

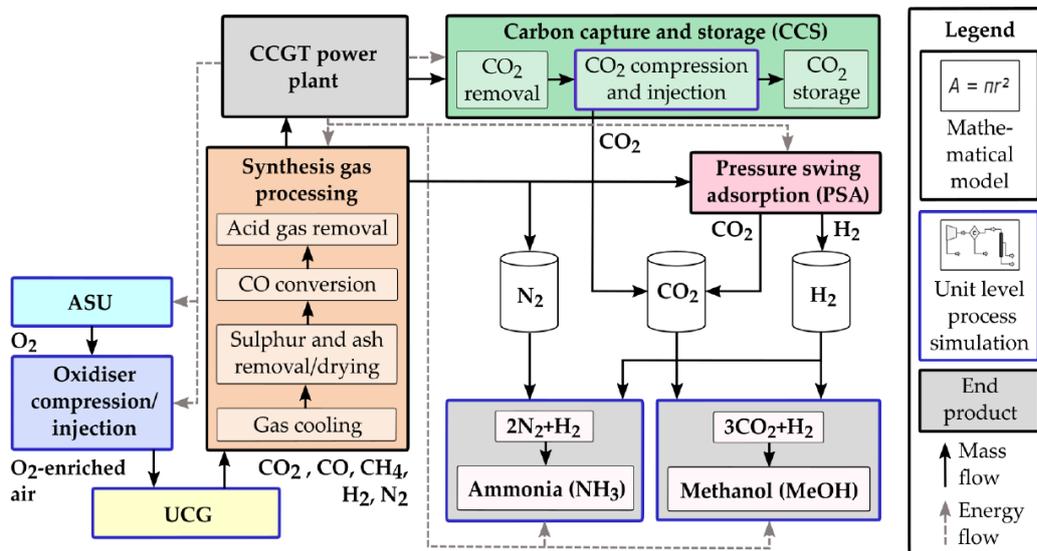
PROJECT FINDINGS

Assessment of CBM-UCG end-product scenarios

The economics of UCG is dependent on many components, including but not limited to:

- geological setting of the coal seam,
- land use on the surface,
- selected technology for the downstream syngas utilisation,
- selection of UCG oxidant,
- requirements for carbon dioxide capture and storage (CCS).

Within the MEGAPlus project, economic assessment of the overall process chain from the production of a methane-rich synthesis gas, through its cleaning and further processing, to the end products - SNG and methanol was carried out. Focusing on process data such as flow rates, composition and p/T conditions, the subsurface and surface process steps were integrated to assess fully commercial operations resulting in 16 different model setups located in the three project study areas, i.e. South Wales (UK), Ruhr District (Germany) and Upper Silesian Coal Basin (Poland). These analyses took into account different locations, end products, operational boundary conditions as well as individually integrated process optimisation, serve as benchmark to identify the most and least economical process chain locations and combinations. A techno-economic modelling was applied to determine process costs for oxidiser production, in-situ gasification, autonomous power supply, CAPEX and OPEX for the CBM process, CCS costs and finally the overall levelised production costs for SNG and MeOH (figure below).



Techno-economic model for cost determination (GFZ, Potsdam)

Sixteen fully commercial techno-economic model setups have been established based on the project's findings. The techno-economic modelling results show that taking into account the

current prices (September 2021) of the analysed commodities (MeOH: 517 €/t, Natural Gas: 17 €/GJ) both methanol and SNG production could be economically competitive under the given site-specific geological and operational constraints, however for the SNG scenarios the economic performance is much more favourable (tables below).

Results of the techno-economic analysis for CBM-UCG based methanol production

Target coal seam related model setups	Levelized MeOH costs (€/t)	Levelized MeOH costs (€/t)
	Scenario I	Scenario II
Six Feet Seam, South Wales	516.33	516.56
Seam #5 (South), Germany	537.83	526.90
Seam 510, Poland	522.64	496.71
Seam 405 (East), Poland	498.47	474.30

Results of the techno-economic analysis for CBM-UCG based SNG production

Target coal seam related model setups	Levelized SNG costs (€/GJ)	Levelized MeOH costs (€/GJ)
	Scenario I	Scenario II
Six Feet Seam, South Wales	4.84	5.23
Seam #5 (South), Germany	5.06	6.16
Seam 510, Poland	5.46	6.29
Seam 405 (East), Poland	6.62	7.56

Read more at projectmega.eu