



Monash Energy Report 2006



Artist's impression of a potential CTL Plant.

The Monash Energy Coal-To-Liquids (CTL) Project involves the gasification of coal from Victoria's Latrobe Valley for ultimate conversion into transport fuels, while separating carbon dioxide (CO₂) from the production process for transport, injection and storage in deep geological strata (geosequestration).

Monash Energy - Forging Partnerships

The Monash Energy Project entered a new stage in 2006 with the signing of a Joint Development Agreement (JDA) with oil and gas giant Shell and the grant of a mining licence by the Victorian State Government.

The JDA covers a number of project development phases. In the initial concept phase, which is expected to conclude during 2007, Monash Energy, in conjunction with technical advisers from Anglo American publicly listed

corporation (AAPlc) and Shell, will carry out a study of the commercial and technical aspects of the project, including carbon capture and storage (CCS). If successfully concluded, the study will form the basis of the feasibility phase and demonstration activities.

Importantly, the JDA accomplishes a combination of AAPlc's mining and resource skills with Shell's expertise and proprietary technologies in coal gasification and gas-to-liquids (GTL). Under the terms of the JDA, the two parties will jointly develop the CTL project, but Anglo Coal will be solely responsible for developing the mine component.

After recognising that further capital and technological investment hinged on obtaining an early mining licence, the Victorian State Government granted the licence to the project in 2006.

Clean Coal - The Future Starts Now

Victoria's Latrobe Valley is one of the world's largest deposits of brown coal and contains 89% of Australia's brown coal reserves. In recent years, government and community concerns about greenhouse gas (GHG) emissions have meant this vast resource has been underutilised. Increasingly, governments around the world have realised the importance of being able to utilise coal resources for fuel and energy without the inherent environmental problems.

'Clean coal' is not just a pipe-dream. The technology solutions that the combined expertise of AAPlc and Shell will be proving in developing the Monash Energy Project will help keep coal in the global energy mix for many years, with the long-term goal of zero emissions.



monash
energy



ANGLO
COAL



Even though large-scale rollout in power generation may be decades away, this project recognises the necessity to enable the technologies to be ready when they are required.

In preparation for the CCS component of the project, Monash Energy has contributed significant funds to the AUD\$36 million geosequestration demonstration project in Victoria's Otway Basin. The project, managed by the Cooperative Research Centre for Greenhouse Technologies (CO2CRC), is an industry-government-research collaboration that will inject 100,000 tonnes of CO₂ below the Earth's surface to test the latest techniques in monitoring the behaviour of the CO₂ once stored.

The Monash Energy Project relies not on more research but on the integration and, in some cases, the scale up of technologies relevant to the project, including coal drying, coal gasification, GTL and geosequestration. Each coal behaves in a unique way during drying and gasification, so a key step for the Monash Energy Project will be the demonstration phase to gather further information on this behaviour before finalising a process design.

Part of the data-gathering for this exercise has already begun, with seven boreholes being drilled over 2006-2007, adding to data already gathered by the former state government electricity generating authority.



Project Overview

AAplc's involvement in the Monash Energy Project, which dates back to 2003, reflects its commitment to reducing global emissions of GHG while ensuring a future for coal in the global market.

Forecasts suggest that while it is in electricity production that CCS will make its essential contribution to emissions reduction, in the early years of its development it will be co-production projects like Monash Energy that bring the technologies to fruition and establish the requisite infrastructure. By utilising the synthetic gas from coal gasification to develop a high value-added product such as synthetic diesel, Monash Energy has a commercial opportunity not

available to projects concentrating on electricity markets such as those in Australia, where prices are among the world's lowest.

Shell already has plants producing synthetic diesel from its Shell Middle Distillate Synthesis GTL process. This fuel was used in the Audi that won the Le Mans 24-hour race in 2006, the first ever diesel car to do so. Synthetic diesel from a CTL or GTL plant produces far lower levels of key exhaust emissions than those derived from crude products, and further advances are possible in engines specifically optimised to take advantages of the fuel's unique properties. The estimated reduction in oxides of nitrogen, particulates, aromatics and carbon monoxide emissions is illustrated in Figure 1.

