

# Highly Efficient, Fuel Flexible CHP Technology based on Fixed-bed Updraft Biomass Gasification and SOFC

Department Pyrolysis and Gas treatment

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## Scope:

- Demonstration of 1-10 MW fuel-flexible biomass CHP technology with 40 % electrical efficiency
- Technology and process development:  
KIT → Integrated high temperature gas cleaning
- Techno-economical, environmental and impact assessment

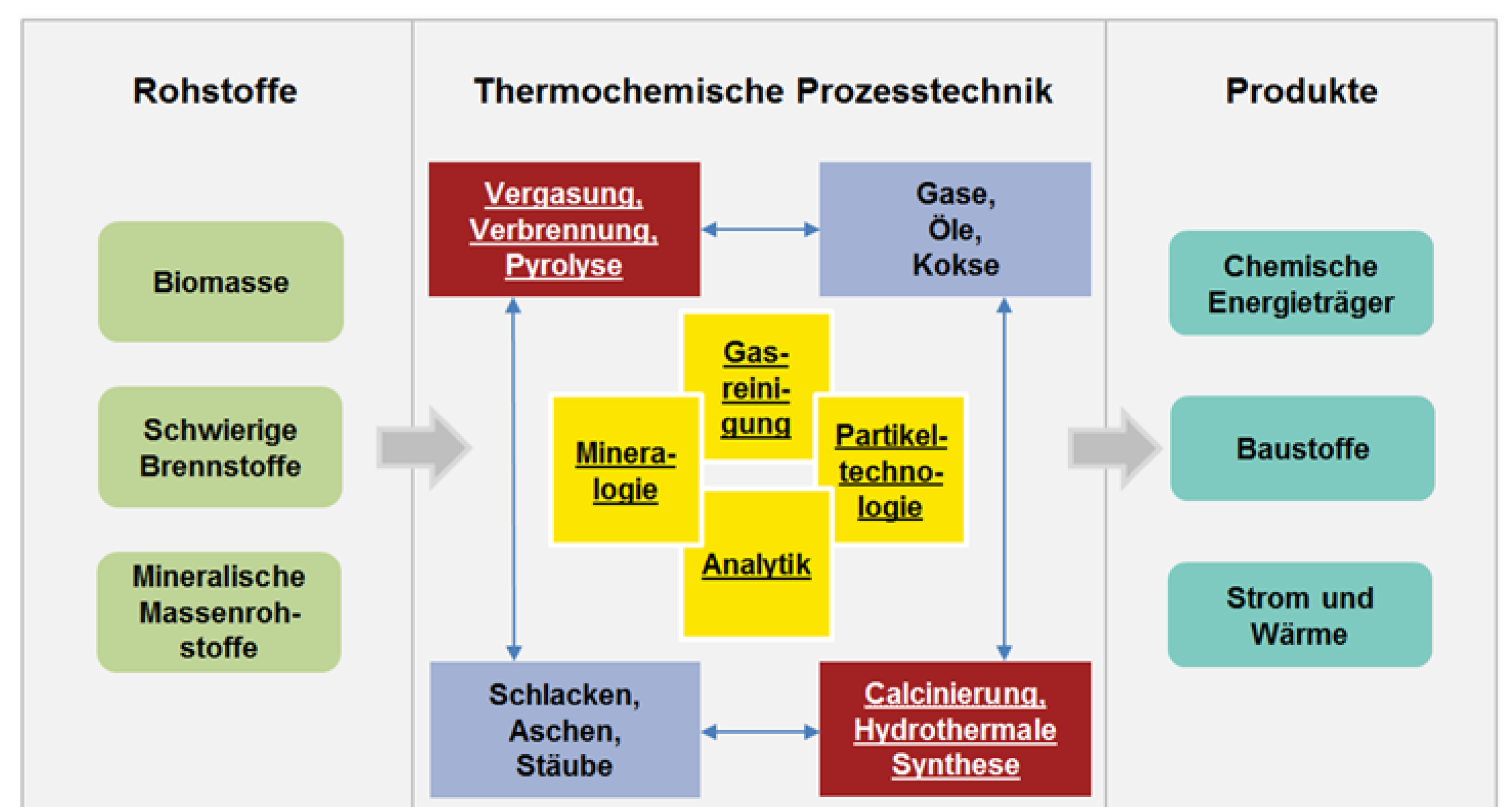
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## Helmholtz-Classification:

Programm Energy efficiency, Materials and Resources

Topic 4 Efficient Use of Fuel Resources

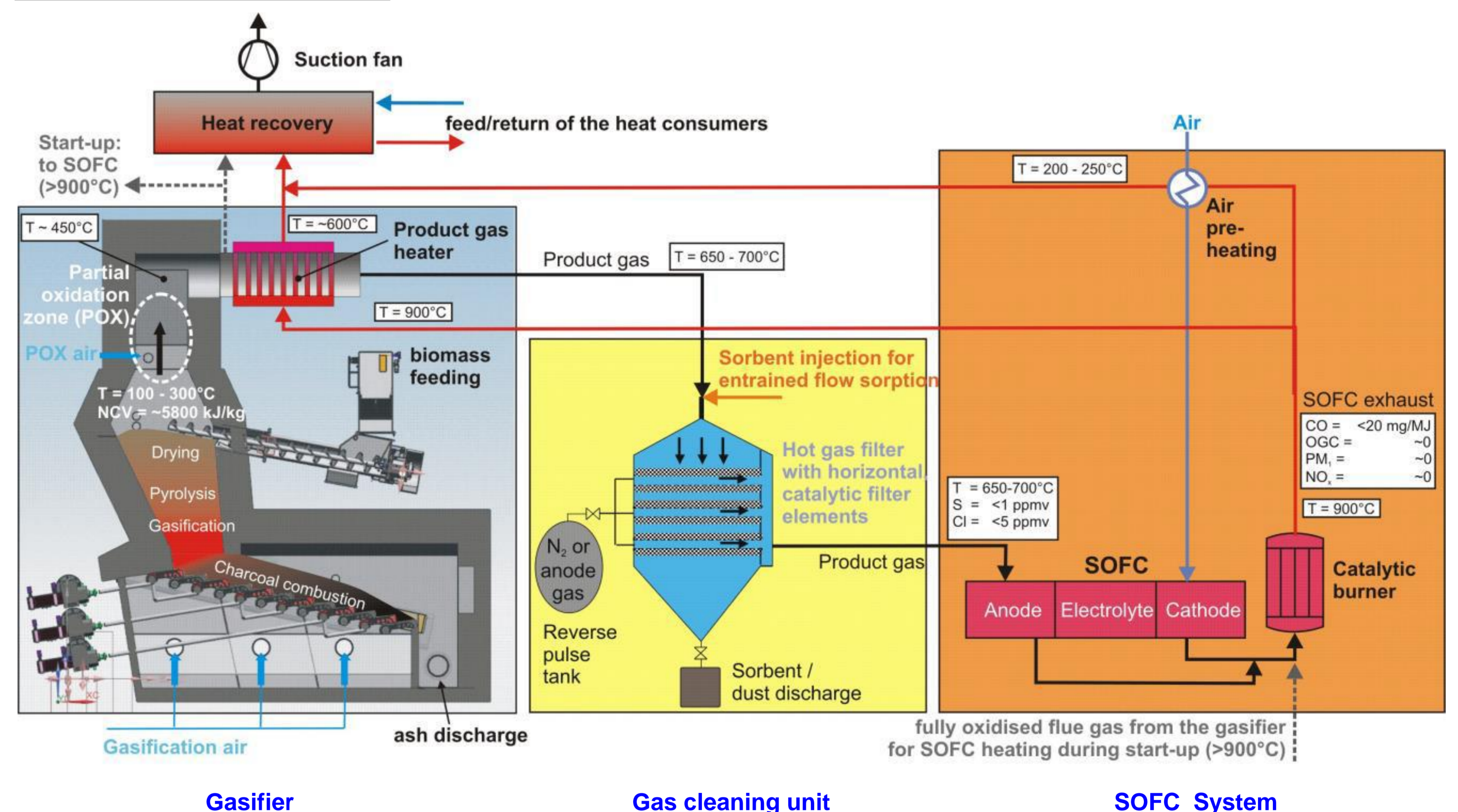
Subtopic 4.3 Gas Cleaning and Aerosol Technology



