

OPTIMAL PROCESS DESIGN OF AMINE-FACILITATED TRANSPORT CARBON CAPTURE WITH NANO MATERIALS ENHANCED MEMBRANES

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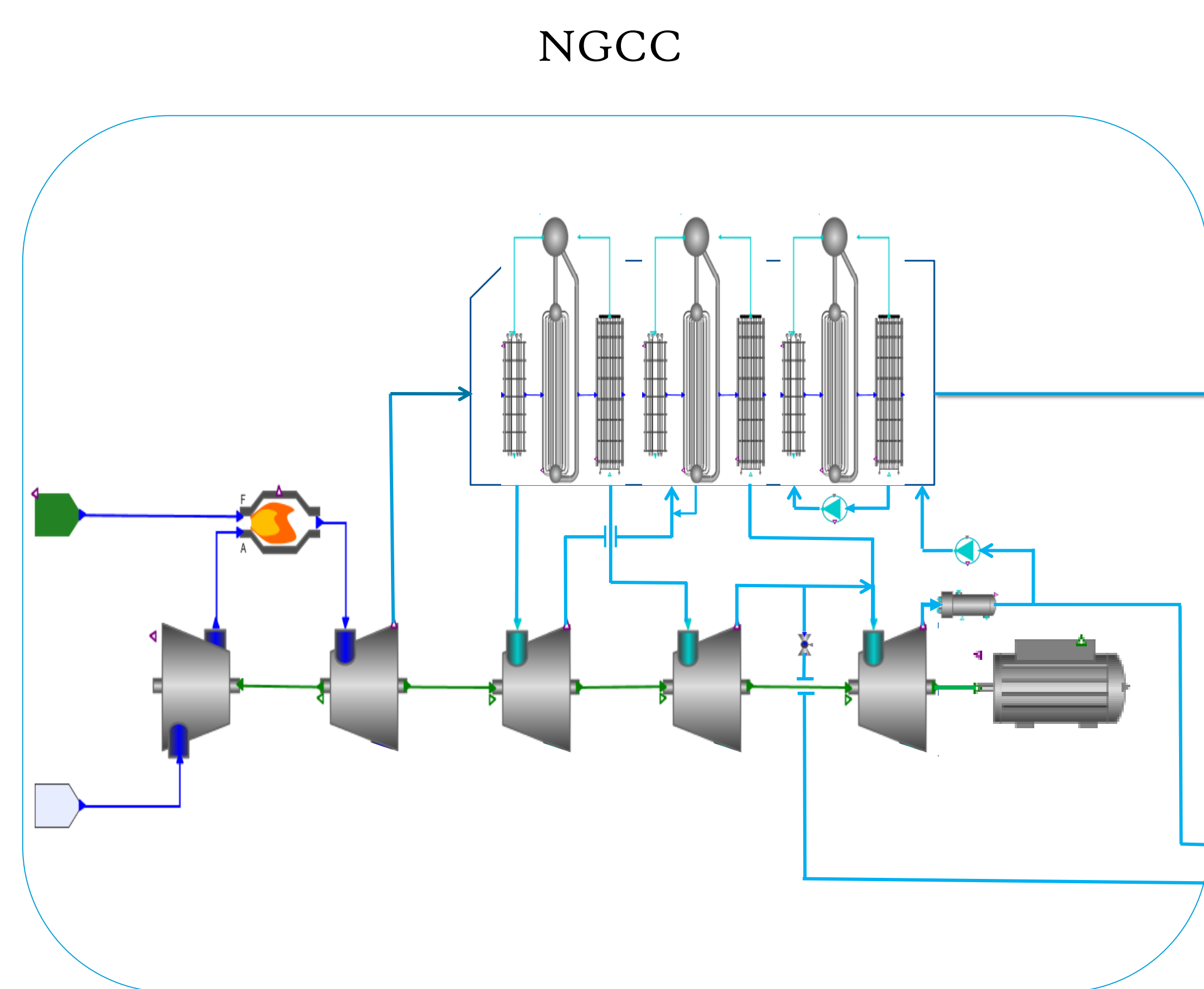
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Introduction:

