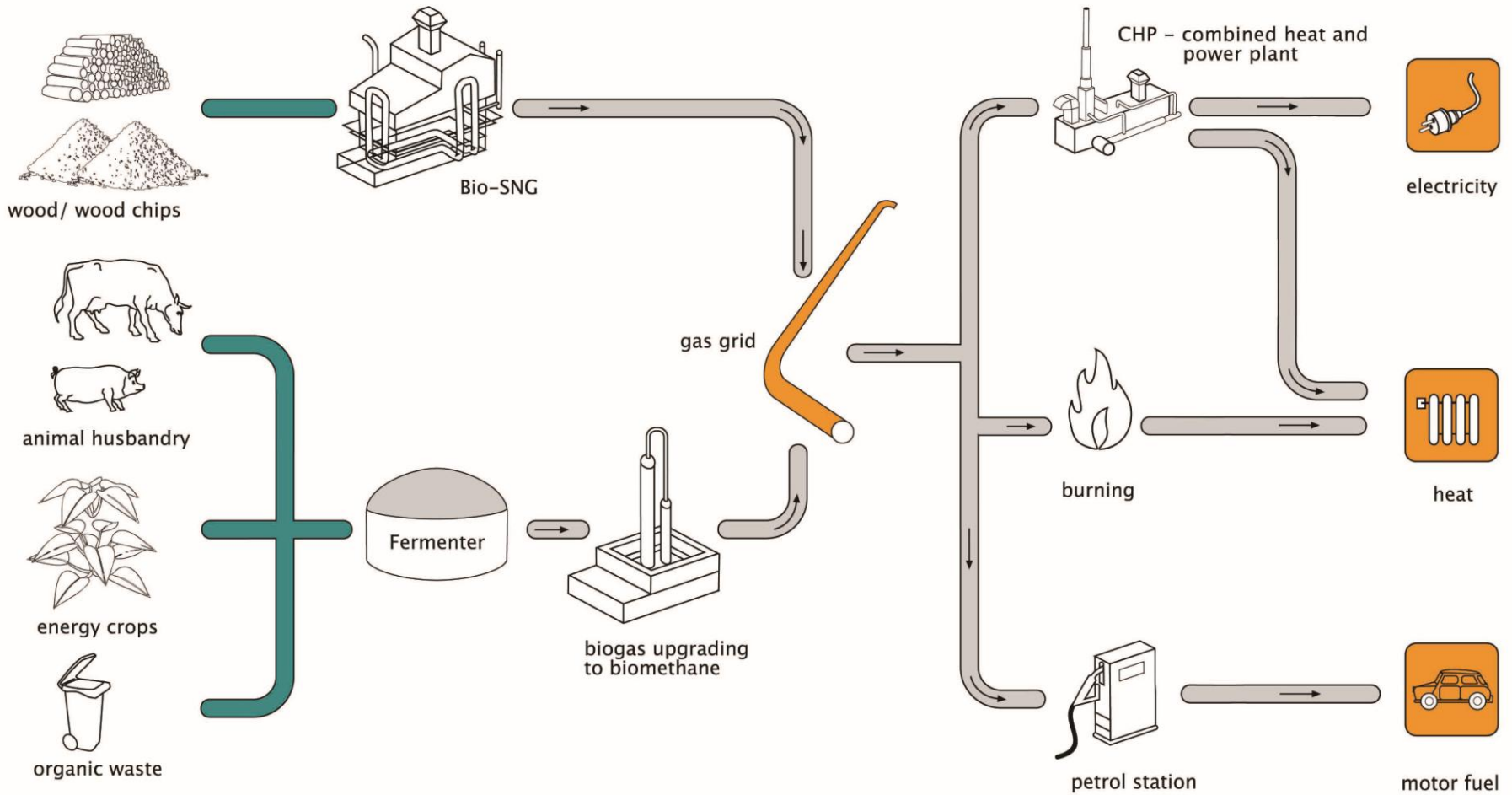
- Domestic energy carrier
- “Green” and environmental sound energy carrier
- Contribution to fulfil the GHG reduction goals – this is especially true for the transportation sector
- Market opener for an increasing gas sale within the transportation sector
- Can be distributed and stored in the existing and very well developed gas infrastructure
- Can be used with a high conversion efficiency within the heat, the electricity and the transportation market



