

Carbon capture and storage

by David Thompson

Value Adviser Associates has recently worked with Evans & Peck, Worley Parsons and Schlumberger to produce a Business Case for the Western Australian Department of Mines and Petroleum for a Carbon Capture and Storage (CCS) project in connection with the Australian Government \$2 billion CCS Flagships Program.

The CCS Flagships Program will make an important contribution to the G8 goal of at least 20 large-scale integrated CCS projects globally by 2020, and is part of the Australian Government's \$4.5 billion Clean Energy Initiative. With global use of coal forecast to increase throughout the coming decades and coal-fired power stations remaining a vital part of Australia's energy mix, implementing CCS technology is an essential part of the global response to climate change.

The Collie South West Hub CCS project, which aims to store up to 3.3 million tonnes of CO₂ per annum, captured from surrounding industry including coal-fired power plants, is one of four projects short-listed by the Australian Government. The Collie South West CO₂ Hub (Hub) was chosen because it is near potentially suitable storage sites and a large source region for CO₂ capture. The project is a West Australian government-industry partnership including:

- » The Department of Mines and Petroleum (leading the project);
- » Perdaman Chemicals and Fertilisers;
- » Griffin Energy;
- » Wesfarmers Premier Coal;
- » BHP Billiton Worsley Alumina;
- » Verve Energy; and
- » Alcoa of Australia.

The project has a research partner in the Western Australia Energy Research Alliance.

About the South West Collie CO₂ Hub CCS Project

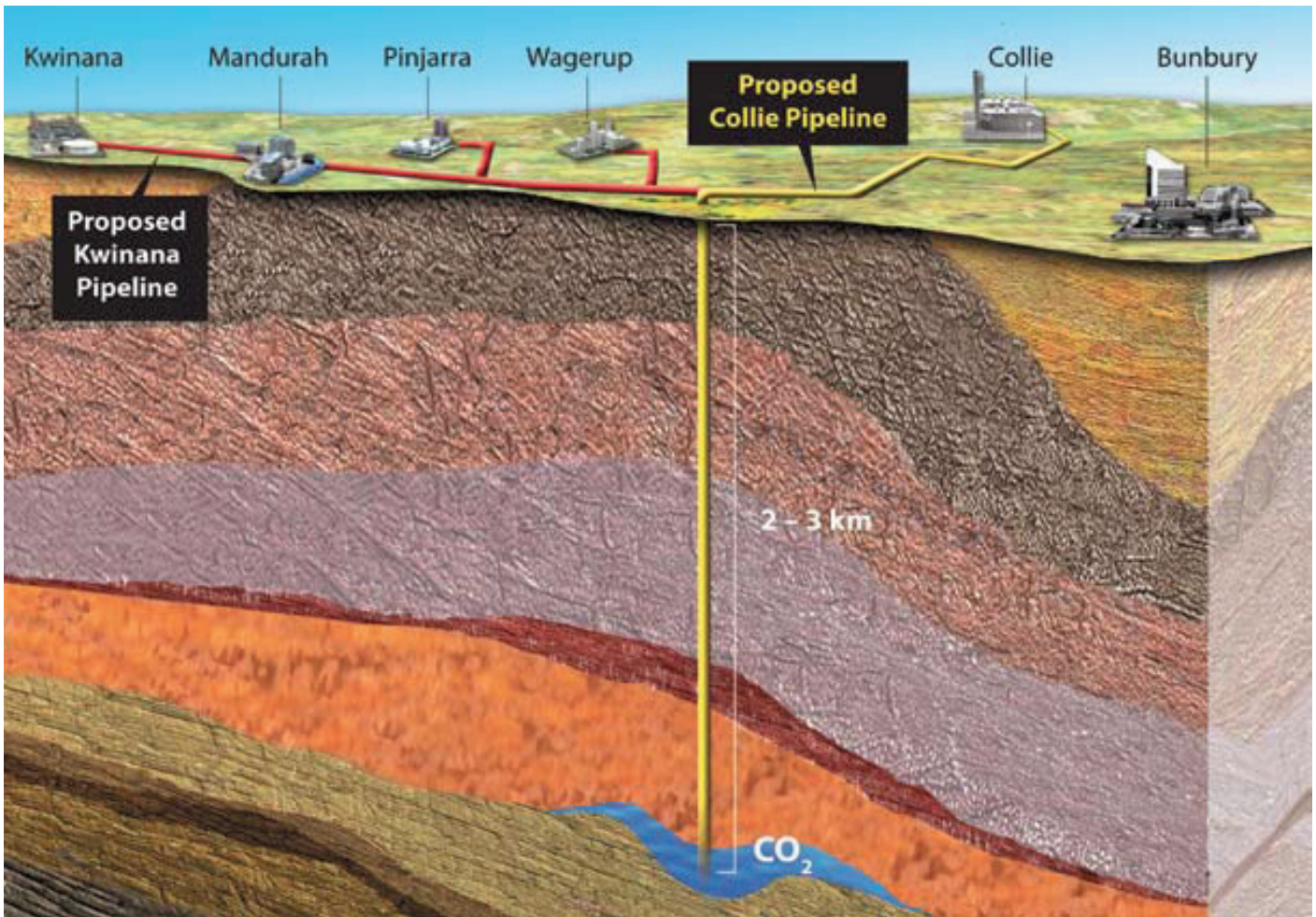
CCS, sometimes referred to as geosequestration, is a method of reducing the contribution of fossil fuel emissions which contribute to global warming. The process involves extracting CO₂ from industrial emissions, compressing the gas into a liquid form and pumping it into deep geological formations for permanent storage.

