

LIFE 20 CCM/GR/001642

CO₂toCH₄: Demonstration of a mobile unit for hybrid energy storage based on CO₂ capture and renewable energy sources

LAUNCHING EVENT



PPC
Renewables



ARISTOTLE
UNIVERSITY
OF THESSALONIKI



HELLENIC AGRICULTURAL
ORGANIZATION - DEMETER



LIFE20 CCM/GR/001642

Launching Event 21st June 2023





What are the main CO₂ capture technologies?



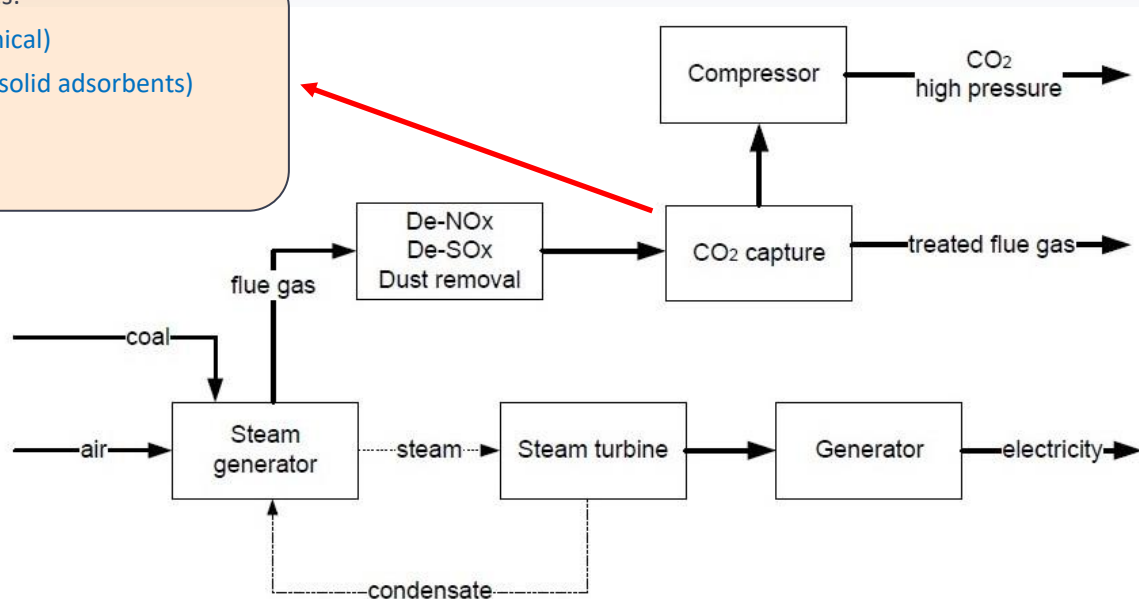
What are the main CO₂ capture technologies?

► *Post combustion CO₂ capture*

Typical schematic diagram of a power plant with **post-combustion CO₂ capture**

Main CO₂ capture technologies:

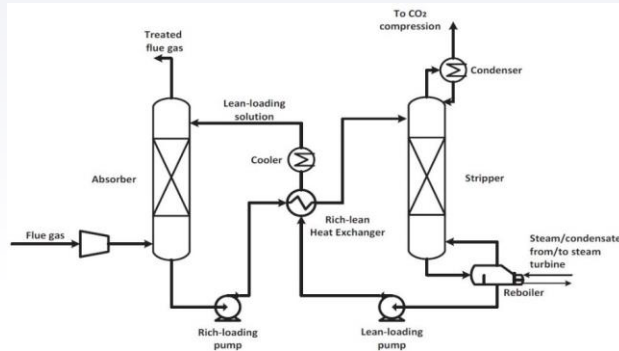
1. Absorption (usually chemical)
2. Adsorption (usually with solid adsorbents)
3. Membrane separation
4. Cryogenic separation



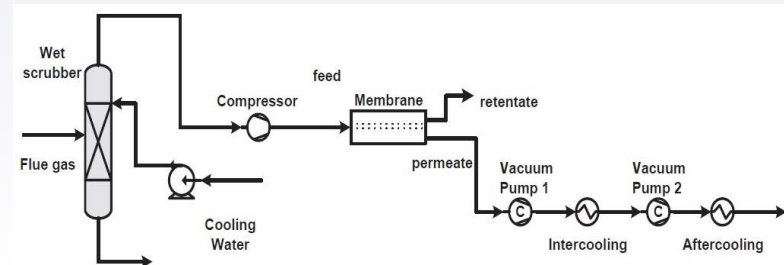
What are the main CO₂ capture technologies?