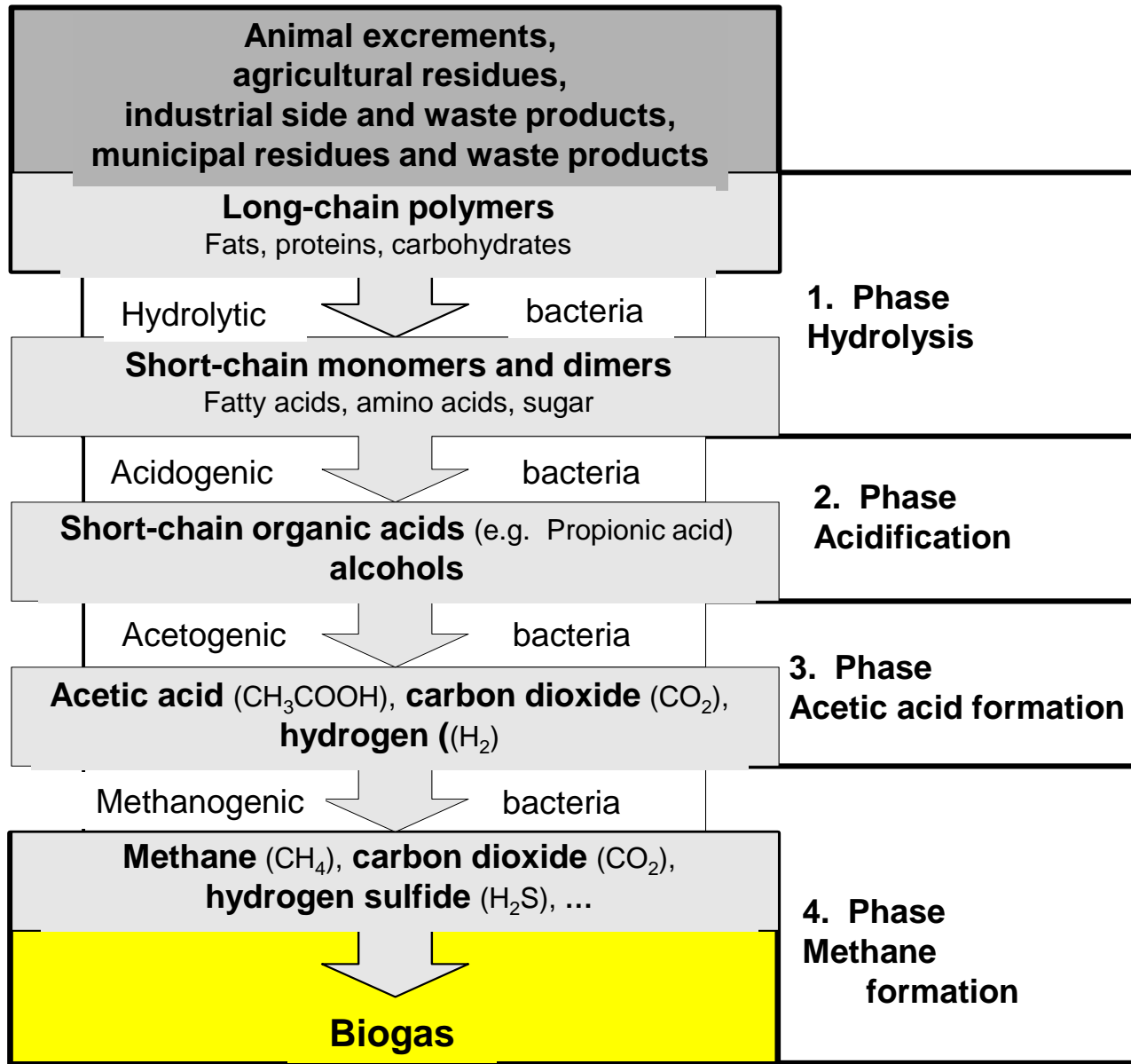
Biomethane Production pathways



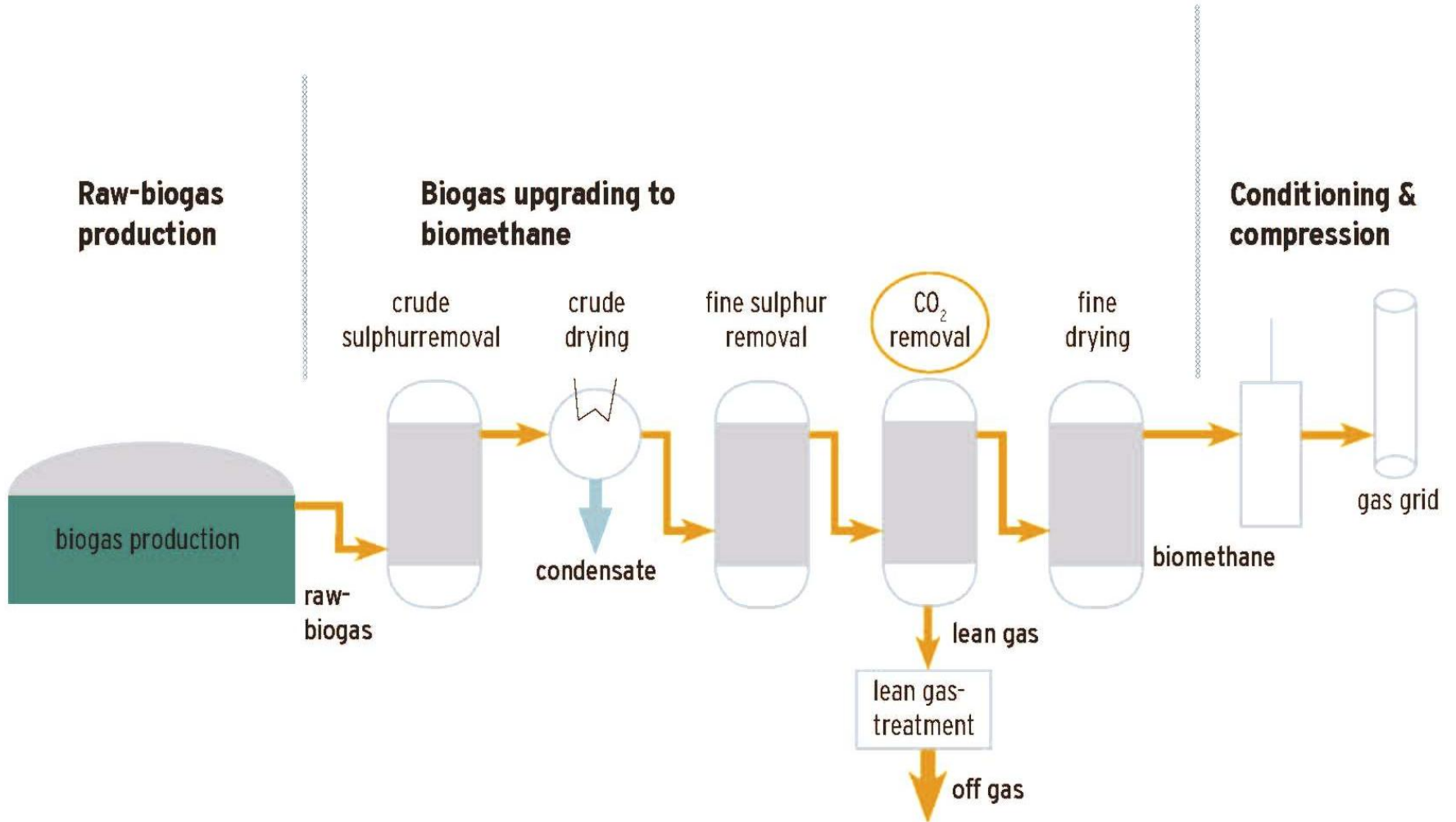
Biomethane Production pathways



Basics of biogas production



Production concept



- Currently 85 upgrading plants are in operation within Germany
- Proven technology in continuous operation (pressure swing adsorption, water scrubber)
- New promising technologies are under development but are rarely in continuous operation (chemical adsorption; physical scrubbing with solvents; cryogenic separation; Glykol-scrubbing; etc.)

