Activities of CO2CRC

David Byers, CEO, CO2CRC Ltd.
WHO IS CO2CRC

CO2CRC SUPPORTS INDUSTRY TO REDUCE GREENHOUSE GAS EMISSIONS THROUGH CARBON CAPTURE & STORAGE RESEARCH

- We are the first company in Australia to have undertaken carbon capture and storage end to end.
- Our research demonstrates carbon capture and storage in-field using novel technologies. We test their efficiency, accuracy and cost-effectiveness bringing confidence to industry and regulators.
- We have safely injected, monitored and contained 80,000 tonnes of carbon dioxide for more than a decade.
- We design, project manage and fund carbon capture and storage programs utilising the best international and local talent.

For more than a decade CO2CRC has:
- Demonstrated the scientific viability of CCS in Australia
- Worked to ensure CO₂ storage is efficient and cost-effective
External context: Challenging domestic public policy environment but opportunities emerging...

Opportunities:

– Growing international interest in CO₂ mitigation strategies that include CCS driven by COP 21 Paris (OGCI initiative, Norwegian CCS hub, IEA commentary)

– US domestic political and industry factors driving policy shifts (US 45Q CCS tax credits, Enhanced Oil Recovery)

– Emerging Australian policy shifts:
  – Affect of variable renewables on reliability of supply;
  – Attention on CO₂ emissions beyond power generation sector;
  – Emerging hydrogen potential
Strategic focus areas

**Optimising Storage**
- Expand the utilisation of the Otway Research facility, data, lessons, know-how for CO2CRC and our collaborators to jointly accelerate the global deployment of CCS.
- Develop CO2CRC’s capabilities for effective subsurface fluids modelling and monitoring operation solutions.
  - Low cost, low-impact novel monitoring
  - Well integrity and leakage mitigation

**Reducing Capture costs**
- Develop optimised (fit-for-purpose) gas treatment solutions involving membrane, adsorbent, solvent (and hybrid schemes)
  - Durable membrane/adsorbent materials suitable for high CO₂ content gas
  - Optimise separation under different conditions & deliver compact solutions
  - Materials testing at the Otway Capture Facility

**Enhancing CO₂ Utilisation**
- Develop expertise to support Australian industry efforts to increase hydrocarbon recovery through CO₂-EOR
- Biorefinery (biomass to fuel, energy & chemicals) – investigate viability in an Australian context
- Carbonate mineralisation (building products) – test possible R&D collaboration with minerals industry

**Collaboration & Leadership**
- Provide expert CCUS advice for government industry, and key decision makers, leveraging our technical proficiency and research track record
- Lead technical nexus & forum for the CCUS community in Australia
- Facilitate CCUS demonstrations, aligning government, industry and community
CO2CRC Otway Research Facility

- One of the most comprehensive CO₂ storage demonstration laboratories in the world
- Verification of the fundamental science of CO₂ storage in Australia and further validated the technology globally
- Features an investment of over A$110 million to demonstrate real-world injection, storage and monitoring techniques
- In-situ access to approximately 400,000 t of CO₂ from the Buttress gas field (79% CO₂ and 19% CH₄), providing the site with a unique storage bank of CO₂ for an array of experiments.
- Ideal for appraising storage and monitoring performance
- Including a state of the art seismic monitoring array
- All regulatory approvals for testing and piloting technology and local community support
- Availability of high quality, comprehensive, datasets, from previous operations (data obtained from three closely spaced wells).
CO2CRC Research Facility—Fifteen years of success

- Otway Stage 1: 2004 – 2009 (Storage Concept) - Complete
  - ✓ Demonstrated safe transport, injection and storage of CO₂ into a depleted gas reservoir

- Otway Stage 2: 2009 – 2019 (End to End Saline Formation Storage) — nearing completion
  - ✓ Demonstrate safe injection and monitoring into a saline formation

- Otway Stage 3: 2016 – 2028 (Effective Storage M&V) – Construction 2019
  - Develop and validate low impact, reliable and cost-effective subsurface monitoring of CO₂

- Otway Capture Skid: 2016 – 2019 (High CO₂ NG separation) - ongoing
  - Develop cost-effective, compact natural gas separation technology under high pressure with high CO₂ content.

  - Trial near surface monitoring of fault controlled CO₂ migration
Otway Stage 3
Subsurface Monitoring & Validation

1. Development of high-resolution, on-demand monitoring capability to identify and track CO₂ plume movement in the Subsurface.

2. We will employ non-invasive monitoring techniques that will be acceptable for community and regulators.

3. The project will evolve these technologies from benchtop application to in-field validation, aligned with operator need.

4. The project will provide a suite of technologies and workflows that can be selected to create bespoke solutions which optimize effectiveness and costs in commercial monitoring projects.
CO₂-EOR Opportunity

- Production from existing oil fields in Australia is in decline. Companies are expressing interest in developing CO₂-EOR to increase hydrocarbon recovery and extend field life.
- Cooper/Eromanga, Surat, Gippsland, Bonaparte & Carnarvon Basins have been identified as having the potential to benefit from EOR.

Current industry challenge: Development of domestic expertise including the transfer of knowledge from international EOR operations; joint government-industry pilot scale feasibility activities & develop & optimize a fit for purpose pilot plant (‘in-situ lab’) for CO₂-EOR.

Research topics: The improved recovery factor as a result of CO₂ injection under different circumstances; how to improve the sweep efficiency; what percentage of CO₂ can be permanently stored and how to influence this; how to extract the trapped oil in the Residual Oil Zone (ROZ) with CO₂ injection; address the integrity of legacy wells after exposure to CO₂; cost effective & optimized surveillance & monitoring programs.

Roles of CO2CRC:
- Centre of Excellence for CO₂-EOR (as a program within CO2CRC to complement current CCS functions).
  - Contribute to the development of a fit-for-purpose pilot plant
  - Coordinate and optimise research activities to maximise contributions to industry.
  - Systematically screen fields across Australia for EOR potential (potentially)

Australian crude oil, condensate & naturally-occurring LPG resources.
Contact CO2CRC

CO2CRC Limited
11-15 Argyle Place South, Carlton, VIC 3053
PO Box 1182, Carlton VIC 3053
Phone: +61 3 8595 9600
Email: info@co2crc.com.au
www.co2crc.com.au
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