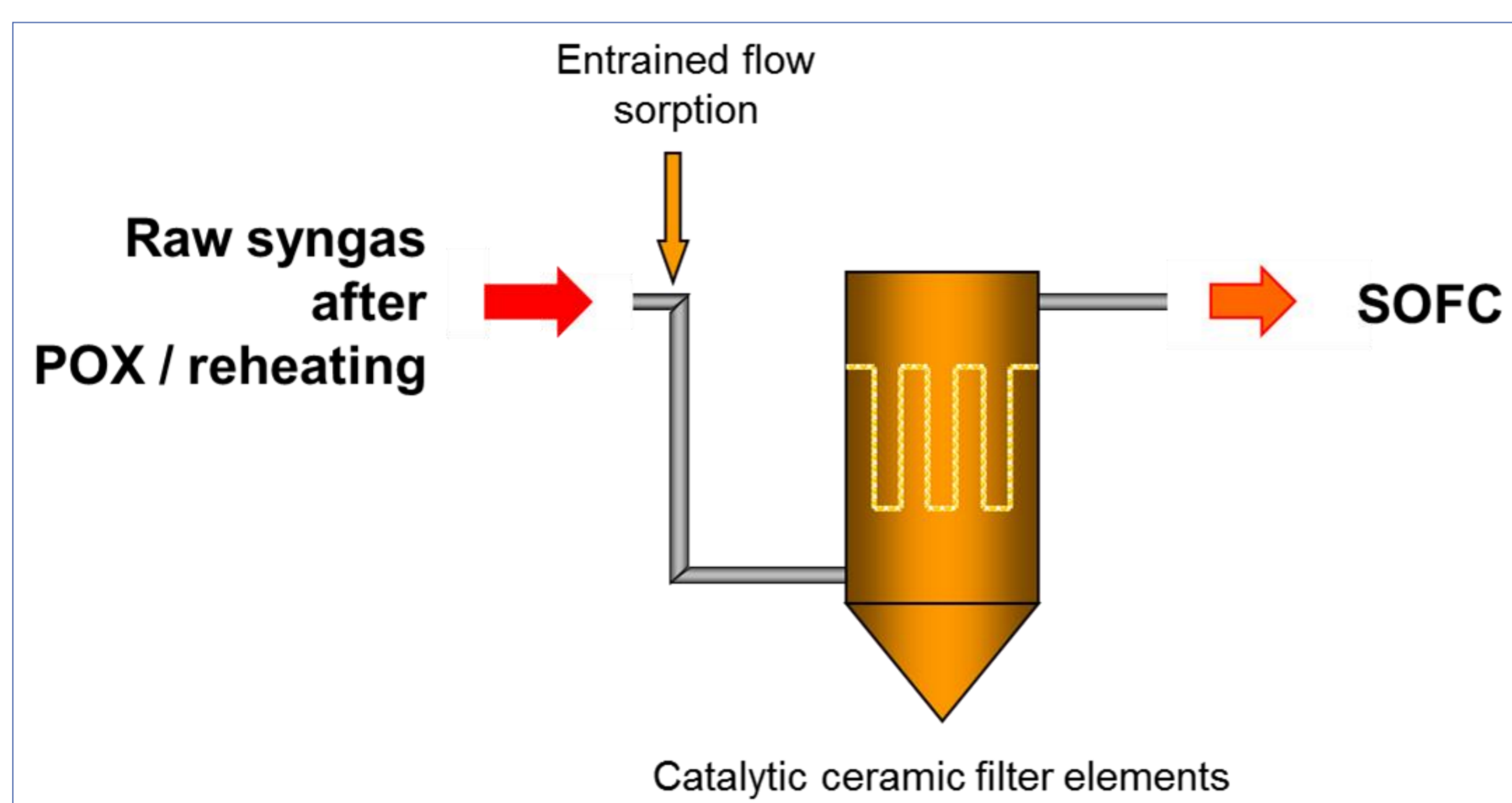
## Objectives:

- Fuel-flexible biomass CHP technology load range 1- 10 MW
- Electric efficiency 40%  
Overall efficiency 90 %
- Technology and process development  
→ Updraft gasification technology  
→ **Integrated high temperature gas cleaning**  
→ Solid oxide fuel cell technology (SOFC)
- Techno-economic assessment
- Environmental assessment
- Impact assessment
- Market potential studies

## Overall Process:



## Process Development ITC:



### Particulates

- Hot gas filtration with ceramic fibrous filter

### Tar conversion

- Catalytic coated filter

### Trace contaminants

(S-, Cl-species)

- Mineral sorbents

- Ceramic filter system with proprietary recleaning technology (600 – 700 °C, syngas)

- Horizontal arrangement of the filter elements
- Rigid ceramic fibrous material

- Catalytic coating of the filter elements

- Pt based catalyst
- Transfer pellet technology

- Entrained flow sorption process upstream of the filter system

- Dry mineral sorbents (mixtures)
- Flexible adjustment to syngas load

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