

Fischer-Tropsch synthesis – A technology to mitigate climate change?

Dr. Robert Güttel

Clausthal University of Technology



Levers to mitigate Climate Change

technology

use of
sustainable
resources

increase
efficiency of
consumer

solar power
wind power
biomass

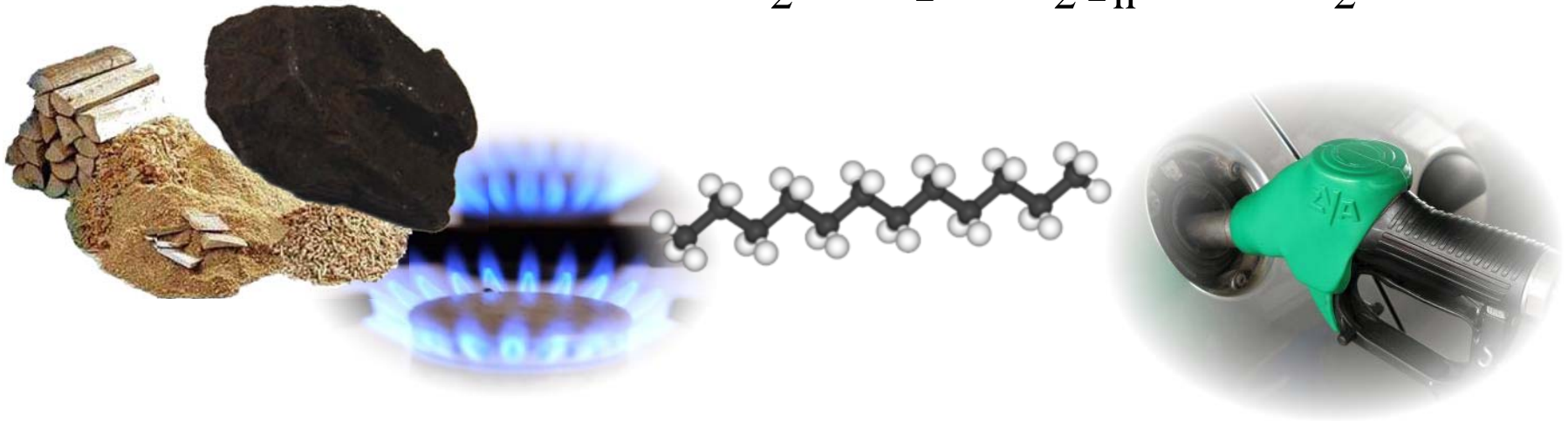
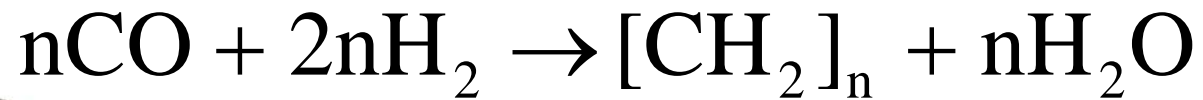
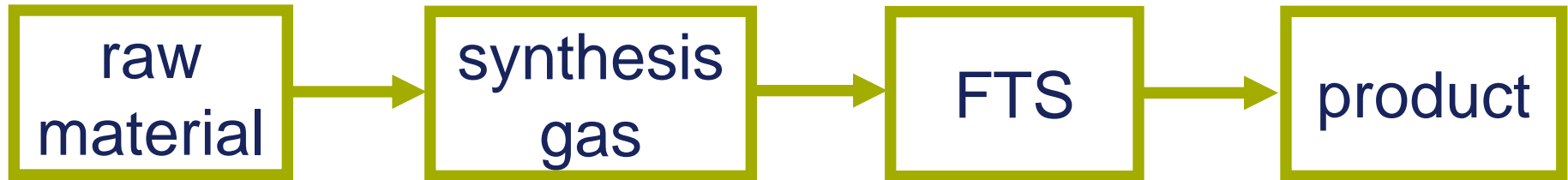
engines
heating
light

society

reduction of
consumption

mobility
heating
consumption

What is Fischer-Tropsch Synthesis?



How can FTS contribute?

- avoid flaring of associated gas (CH_4 ; GWP 25)
 - fuel production
- utilization of biomass
 - fuel production
 - base chemicals
 - carbon based substances



Abatement potential

- ca. 80 % of GHG emission by combustion of fuel¹
- ⇒ huge abatement potential for fuel from biomass
- case Germany
 - energy from biomass² 1200 -1700 PJ/a
 - consumption traffic³ 2541 PJ/a
 - consumption total³ 8714 PJ/a

Pre-requisites

Aim: CO₂-neutral utilization

- ✓ raw material biomass
- technological know-how
- financial background
- ✓ infrastructure for transportation
of raw material and product



Limitations

- need of biomass \Rightarrow concurrence to food production
- efficiency of
 - photosynthesis
 - technology
- capacity given by
 - photosynthesis minus agriculture
- investment costs



Use of Biomass in FTS

- keyword: Biomass-to-Liquids (BTL)
- decentral distribution all over the world
- no sense for transportation of diluted raw material
- decentral small scale production units
- 😊 CO₂ neutral “cleaner” fuel (S, N free)
- 😊 production possible in developing countries
- capacity limited by photosynthesis

Conclusions

- high abatement potential for FTS
- decentral use of biomass
- feasibility limited
- important process for carbon-based substances
- ☞ limitations not by process but by raw material
- ⇒ FTS essential process for sustainable future

Thank you for your attention



Sources

- 1 Germany 2008: Umweltbundesamt 2010.
- 2 technical feasible, 2009, Nationaler Biomasseaktionsplan für Deutschland, Anhang Tabelle 1.
- 3 Germany 2009: BMWi 2010, Energiedaten, sheet 5.