The South West Collie CO₂ Hub CCS project has been established to examine the options for CCS in saline aquifers three kilometres beneath the Swan Coastal Plain. Initial studies have identified the Lesueur formation, north of the Kemerton industrial area, as the best potential storage site for CO₂. The concept could also allow captured CO₂, transported through a steel pipeline, to be used in carbonation of alumina refinery residue and support the reuse of what is presently an industrial by-product.

The Concept

The Collie Hub has the potential to be a multi-user carbon dioxide hub providing opportunities for a variety of industry operations to connect to a common storage facility. Key elements of the project include:

- » An industrial carbonation project using CO₂ to treat Pinjarra and Wagerup alumina refinery residue for potential use in agricultural and engineering products;
- » A trial project to test the use of the Lesueur formation beneath the Swan Coastal Plain for storing CO₂;
- » Establishment of a pipeline to the Collie industrial area to tap carbon dioxide emissions from WA coal fields industries;
- » Participation of mineral processing and energy generation companies in the carbon capture and storage program.



At Collie, the plan is to pump liquefied CO₂ into a sandstone formation and saline aquifer. When injected into the sandstone most of the CO₂ becomes trapped within the sandstone pore space while some will dissolve in the saline water. How much of the CO₂ is dissolved and how much is trapped can be subject to local variations. Over time the saline water will also dilute the trapped CO₂. Carbon capture and injection into underground geological formations has been used in the oil and gas industry for more than 30 years.

Business Case

Worley Parsons was appointed as a consultant to the project and to produce a Business Case which included a high level assessment of seven key aspects for a CCS project:

- » Storage mapping, site selection and characterisation;
- » Carbon capture;
- » Pipeline transport requirements to storage site(s);
- » Regulatory framework (State and Federal);
- » Commercial framework for a carbon capture and storage project;
- » Stakeholder management; and
- » Research.

Value Adviser Associates was engaged by Evans & Peck/ Worley Parsons to assist in developing the Commercial Framework and Business Case, including commercial structure, operating principles, multi-user facility arrangements, future third party access arrangements, risk management strategies, project life cycle economics and determination of the gap (i.e. public funding requirements) between private sector capital investment and the economic drivers of the project.

Value Adviser Associates also built a financial model that enabled the partners to assess the economics of the storage facility, the pipeline business and each partner's project both separately and on a consolidated basis, over a number of stages from the enabling phase to first commercial operations then expanding to include existing and proposed operations and finally to include future expansion of project capacity.

To discuss Value Adviser Associates' role in this project please contact David Thompson, General Manager of the Brisbane office on 07 3221 4857 or email d.thompson@vaassociates.com.au

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