Adsorbent evaluation and design for post-combustion CO_2 capture (WP A1a)

Co-Investigator: Camille Petit, Niall Mac Dowell
Key researchers: David Danaci, Mai Bui
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bit.ly/ddanaci

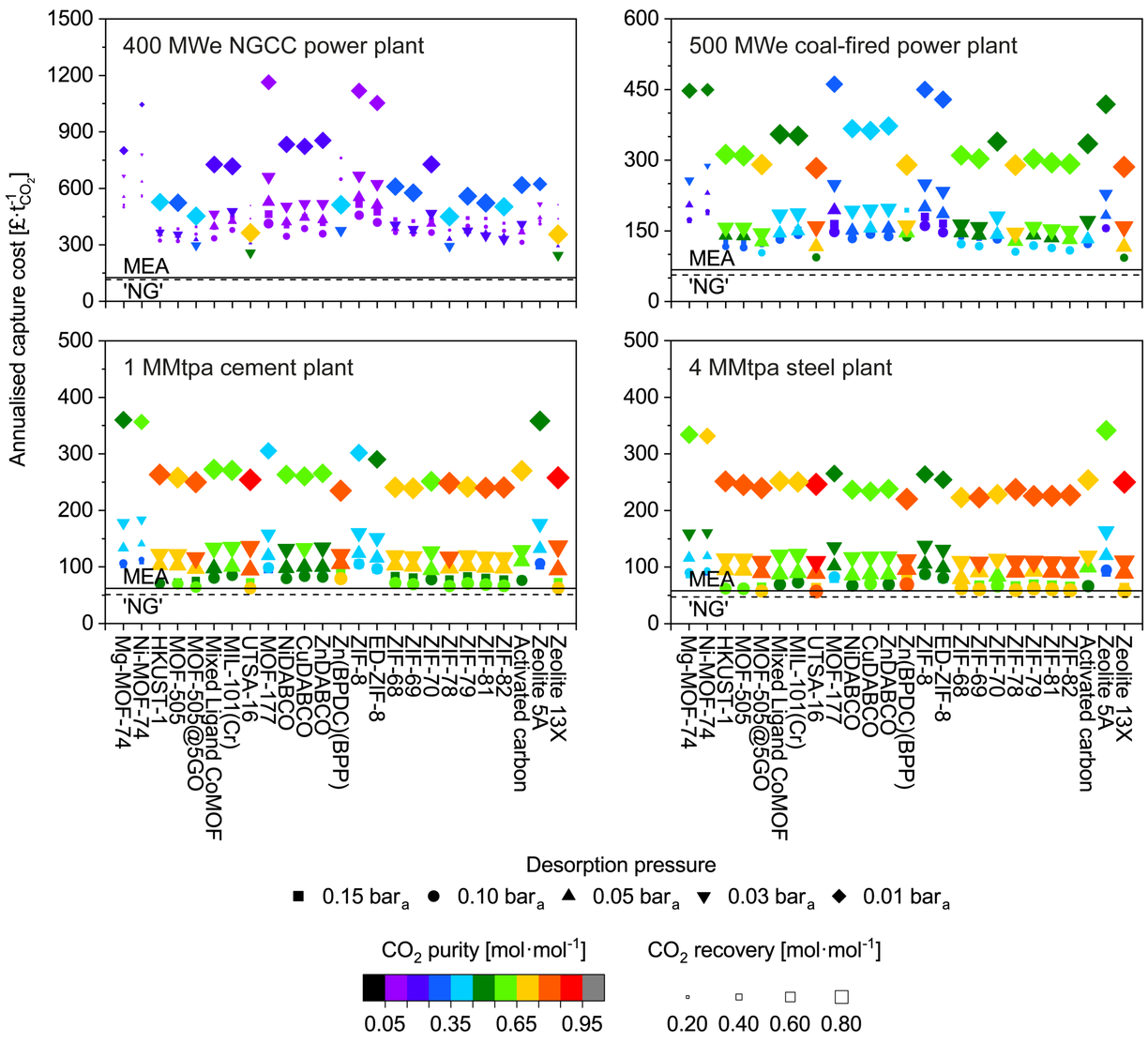
Project overview

- Investigate the suitability of adsorption for post-combustion CO_2 capture
- Consider a range of flue gas sources for separation by pressure-swing (PSA) & temperature-swing adsorption (TSA)
- Identify the 'ideal adsorbent' characteristics which maximise performance
- Identify required input data to accurately assess an adsorbent, and populate missing data

Key objectives:

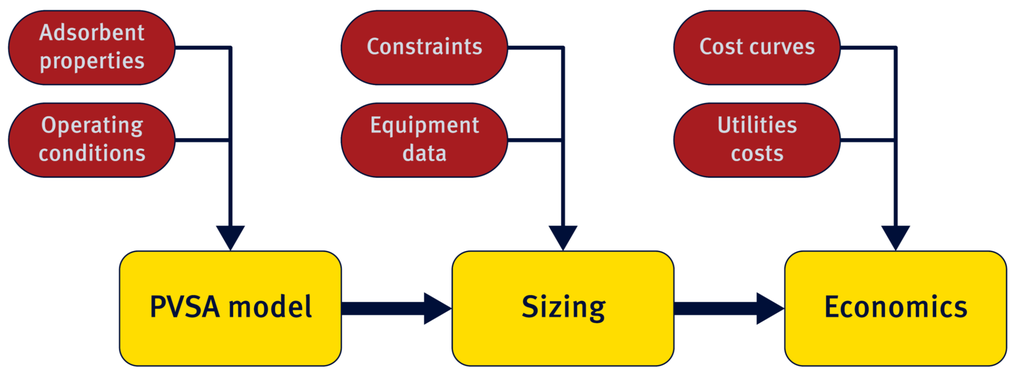
- Develop adsorbent screening tool for a range of flue gas sources
- Identify relationship between adsorbent properties and capture performance
- Develop reduced order model for new adsorbent screening
- Populate missing data required for adsorbent evaluation

Adsorbent screening results for post-combustion and industrial capture

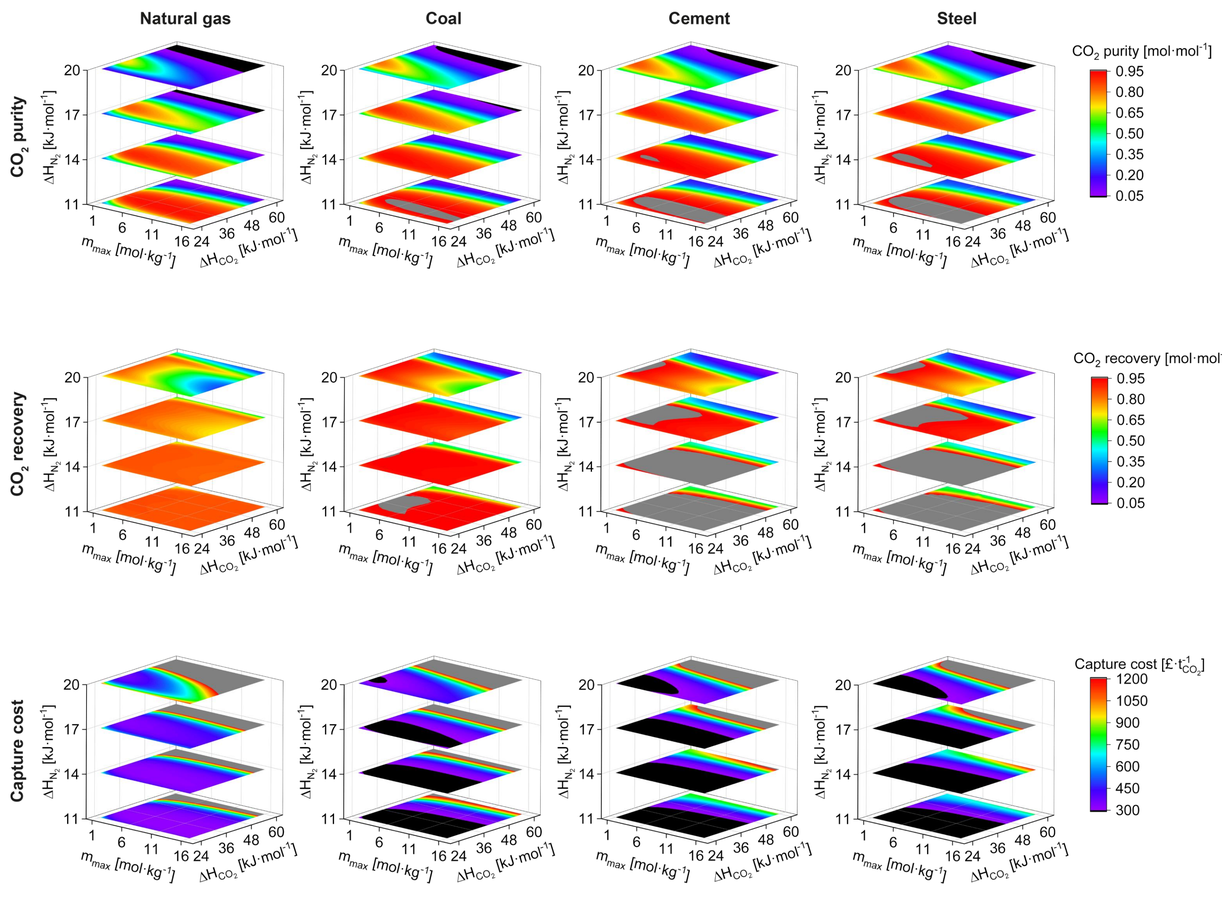


Research highlights

- Screening tool developed for post-combustion capture via PVSA
- Performance of 22 MOFs compared over 4 scenarios (top right)
- Data generated using screening tool to develop reduced order model (bottom right)
- Reduced order model can be used to swiftly evaluate new adsorbent performance
- Desirable adsorbent properties identified



Reduced order model for new adsorbent screening



Next steps

- Develop TSA model
- Continue populating adsorbent physical properties data

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