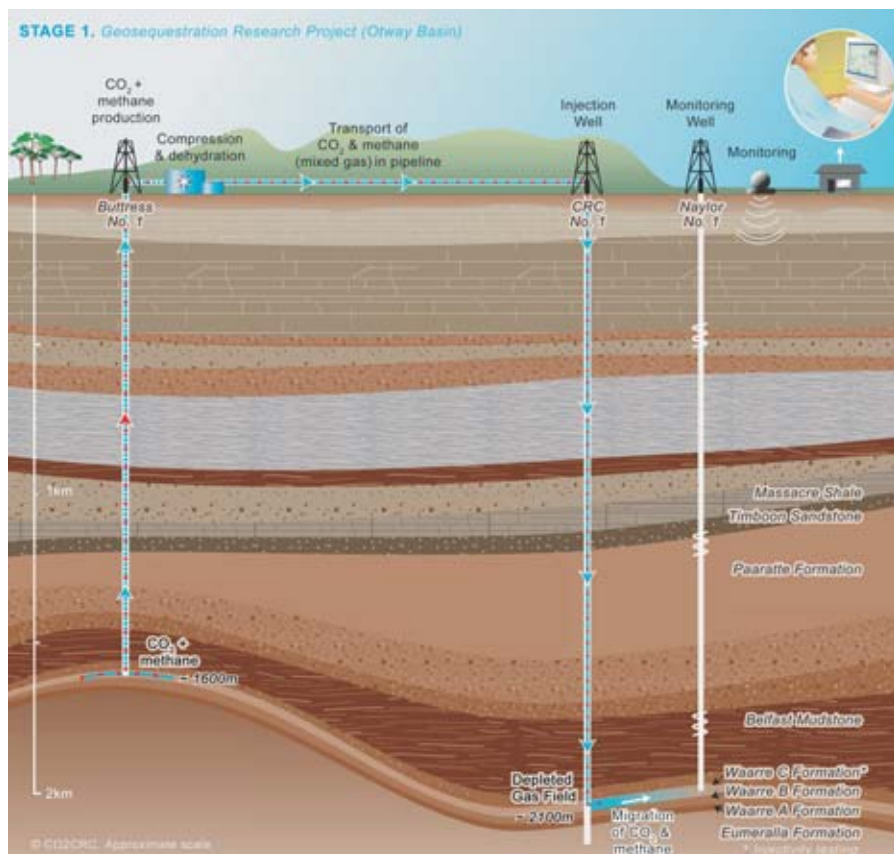


Figure 1: Otway trial concept: Courtesy of CO2CRC.



Peter de Wit, Shell, and Tony Redman, Anglo American, sign the Joint Development Agreement while Victorian Premier Hon. Steve Bracks MP looks on.

The Monash Energy Project encompasses:

- The construction of a CTL plant producing 60,000 to 70,000 barrels per day of transport fuels, particularly an ultra-clean, virtually zero-sulphur synthetic diesel, using Shell's proprietary coal gasification and GTL technologies;
- Anglo Coal Australia establishing a mine to supply brown coal (lignite) to the plant at a rate of approximately 25-30 million tonnes per annum (Mtpa) from the Flynn field in the Latrobe Valley; and
- Installing equipment and pipelines for the compression and transport of CO₂ from the production process to a suitable site in the offshore Gippsland Basin, for injection and permanent storage deep underground in the geological strata.

South-eastern Australia is currently experiencing a severe and extended drought, highlighting the need to ensure the optimal recovery and treatment of water during the production process, as shown in Figure 3.

Location

The brown coal fuel source and proposed processing facilities are located in the resource rich Latrobe Valley, 160 kilometres east of Melbourne, in the state of Victoria. The Latrobe Valley is one of Australia's major sources of energy-based GHG emissions and is home to the world's biggest brown coal resource. The Monash Energy mining licence covers an area around Flynn's Creek to the east of the existing 30 Mtpa mine that supplies the Loy Yang power stations.

Combining the vast lignite resources of the Latrobe Valley with potential CO₂ storage capacity in the offshore Gippsland Basin, the location of the Monash Energy Project reflects a world-class combination of a source and a 'sink' for CO₂.

