CO₂ Capture with Chemical-Looping Combustion (CLC)

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**PRINCIPLE**

metal oxide (MeO) transfers oxygen from air to fuel

**PRACTICE**

fluidized-bed technology

**PURPOSE**
Oxygen is transferred from air to fuel by metal oxide particles

Inherent CO₂ capture:
- fuel and combustion air never mixed
- no active gas separation needed
- large costs/energy penalties of gas separation avoided

• Potential for real breakthrough in costs of CO₂ capture

But does it work in practice ??
Yes, it works!

10 kW gas, 2003

300 W gas, 2004

10 kW solid fuel, 2006

100 kW solid fuel, 2011

Total operation at Chalmers: 3700 h
Options for CLC

Capture CO₂ from fossil fuel combustion, (or hydrogen production)

Capture CO₂ from air with biomass combustion, (negative emissions)
Need for negative emissions ??
Carbon budget for max 1.5°C and 2°C :
200 and 800 Gton CO₂
Emissions today >35 Gton/yr :

>>> 6 - 25 years left of todays emissions

Negative emissions will be needed to meet climate targets

THANK YOU!

>300 CLC publications and 7 CLC songs at:
http://www.entek.chalmers.se/lyngfelt/co2/co2.htm