



ASSOLOMBARDA
Confindustria Milano Monza e Brianza

Produzione di gas di sintesi da CO₂ e H₂S

Speaker

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POLITECNICO
MILANO 1863



Current picture

“35'000 Mt of anthropogenic CO₂ emissions” [1]

Main reasons

- ***Energy generation***
- ***Coal uses***
- ***Fuel processing/uses***
- ***No uses...***

Current reuse:

- ***Urea and methanol synthesis***
- ***Sequestration and storage***

Need for hydrogen (then, energy) or other costly reducing agents (e.g. methane)

[1] Le Quéré et al. The global carbon budget 1959-2011. *Earth System Science Data Discussions* **2012**, 5, 1107-1157.

New technology – AG2S™

Convert CO₂ into

- syngas (AG2S™ - Acid Gas to Syngas) and**
- valuable chemicals (AG2L™ - Acid Gas to Liquid)**

Without any use of hydrogen or costly reducing agent

Another emission (H₂S) is used (AG2S™ reaction):

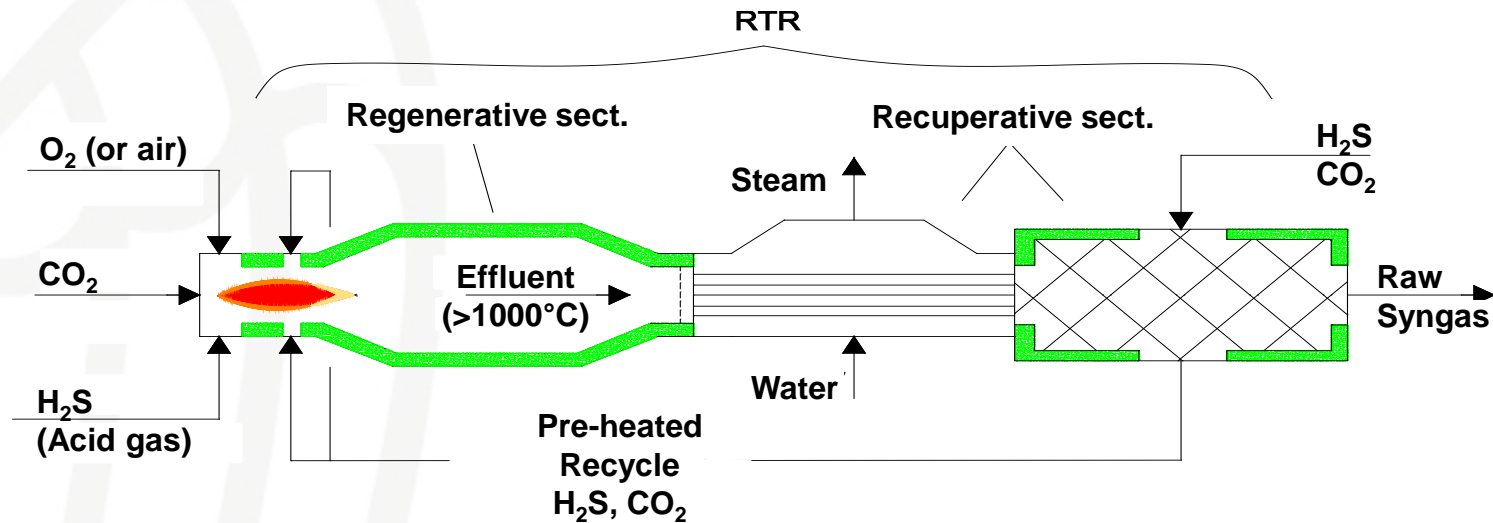


Possible when CO₂ and H₂S are in co-presence:

- Natural gas, Coal, Shale gas, Shale oil, (heavy) oil**
- Biomass, Biogas, Geothermal energy**

Easiness/feasibility: same units for CO₂/H₂S separation

The AG2S™ system ^[1]



Features:

- *High conversion yield*
- *No by-products*
- *Energy sustainability*

AG2S™

AG2L™

Applications:

- *Different scales according to the application field*
- *Thermal/catalytic nature of the treatment*

^[1] Manenti et al., wo/2015/015457 Syngas production by CO₂ reduction process, 2015

Feasibility study

Ready for:

- coal gasification, oil refinery, shale oil, coke oven gas, hydrotreating, natural gas, geothermal energy

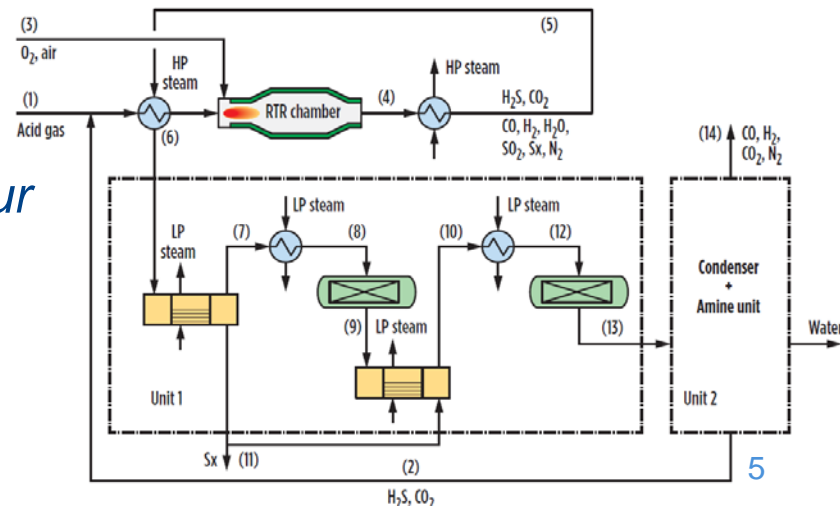
The case of IGCC revamp (77 t/h; coal with 5%w sulfur):^[1-2]

- Gas/gas heat exchanger (49700 kg, 727 k\$)
- Burner (165 k\$)
- Amine washing (New 30 m³/h unit, 6.16 M\$)



Payback: 1.63y

- Accounting for syngas only
- Not considered: CO₂ certificates, sulfur sales, sulfur-rich resources



[1] **Bassani et al.**, Acid Gas to Syngas (AG2S™) technology applied to solid fuel gasification: Cutting H₂S and CO₂ emissions by improving syngas production, *APPLIED ENERGY*, **2016**

[2] **Manenti et al.**, Syngas from H₂S and CO₂: an Alternative, Pioneering Synthesis Route?, *HYDROCARBON PROCESSING*, **2016**

Technical readiness level

Laboratory for H_2S/CO_2 use and test: *ready* at Politecnico di Milano (operation)

Pilot plant: *ready* in Sotacarbo SpA (construction)

Portable module for conversion: *planned* at Technical University of Berlin
- Searching for industrial partner

Licensing: FEED *ready*
- Searching for EPC and/or industrial partners

R&D & License agreement *tbd*
- Searching for industrial partners
- Co-ownership, further advance, commercial phase



Thanks for the kind attention

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