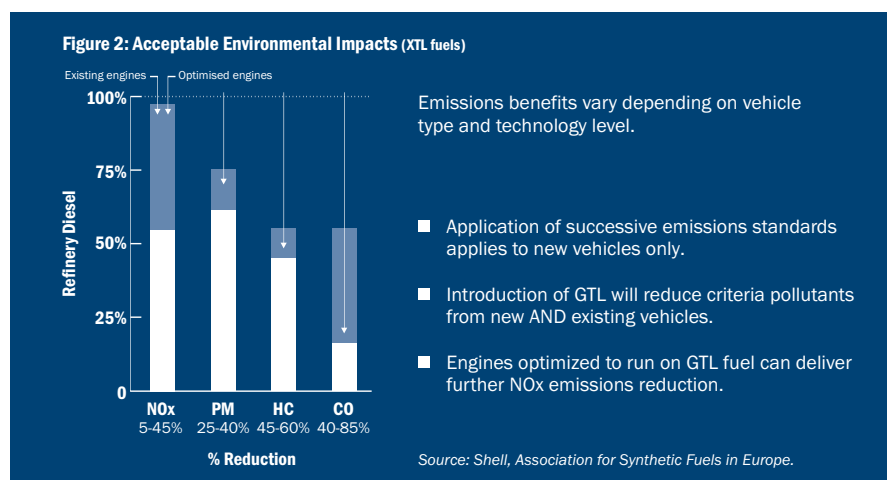
Looking to the long-term future of the Latrobe Valley, Monash Energy could be the catalyst for the development of shared CCS infrastructure that would enable creation of an industrial hub in the Latrobe Valley. This hub could service industries that would otherwise produce unacceptable amounts of CO₂. Power and chemical industries could utilise the pipeline and sink sites in the Gippsland Basin to transport and store CO₂.

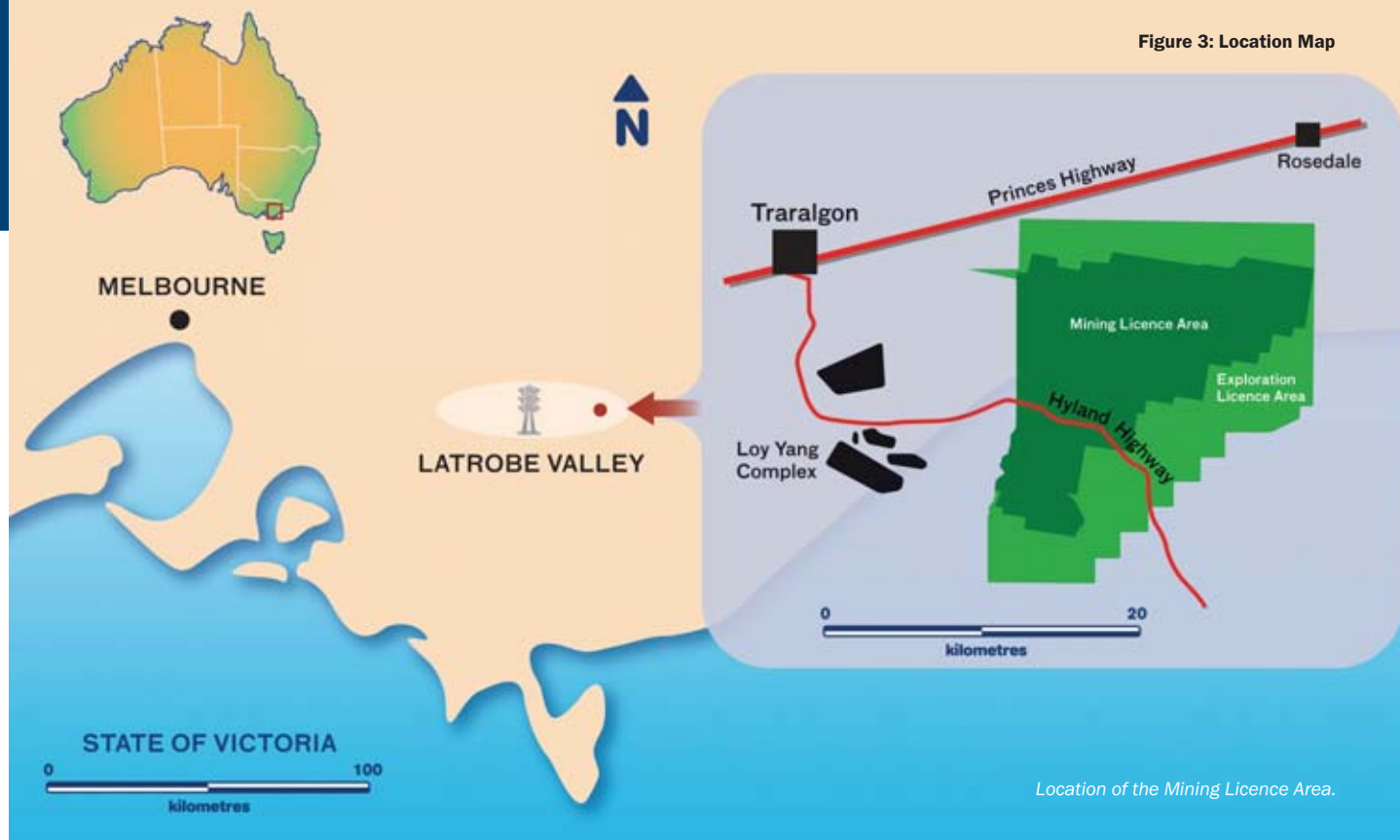
Stakeholder Engagement

A commitment to stakeholder engagement is at the heart of Monash Energy's Sustainable Development Framework, and underpins the future of the Project.