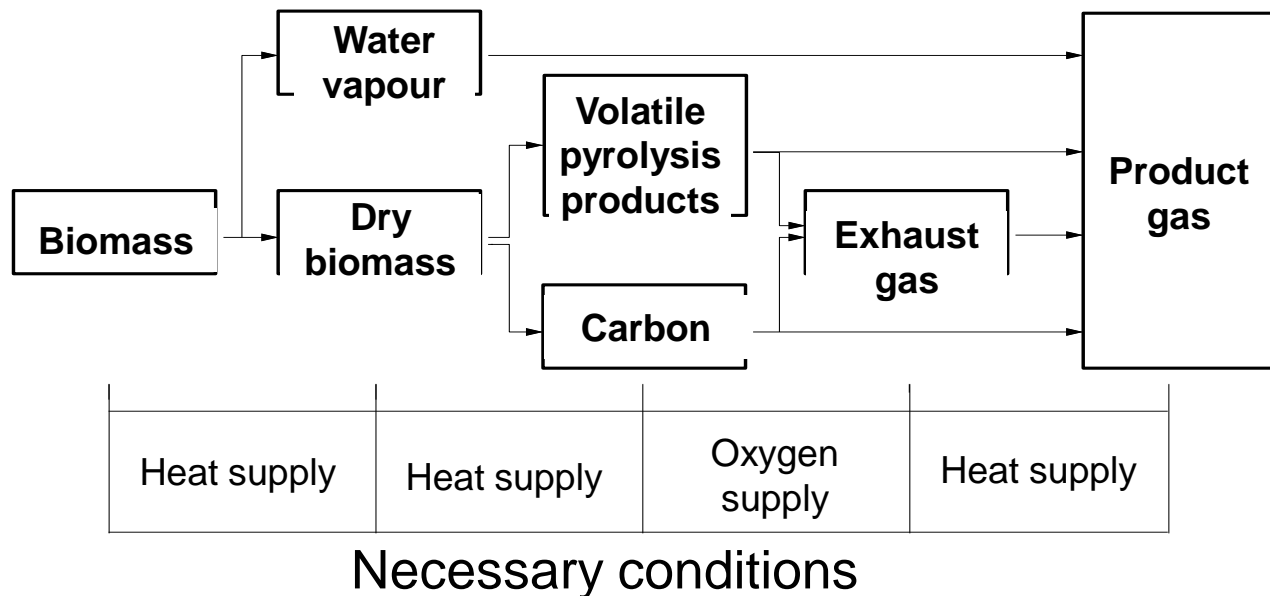


Basics of biomass gasification

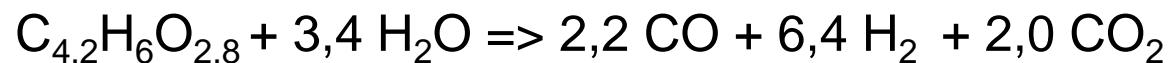


Stages of the thermo-chemical conversion

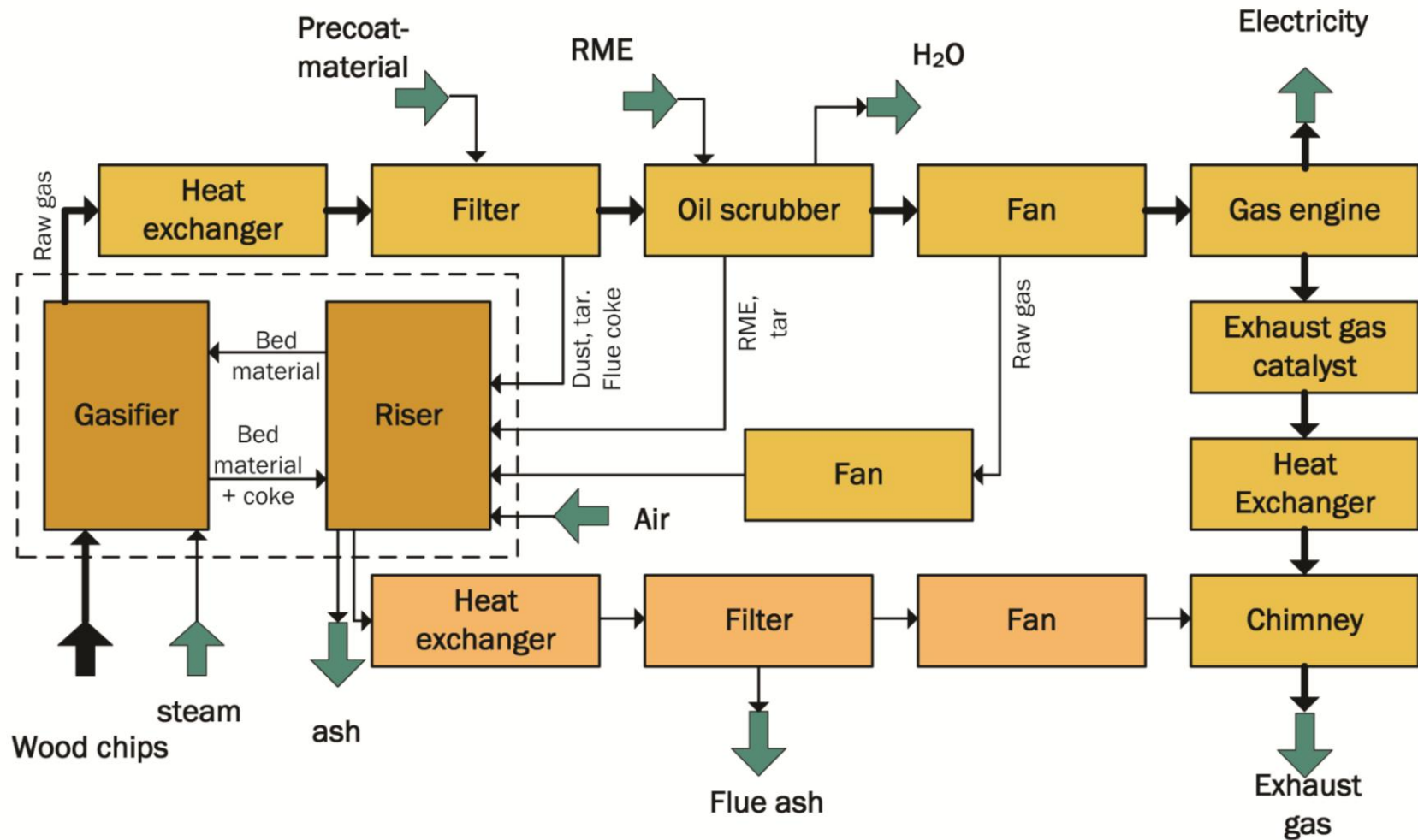
Heating and drying	Pyrolytic decomposition	Oxidation	Reduction
100 - 200 °C	150 - 500 °C	500 - 2 000 °C	800 - 1 100 °C



Gas production (steam gasification)