► Main CO₂ capture technologies

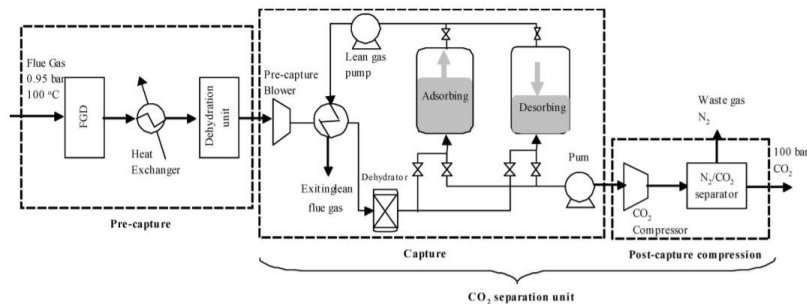
Absorption



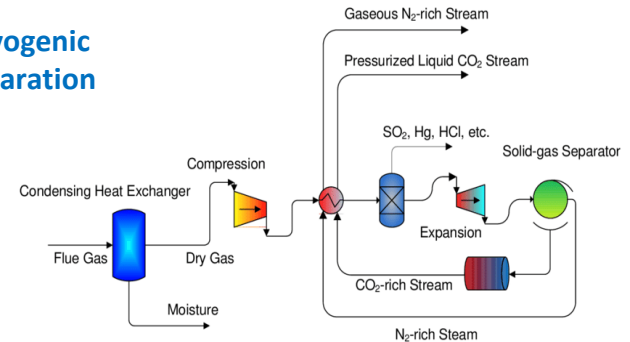
Membrane separation



Adsorption



Cryogenic separation



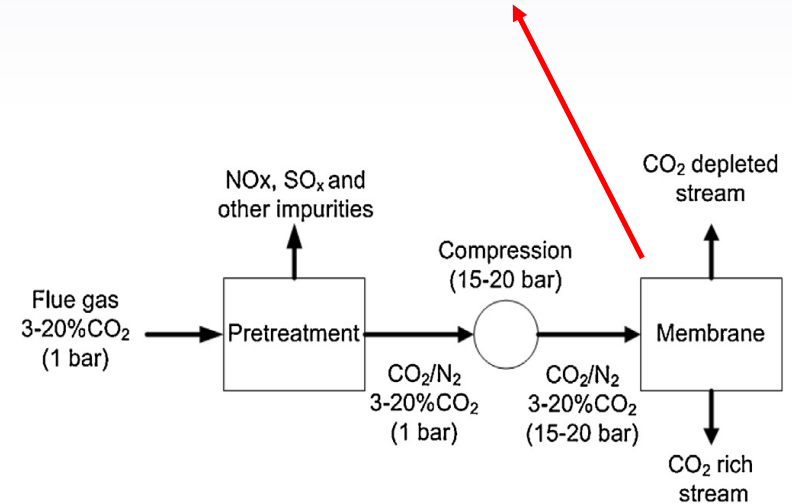
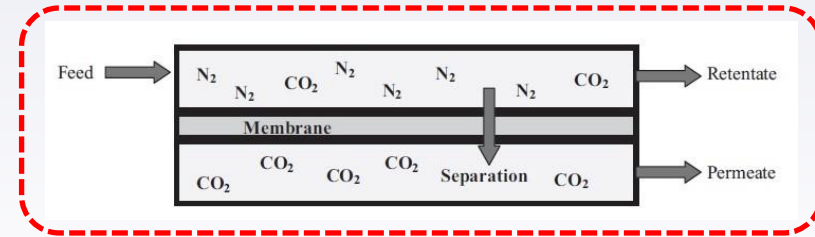


How can membrane separation be applied for separating CO₂ from flues gases?



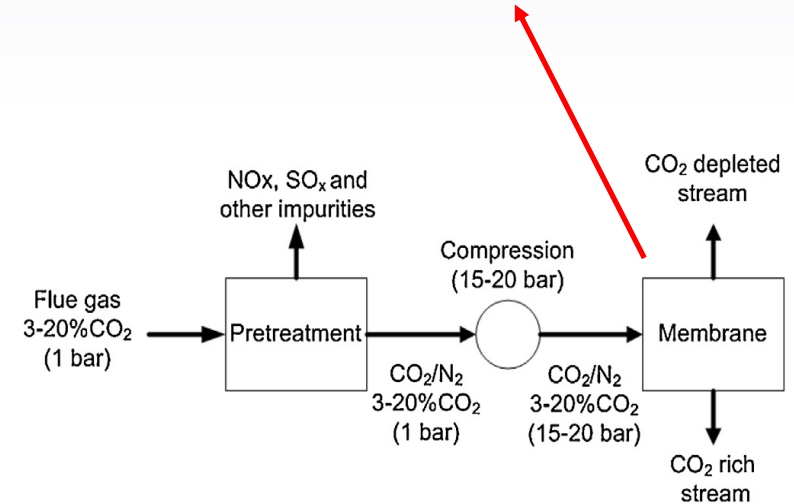
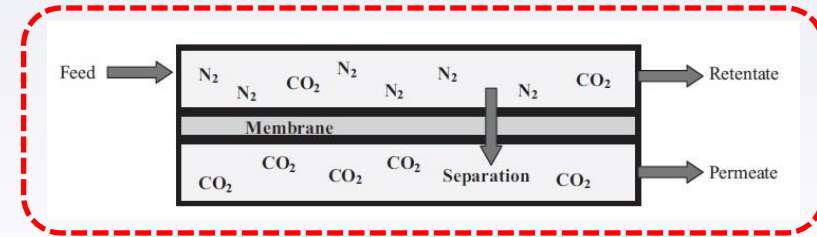
How can membrane separation be applied for separating CO₂ from flue gases?

