An Overview of CO2CRC’s Capture Program

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Abstract

CO2CRC Limited (CO2CRC) is one of the world’s leading research organizations focused on carbon dioxide capture and geological sequestration (CCS). CO2CRC’s capture program has established a formidable reputation over the past decade, not only for identifying practical advancements in solvent, membrane, adsorption and cryogenic technologies for CO2 separation from flue gas, syngas and acid gas, but also for advancing the understanding of the principles that underpin these. CO2CRC, has successfully operated in-field pilot test facilities providing it with knowledge and expertise in the development of cost-effective solutions for carbon capture in local conditions thus making CO2 capture and utilization an attractive option for industries to bring down the greenhouse gas emissions.

The CO2CRC capture program has adopted the following key strategies to achieve the program’s objective of developing low-cost capture technologies for Australia:

1. Advance research directions with low environmental footprints and the potential to reduce the cost of capture by 20-50 per cent.
2. Focus on the adaptability of technologies for Australian conditions.

This paper will detail the current capture program of CO2CRC as shown in Figure 1. The capture program includes research and development projects as well as commercial scale industrial projects.

The recently opened in-field testing at CO2CRC’s Otway Capture Facility has become the hub of CO2 capture research in our Otway National Facility. Here, compact and robust technologies for CO2 capture for high pressure and high content CO2 gases are tested. Tests are being conducted using adsorption technology and three different types of membrane based technologies with gas pressure from 20 bar to 75 bar. These technologies have the potential to be commercialized for natural gas processing. This paper will provide preliminary results obtained so far from the Otway Capture Facility.

Solvent membrane contactor pilot plant project conducted in Delta Electricity’s Vales Point Power Plant, NSW and funded by the Coal Innovation NSW (CINSW), utilizes the advantages of both solvent and membrane technologies. The pilot plant has the capacity of processing 100 kg/hr of flue gas from the black coal based power plant. This hybrid technology will reduce capture energy requirement and the footprint with expected mass transfer coefficient > 0.006 cm/s for absorption and > 0.002 cm/s for solvent regeneration. The process intensification potential for this technology will also be discussed along with the results from laboratory based testing.
CO2CRC is expanding its techno-economic portfolio for the capture program involving expertise knowledge available inhouse and from other national research organizations. This would address details of real capture costs for commercial CCS implementation in Australia for each capture project undertaken by CO2CRC.

This paper will also discuss the CO2CRC’s commercial and industrial scale CO₂ capture and utilization projects. CO2CRC’s role in selecting the best technology from various competing technologies, developing basic process for providing clean and efficient option for producing hydrogen from Victorian brown for Hydrogen Energy Supply Chain Project will be discussed. A 50 TPD project will produce food grade CO₂ on commercial scale from the flue gas of a coal based power plant. A solvent based capture technology will be incorporated. Through Loy Yang Capture Retrofit study, we will demonstrate collaborative efforts from the world’s best carbon capture research organizations for implementing large scale CCS projects.

This paper will have a detailed discussion on CO2CRC’s experience in overcoming the challenges of carbon capture research and application of carbon capture technologies to industrial scale for commercial benefits.

![CO2CRC's Current Carbon Capture Program](image)

**Figure 1- CO2CRC’s Current Carbon Capture Program**