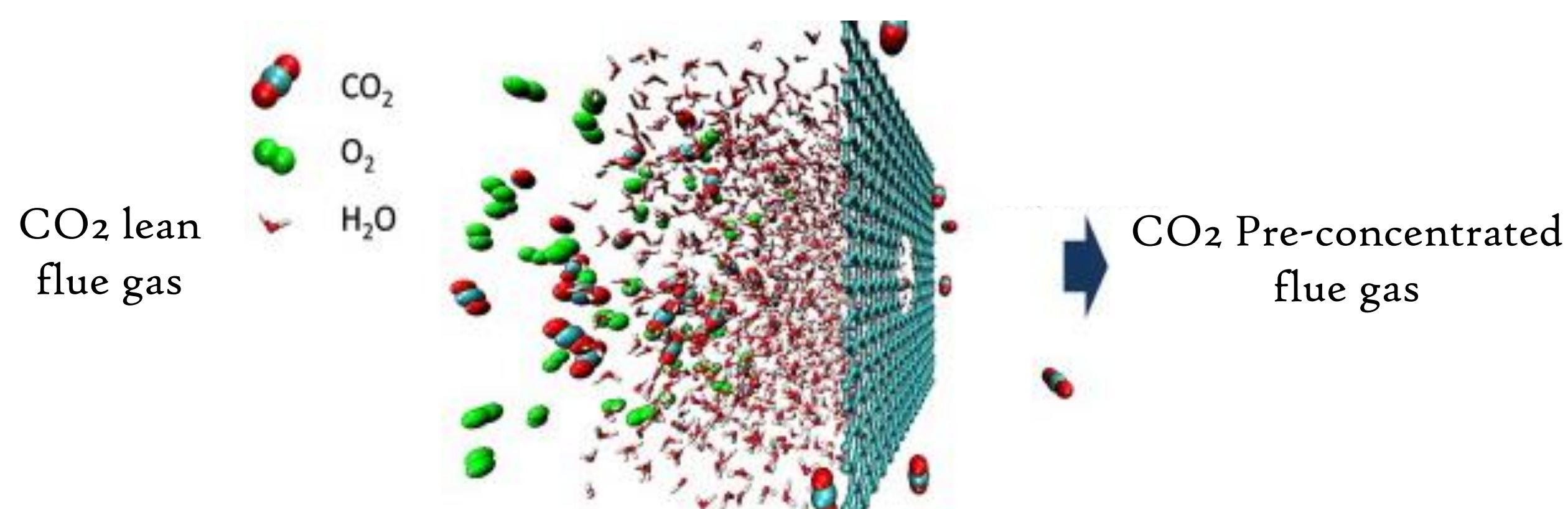
Commercial deployment of CCS technologies must address the principal challenge of reducing the regeneration energy requirement of aqueous amine solution in an absorber-stripper configuration while synchronously relegating the parasitic energy consigned on the power plant. NanoMaterials Enhanced Membranes for Carbon Capture (NANOMEMC²) presents an innovative technique to pre-concentrate CO₂ upstream of the ACP, to enhance driving forces for absorption and subsequently decrease the SRD.

Research Objectives:

