

UK CCS workshop – CO<sub>2</sub> Capture and Hydrogen  
Web meeting hosted by UKCCSRC  
Date 24<sup>th</sup> March 2021, 10 am – 12 noon  
Chaired by CCSA TWG representative Alastair Rennie, YOenergy

### **Key UK research needs highlighted through workshop**

- Environmental controls optimisation (holistic model of additional processes)
  - A tool that provides quantitative guidance to various environmental impacts to support technology, licensor and consent development
  - The above tool should address issues such as - Adding Selective Catalytic Reduction (SCR) to minimise NO<sub>x</sub> (and solvent degradation), adding acid wash to reduce ammonia slip and adding treated flue gas heater to prevent visible plume and/or aid dispersion
- Define system boundary for a complete Capture or CCS plant
  - Including: Amine selection, mass and energy balances, utility requirements, effluent stream and emissions, emissions points and compositions
  - How does this tie in with energy from waste (EfW) plant
- Low concentration residual waste from processes at risk of causing environmental damage
  - Waste that cannot be re-used/recycled i.e. ash, water/atmospheric discharges
  - Assess acceptable concentrations of residual wastes in captured CO<sub>2</sub>; depending on CO<sub>2</sub> stream destination (i.e. concrete curing, sequestration, carbonation) and, if any, short cycle CO<sub>2</sub> processes tolerating low concentrations of these wastes
- Containment challenges for smaller emitters
  - Analysis of how adequate CO<sub>2</sub> purity can be attained to go into the network and storage
  - What is within the control of the network to mix streams to meet storage specifications
  - How can a capture plant be adapted accordingly including retrofit
  - How to decarbonise plants not in clusters
  - What does CCS and H<sub>2</sub> really look like for smaller plants
- Cost reduction of CCS
  - Potential biotechnology solutions
  - How can the capital costs be reduced? Design risks, operational & flexibility trade-offs, retrofit and capture ready costs
  - Meta study of cost reduction opportunities
- Measurement/metering needs
  - Metering approaches for CO<sub>2</sub> that achieve objectives in the most cost-effective manner
  - Cost-effective/robust post absorber separation devices that curtail fugitive emissions
  - Capture needs identified by the [NPL Energy transition report -CCS](#)
  - Hydrogen needs identified by the [NPL Energy transition report -H2](#)
- Independent technology review for Hydrogen technologies
  - Pros and cons of technologies, work to provide an unbiased view
  - Including but not limited to: ATR & GHR, SMR & GHR and POX for H<sub>2</sub> production
  - An independent review based on simulation of the completing pathways and their potential
- BECCS feedstock review
  - How much biomass or waste will be available in the context of a circular economy
  - Review of the potential feedstocks available in the UK and suitable for negative emissions hydrogen/ammonia generation, life cycle analysis basis

- Hydrogen Storage
  - Validating techniques for Hydrogen storage, flow rates and the associated support needed
  - Flexible and viable larger storage methods other than salt caverns
  - Optimisation of the Hydrogen supply chain
- Retrofitting Aspects
  - Retrofit of CO<sub>2</sub> capture on existing H<sub>2</sub> facilities
  - Integration of next generation CO<sub>2</sub> capture technologies in hydrogen production
  - Flexible operation of hydrogen production plants: turndown, hydrogen storage
  - Hydrogen production with liquid and gaseous biogenic feedstock (i.e. ethanol, biomethane)