UKCCSRC PACT FACILITIES

CARBON CAPTURE AND STORAGE
WHAT ROLE FOR R&D IN DELIVERING COST-COMPETITIVE CCS PROJECTS IN THE UK IN THE 2020s

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Carbon Capture PACT facilities

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PACT facilities

UKCCSRC PACT FACILITIES

www.pact.ac.uk

- Specialist national facilities for R&D in advanced fossil-fuel energy, bioenergy and carbon capture technologies
  - Pilot-scale platform for technology development and validation
  - Supporting analytical facilities
  - Process/system model development and validation
- **Aim:** Support and catalyse industrial and academic R&D to accelerate the development and commercialisation of novel low carbon technologies
- **Objectives:**
  1. Provide platform for cost reduction through R&D, Learning, KT
  2. Bridge gap between bench-scale R&D and industrial pilot trials
  3. Provide shared access to industry and academia
  4. Provide relevant capability for R&D
     1. technical feasibility and process evaluation
     2. technology validation and de-risking
     3. process integration and design concepts for scale-up
  5. Support development of operational experience

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Department of Energy & Climate Change

EPSRC Engineering and Physical Sciences Research Council

UKCCS RESEARCH CENTRE

PACT sites and capability

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- Combustion research
- Gas, Coal, Biomass
- Post Combustion Capture (coal/biomass/gas)
- Oxyfuel (coal/biomass)
- Fluidised bed combustion
- Chemical looping
- Industrial Carbon Capture
- CO2 transport
- State of the art analytical capability

PACT Edinburgh: ACTTROM

Transportable Mini-Lab for onsite, long-term capture media testing under real operating conditions

PACT Core Facilities

- 1 tCO_2/day Solvent-Based Capture Plant
- 250 kW air/oxy combustion rig for coal/biomass
- 330 kW Gas CHP Turbines
- Gas Mixing Facility: synthetic/modulated flue/industrial process gas
- Online Monitoring and analytical facilities

PACT Nottingham Analytical Facilities: CCS and unconventional gas

- Solvent analysis
- Thermal analysis:
- Spectrometry and spectroscopy
- Modular 800C, 100bar flow reactor
- Milling equipment with powders analysis

PACT Office

- Admin & Business Centre of UKCCSRC PACT
- Business and stakeholder engagement
- Office for users accessing facility
- Computer modelling facilities
- CPD & training

PACT Cranfield Facilities

- 150kW PF Air/Oxy Rig
- CO_2 Transport Flow Rig
- 50kW Chemical Looping Facility
- 750kW Gas Turbine Burner with deposition probes
- 300kW Circulating Fluidised Bed Combustor/Gasifier

Research projects

Combustion

•Coal and biomass combustion characterisation and emissions control strategies

Post Combustion Capture:

•PCC with coal/ biomass (impact of flue gas composition, trace gases, emissions mitigation strategies)
•Capture from Gas (conventional, EGR, Selective EGR, HAT)
•Alternative/ process bespoke solvent evaluation and benchmarking for: energy performance, solvent degradation; emissions and control; and corrosion
•Flexible, transient operations through increased rich solvent inventory at peak times
•Absorber turndown
•Process modelling and validation
•Process equipment efficiency: absorber packing , heat integration

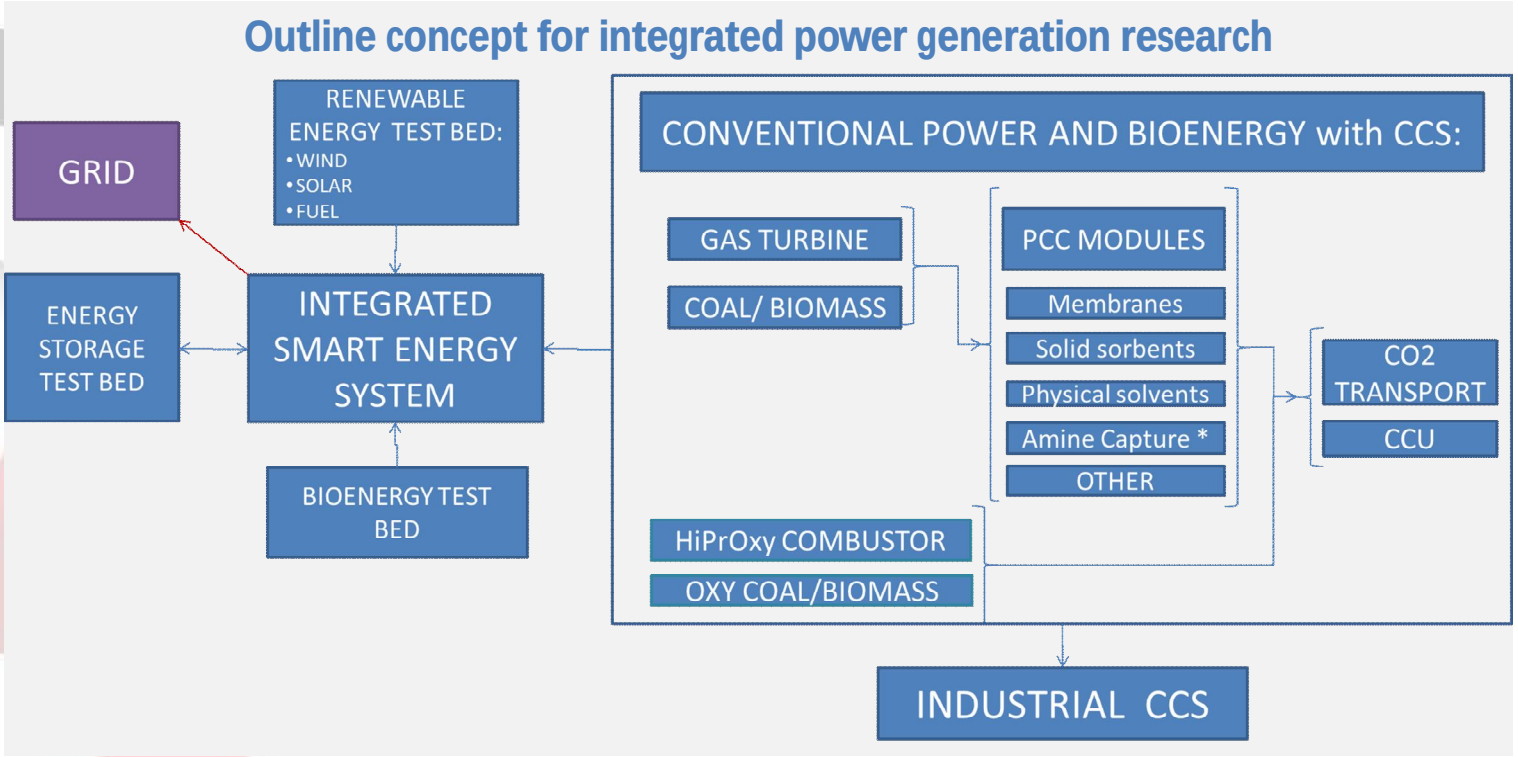
Oxyfuel combustion

•Oxy coal and Oxy-biomass
•Combustion characterisation and modelling for scale -up
•Emissions characterisation

PACT 2 - future capability review

UKCCSRC PACT FACILITIES

- Ensure **relevance** of facilities to current and future R&D needs
- **Broaden capability** to cater for a wider range of projects
- Introduce new technology pilot plants, e.g. high pressure oxy
- Provide test beds for new and existing PCC/other technologies with analytical, flue gas, other facilities
- Provide test beds CCU
- Evaluate **role of CCS in integrated energy systems**: Transient operations….
- Support for Industrial CCS



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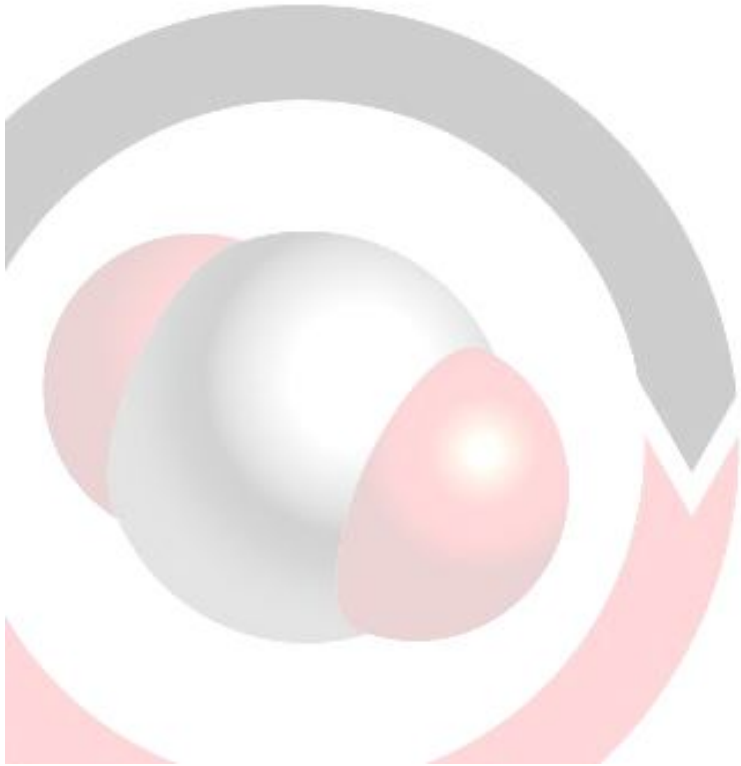

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