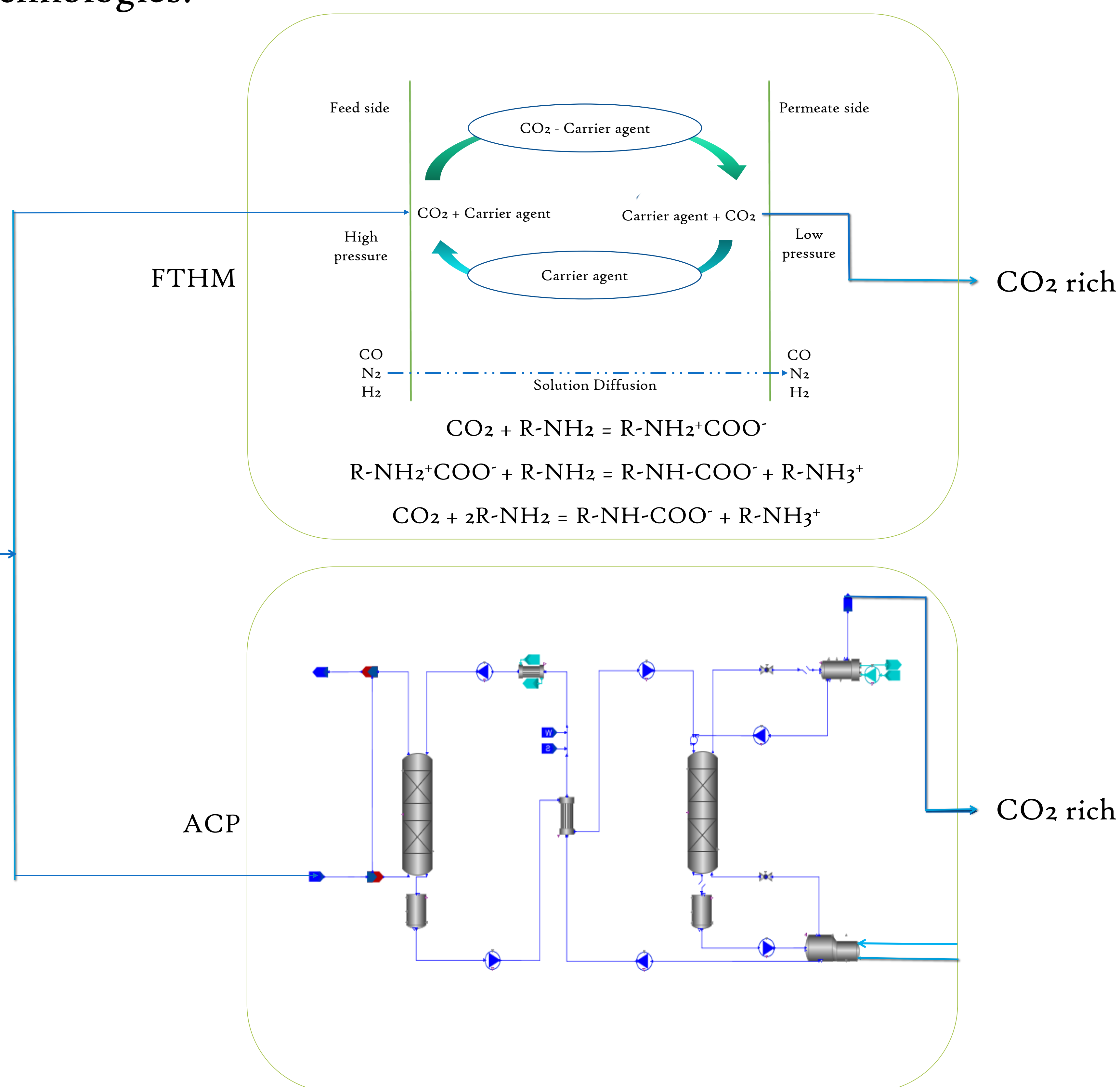
NANOMEMC² aims to reduce the power plant's parasitic energy by 20%, and 20% reduction in both CAPEX & OPEX, a projected target of 40/ton of CO₂ outwitted and a 35% decrease of CO₂ emissions. How does it compare to other CO₂ separation technologies?



Current & Future work:



1. Assessment of different operating conditions using Facilitated Transport Hybrid Membrane (FTHM) for subsequent design optimization
2. Comparison of FTHM CO₂ capture technology with other CO₂ capture techniques
3. Assessing the impact of varying CO₂ concentration on the performance of FTHM



Methodology:

$$P_i = \frac{N_i}{\Delta p_i/l} \quad \alpha_i = \frac{y_i/y_j}{x_i/x_j}$$

$$N_A = \frac{D_{AB}(C_{AB,1m} - C_{AB,m2})}{l} + \frac{D_A(C_{A,1} - C_{A,2})}{l}$$

Where, P_i , α_i and N_A are Permeability, Selectivity and steady state flux of CO₂

Process modelling (gCCS) and Experimentations campaigns to be carried out at the PACT facilities.

Acknowledgement:

