Green Fuel Cell

Fuel cell fuelled by gasification gas

EU project financed by Sixth Framework Programme

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Outline

- Objective
- Partners
- Project overview
- Potential SOFC pollutants
- Technology gap
- Solutions
- Ongoing work
- FORCE’s tasks
- Coherence with MicroCHeaP

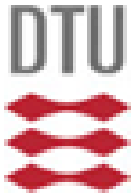
Objective

- To produce a gas that can meet the requirements for fuel for solid oxide fuel cells through reliable, up-scalable and cost-effective staged gasification of biomass

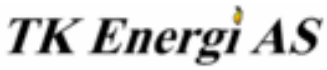
- Build lab-scale pilot plants

Partners

Agricultural Research for Developing Countries, FR



Technical University of Denmark, DK



TK Energy, DK

Energy Research Centre of the Netherlands, NL

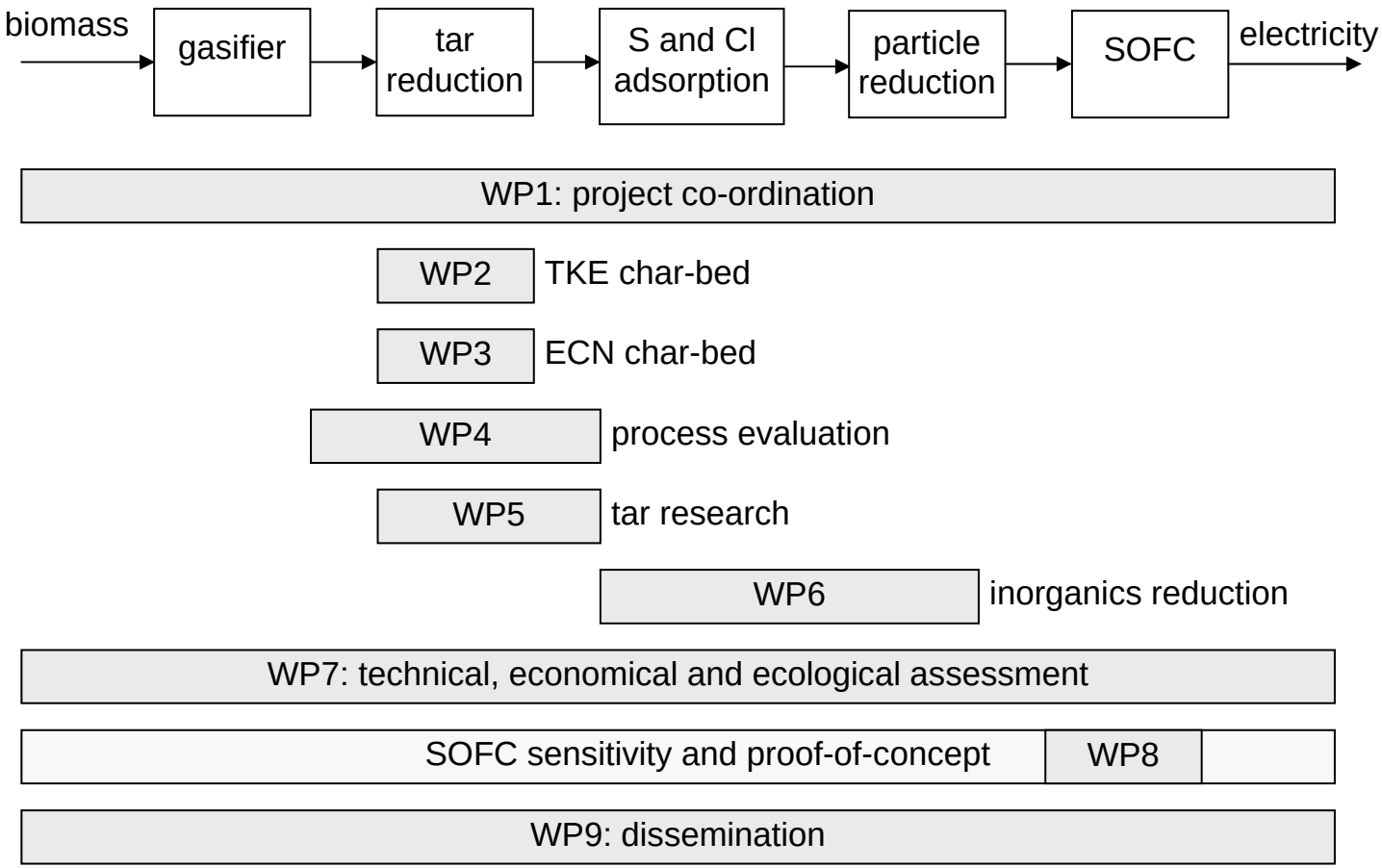
Risø National Laboratory, DK

The French Atomic Energy Commission, FR

FORCE Technology, DK

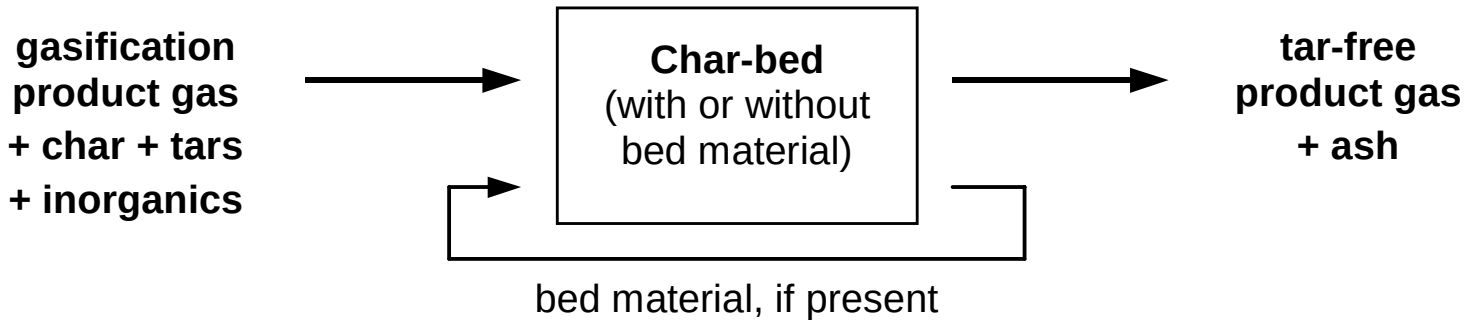
Institute of Chemical Technology Prague, CS

Project overview



Technology gap

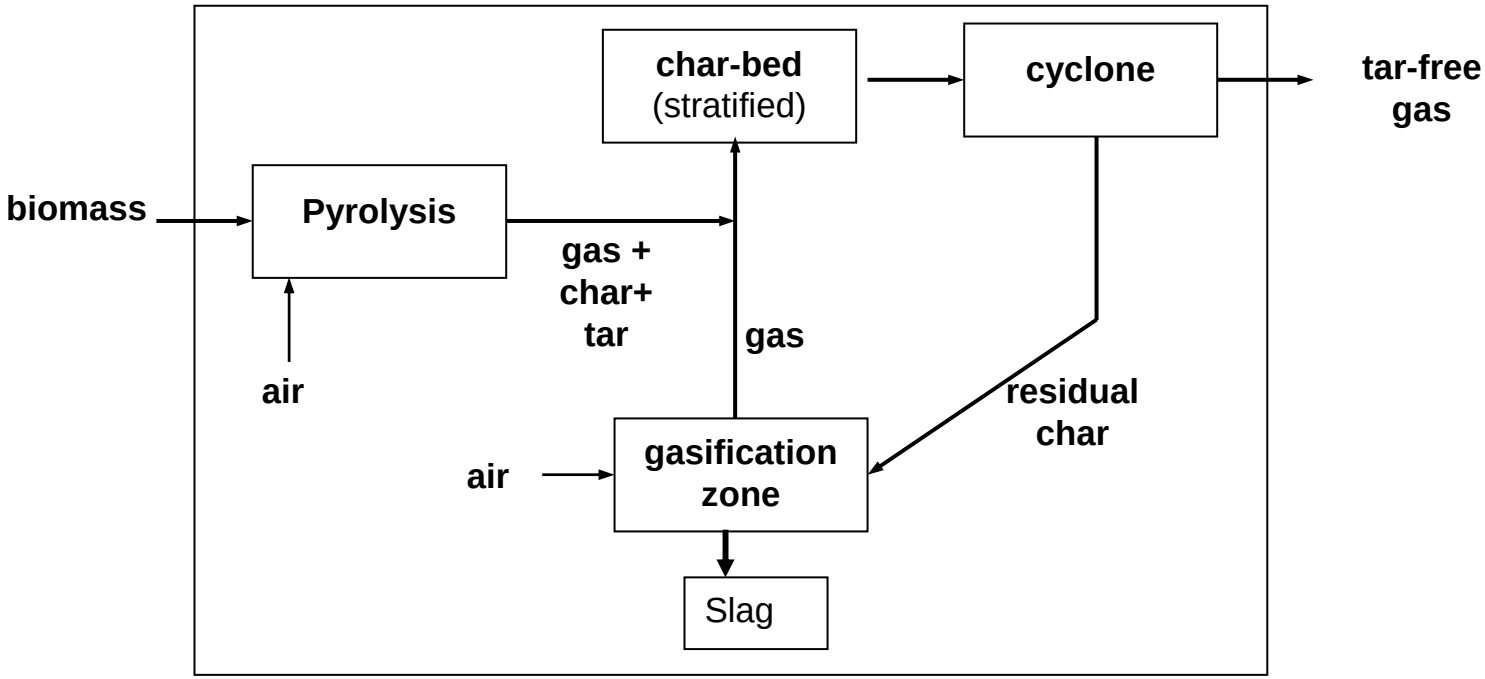
Principle of tar removal with char bed



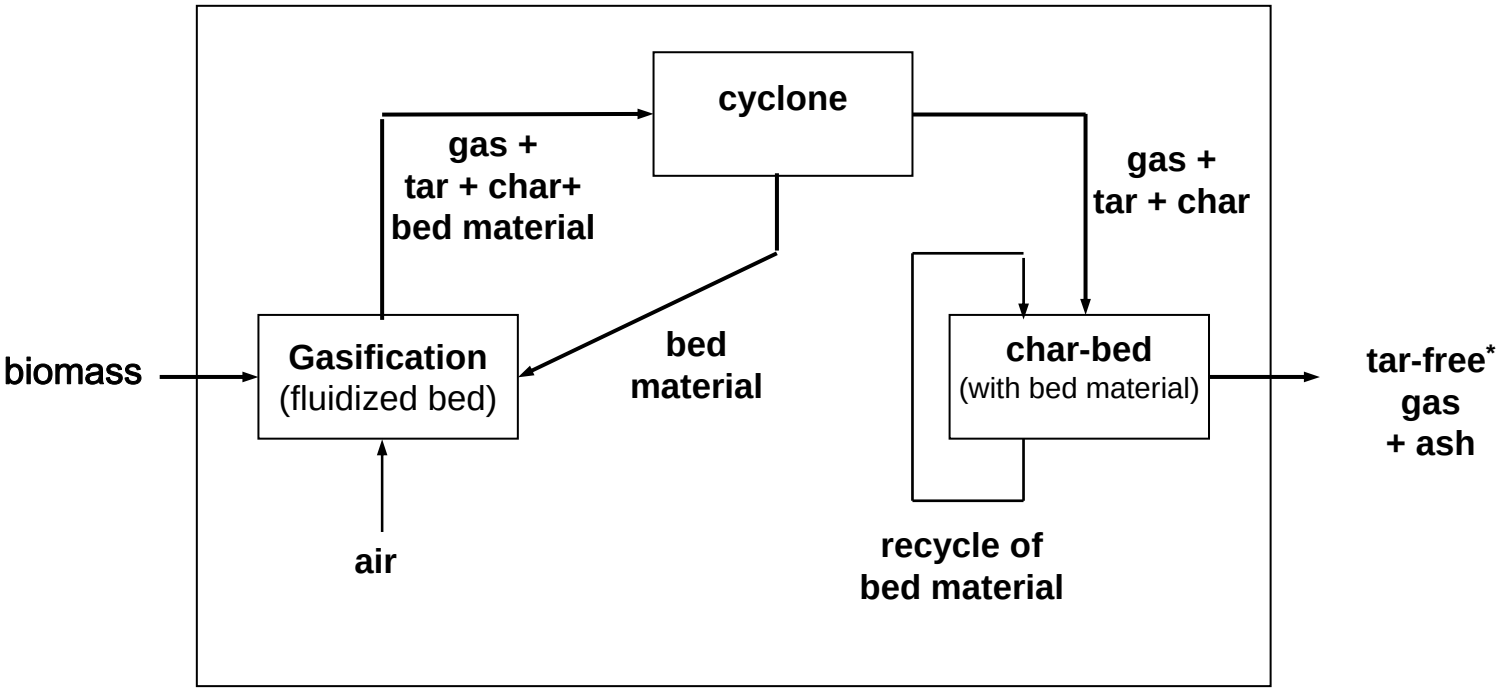
Two concepts:

- TKE concept – char bed without bed material
- ECN concept – char bed with bed material (TREC-reactor)

TKE concept char bed without bed material



ECN concept – char bed with bed material



SOFC potential pollutants

Dust, solid particles

Organic components: light hydrocarbons, tars

Nitrogen components: NH_3, HCN, ...

Sulfur components (gases): H_2S, COS, ...

Halide components (gases): HCl, HBr, HF, HI, ...

Alkali salts (condensable): KCl, KOH, NaCl, NaOH, ...

Heavy metals (condensable except Hg)

Knowledge of maximum content in gasification gas is limited; however for many inorganics < 1 Vppm

Ongoing work

- Hot gas cleaning chain – solide absorbents (moving granular beds or active filter reactors)
- Investigation of SOFC material sensitivity

FORCE's tasks

- Optimizing gasifier design by using CFD
- WP leader of WP7 "Technical economical & environmental assessment"
  - Technical evaluation (verification): measurements
  - Market evaluation
  - Environmental evaluation - comparative analysis
- Overall system assessment

Coherence with MicroCHeaP?

NO!

Plant size GFC: 1-30 MW_{el}

MicroCHeaP: < 5 kW_{th}

YES!

Clean gasification technology

Gas cleaning

SOFC applicable for micro CHP systems

For further info:

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Thank you for attention!