- ✓ Membrane separation processes are already being used commercially for CO₂ removal
- ✓ Separation principle: The separation is based on the selective permeation of gas components through a semi-permeable membrane, which acts as a barrier for specific gas components, although allows some others to permeate the membrane, according mainly to their effective sizes



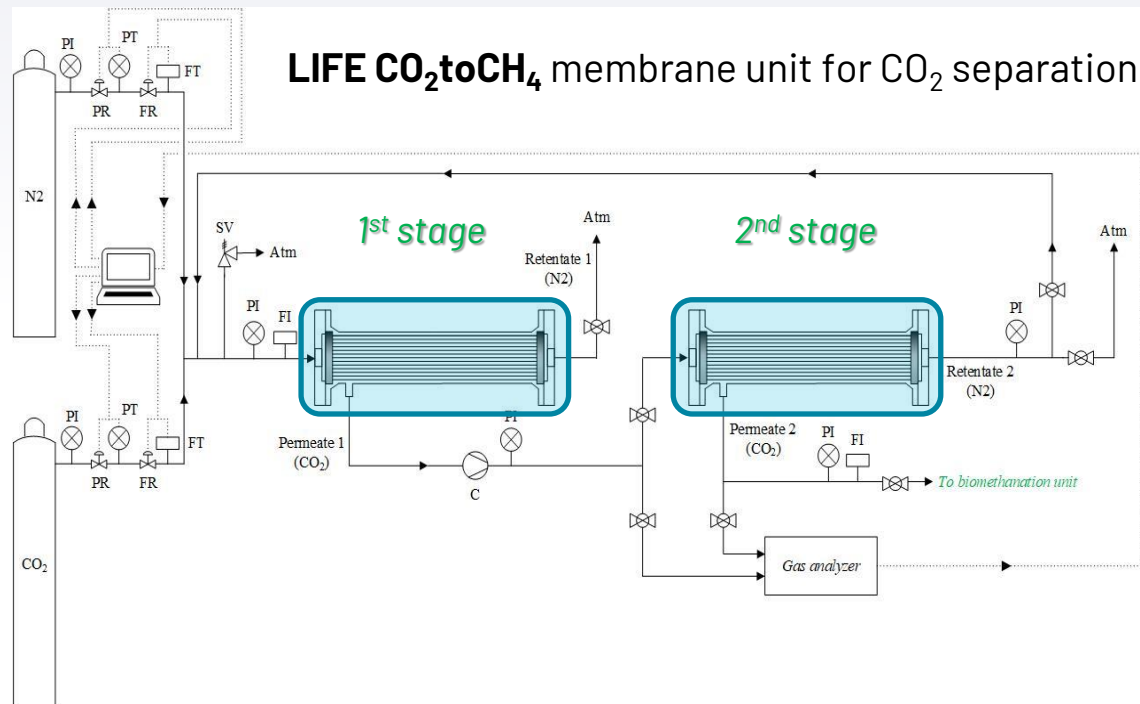
How can membrane separation be applied for separating CO₂ from flue gases?

- ✓ It is an environmentally friendly technology with rather simple operation, low energy demand and without the production of harmful wastes
- ✓ The most significant drawbacks include the rather frequent replacement of membranes and the requirement for effective biogas pre-treatment, i.e. the necessary preliminary removal of H₂S (at least), water, oil droplets and aerosols



How can membrane separation be applied for separating CO₂ from flue gases?

STEPS 



1. Start-up/testing of the membrane unit
2. Application of different gas ratios to simulate flue gases from several industrial sectors (power plants, biogas plants, cement industries etc.)
3. Evaluation of the gas purification membrane unit in terms of CO₂ capture
4. System optimization

Thank you



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