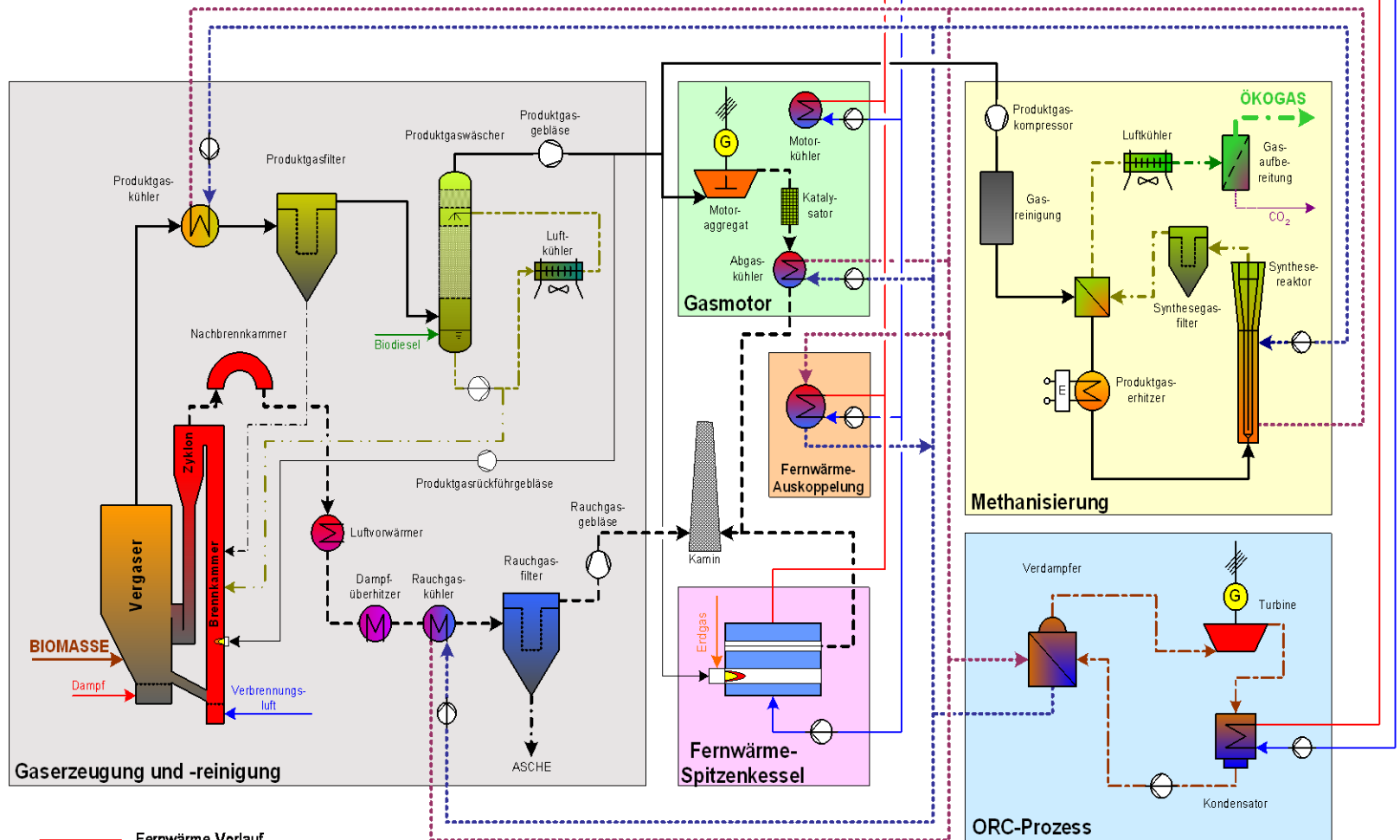
Production concept



Bio-SNG Production concept

Fernwärme-Vorlauf

Fernwärme-Rücklauf

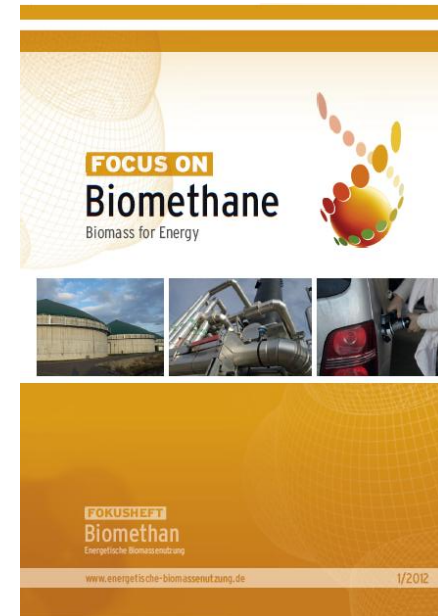


- Fernwärme-Vorlauf
- Fernwärme-Rücklauf
- Produktgas
- - - Synthesegas
- - - ORC-Kreislauf
- - - Thermoöl-Vorlauf
- - - Thermoöl-Rücklauf
- - - Rauchgas, Abgas
- - - Wäscher-Kreislauf



- Biogas and Bio-SNG are technically efficient options that can be applied to produce biomethane in significant volumes in the medium term
 - Biogas technology is available on the market
 - Bio-SNG is in the demonstration phase
- Due to different input materials and the power ranges an efficient use of the locally available biomass resources is possible through combinations of biogas and Bio-SNG plants
- For the distribution of biomethane as a transportation fuel the European wide gas grid is available as well as a growing number of refuelling stations
- For the provision of biomethane various R&D- and demonstration activities are on going; but there are still questions open and problems unsolved
- The perspectives of this technology are promising, as it allows to
 - produce efficiently and within relative small units
 - an energy carrier for the existing infrastructure
 - generate power, heat and especially transportation fuels.

- Published by the service & support team of the BMU-funding program „Biomass energy use“
- Contents:
 - Country profiles
 - Recent activities in the R&D
 - Experiences from the practice
 - Information on biomethane trade
 - Interviews with biomethane experts



www.energetische-biomassenutzung.de

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