

UNDERGROUND GAS STORAGE CASE STUDY

Geological Survey of Victoria, Department of Jobs, Precincts and Regions, State of Victoria
Onshore Otway Basin, Australia

AWT DISCIPLINES

Project Management
Facilities Engineering
Well Engineering
Commercial

PROJECT BACKGROUND

The state government of Victoria had embarked the Victorian Gas Program (VGP); a comprehensive program of scientific research and related activities to assess the potential for further discoveries of onshore conventional gas and offshore gas in Victoria, and whether the State's current underground gas storage capacity could be expanded.

As part of the VGP, The Underground Gas Storage (UGS) Project investigated the potential for development of further gas storage fields in the Port Campbell Embayment.

The overall UGS Project objectives were to complete:

- A specialist technical geoscience assessment of known depleted and unproduced conventional gas fields for underground gas storage in the area between Port Campbell and Warrnambool.

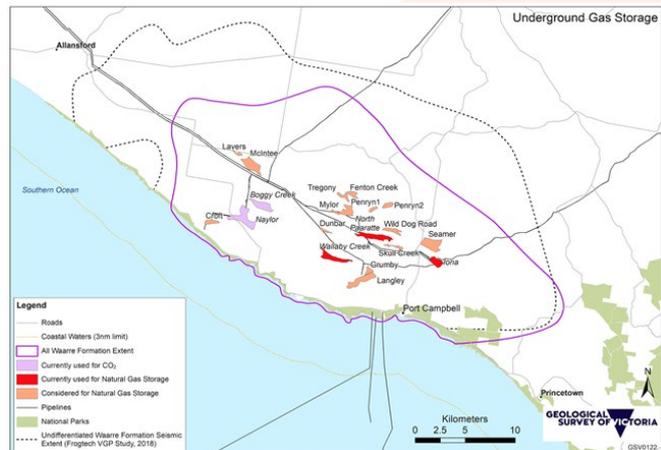
- An assessment of the economic potential of additional onshore underground gas storage.

The UGS Project consists of four inter-related project elements:

1. Representative technical studies
2. Detailed technical studies
3. Commercial feasibility of potential underground gas storage fields
4. Assessment of the economic potential of additional underground gas storage.

For more information contact:

Tel: (+603) 2162 3127 or visit our website at: www.awtinternational.com



AWT WORKSCOPE

AWT was engaged to conduct the Commercial feasibility of potential underground gas storage fields as part of the Victorian Gas Program (VGP) Underground Gas Storage (UGS) Project. The scope included:

- Financial modelling of selected reservoirs including reservoir development, operation, monitoring and maintenance
- Assessment of financial benefit or detriment of producing reserves of remaining in situ gas including natural gas and carbon dioxide
- Consideration of the development costs of gathering lines utilised for conveying gas from fields to production facilities in the area.
- Revenue assessment and sensitivity analysis of value of providing a storage service
- Surface access and infrastructure (roads, hardstand and security fencing etc.).

AWT ADDED VALUE

AWT constructed a commercial model and populated it with field specific data from the detailed technical studies (DTS) conducted by SEAL Energy and other location specific inputs.

The commercial model construct methodology utilised key inputs from the subsurface DTS and other inputs by AWT to define and calculate key technical, revenue, cost and financial parameters that drive the commercial model outputs.

The six fields that were assessed were depleted onshore gas fields, namely McIntee, Croft, Mylor, Tregony, Fenton Creek and Penryn. Assessment for commercial viability was completed for individual fields as well as combination cases, which aggregated fields as identified by the Geological Survey of Victoria (GSV). Data was supplied for input into the commercial model by the DTS, and included Base, Mid and High cases. Combination cases were developed using High cases for the identified fields.

In addition, 3 commercial scenarios were assessed for each field or combination case:

- Field Operations Only scenario, which identified the commercial viability for a stand-alone field development independent of any gas processing facilities.
- Integrated Field Operations and Existing Plant Tie-back scenario, which considered integrated field operations tied back to an existing gas processing facility, which would add injection and/or withdrawal compression and, if needed, processing capacity above available unutilised capacity.
- Integrated Field Operations and New Processing Plant scenario, which considered integrated field operations tied back to a new gas compression and processing complex.

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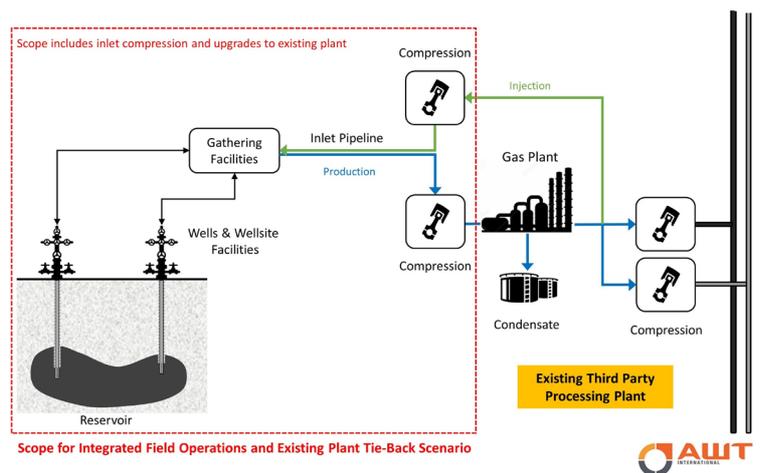
- A specialist technical geoscience assessment of known depleted and unproduced conventional gas fields for underground gas storage in the area between Port Campbell and Warrnambool.
- An assessment of the economic potential of additional onshore underground gas storage.

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The commercial feasibility assessment of the identified fields indicated that:

- Stand-alone Field Operations Only cases are commercially viable for McIntee, Mylor, Fenton Creek and Tregony fields. However, the practicality of operating the fields as a stand-alone business requires further assessment.
- Integrated Field Operations and Existing Plant Tie-back scenarios provide more attractive commercial outcomes for all six fields as single field developments due to efficient use of existing infrastructure.
- No Integrated Field Operations and New Processing Plant scenarios are commercially viable for a single field development.
- The McIntee and Mylor fields provided the best economic value for both Field Operations Only and Integrated Field Operations and Existing Plant Tie-back scenarios due to larger available nominal gas storage volumes and higher gas storage cycle rates. These fields may be considered for commercial single field development.
- The Fenton Creek and Tregony fields provided reasonable economic value for both Field Operations Only and Integrated Field Operations and Existing Plant Tie-back scenarios. These fields may be considered for commercial single field development as secondary candidates.
- The Penryn and Croft fields provide marginal commercial value and are unlikely to be considered for single field development for gas storage.
- Combination cases provide better economic outcomes as compared to single field cases. Field aggregation provides significant value for commercialisation, including providing alternatives for commercial stand-alone development using independent new processing plants.
- Further technical optimisation of combination cases is required.

The commercial feasibility work that has been undertaken to may be used to develop a plan for further studies, such as more detailed assessment of certain fields and/or combinations of fields. This may also require additional subsurface static, dynamic and network modelling to be undertaken.