Despite the fact that mining is still some time away, Monash Energy has informed landowners in the vicinity of the mining and exploration licence zones of developments in the project. Issues for landowners include the timing, certainty and scope of future works, and the implications for land acquisition.

Monash Energy has had one successful round of negotiations with the Traditional Owners, the Gunai / Kurnai people of





Gippsland, and will hold more discussions in the future. Senior executives undertook a cultural heritage induction, conducted by an elder of the Gunai / Kurnai people, to learn more about the Traditional Owners' history and culture and ensure cultural heritage protections are established.

Monash Energy has also identified other stakeholders, such as local government, community and environmental groups and non-government organisations. The company has taken the view that although the project is still in a conceptual phase, it is important to make contact and identify the issues that will be important to these stakeholders.

The Commonwealth Department of Industry, Tourism and Resources is responsible for developing CCS. It has been consulting with Monash Energy and other interested parties as it develops legislation to provide a secure legal basis for CO₂ injection and storage in geological strata below Commonwealth waters (those offshore beyond the 3 mile limit). A major focus is ensuring CCS is compatible with continuing oil and gas extraction activities in the region. This legislation is expected to be introduced into the Commonwealth Parliament in 2007.

The Victorian Department of Primary Industries has taken the lead for the state government in the development of CCS and, in particular, of the Monash Energy Project. Monash Energy has committed to meeting the highest standards of environmental assessment for the project prior to receiving government approvals and permits.

Internationally, the project has received attention from bodies such as the International Energy Agency, Carbon Sequestration Leadership Forum, and the Asia-Pacific Partnership for Clean Development and Climate. Monash Energy also works with relevant divisions and projects within AAPIC and Shell that have an interest in technology development and reduction of environmental impacts. For example, AAPIC has joined an industry and government consortium in the United States to develop the FutureGen demonstration project, which will combine Integrated Gasification Combined Cycle and CCS with hydrogen production.

**monash
energy**



Matthew Pietsch and Greg Eagle, Monash Energy, and Aaron Frood, Drilltec, inspect drill core in the Mining Licence zone.



The Future

Over the next few years the Monash Energy Project team, in conjunction with AAPlc and Shell, will continue the program of technical development and commercial investigation. Should it proceed through the appropriate stages, the project will initiate a full-scale program of social and environmental assessments as part of a major program of consultation and permitting.

The Monash Energy Project is one with a long way to go, but which, if successful, could make a major contribution to achieving a cleaner future for coal, while helping create new markets for ultra-clean transport fuels.

For further information please visit our website: www.monashenergy.com.au, or contact Scott Hargreaves on 03 9868 7812.

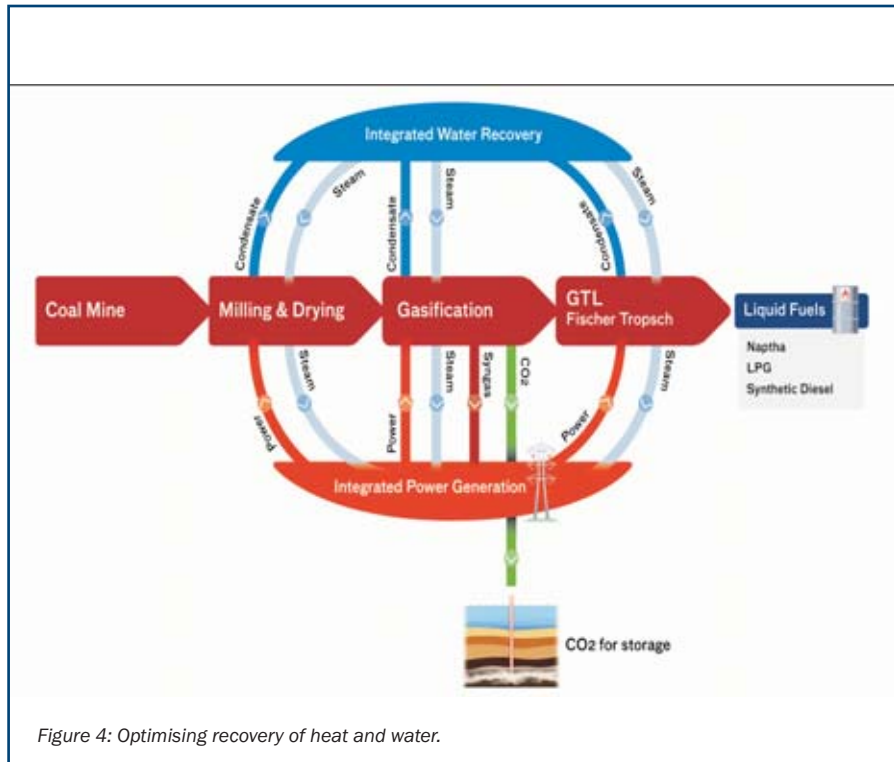


Figure 4: Optimising recovery of heat and water.

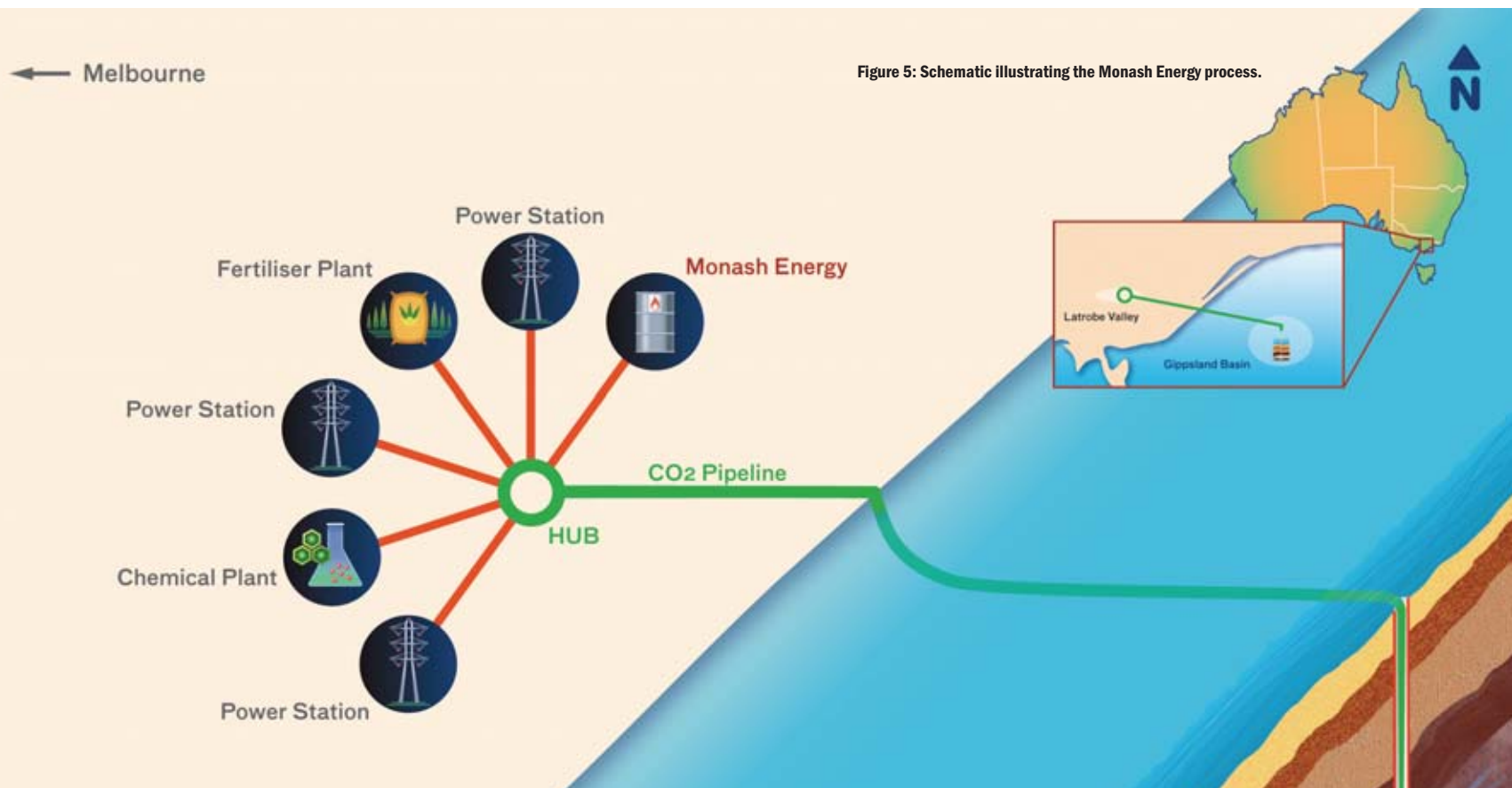


Figure 5: Schematic illustrating the Monash Energy process.



www.anglocoal.com.au