Sydney Basin

EASTERN AUSTRALIA, NSW, ONSHORE AND OFFSHORE

Reservoir:

Nowra-Muree Sandstones and Snapper Point Formation

Seal:

Berry and equivalent Mulbring siltstones

HYDROCARBON POTENTIAL

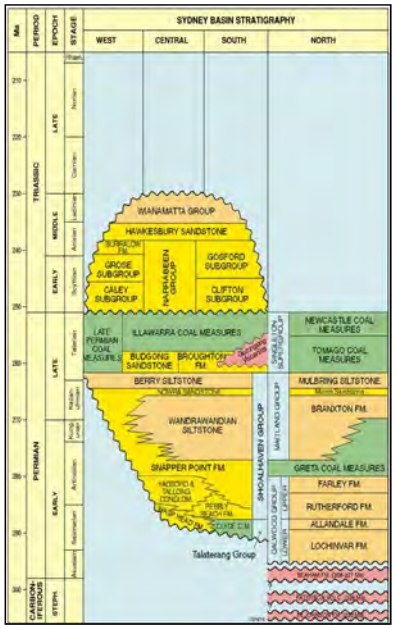
No commercial oil or gas discoveries have been made despite the presence of numerous shows. Unconventional hydrocarbon sources occur within the basin including oil shale deposits as well as coal seam gas reserves.

STRUCTURAL ELEMENTS

(From Stewart and Adler, 1995)

REGIONAL SEAL AREA

STRATIGRAPHY

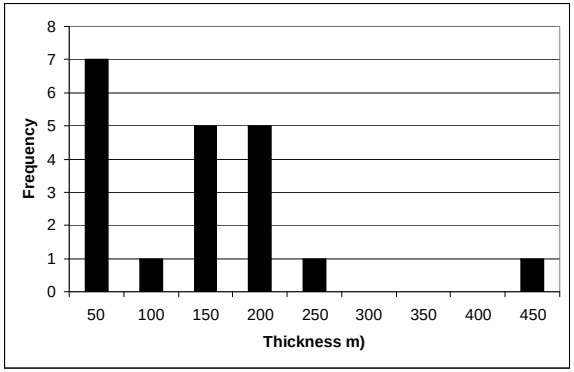


(After Alder et al., 1998)

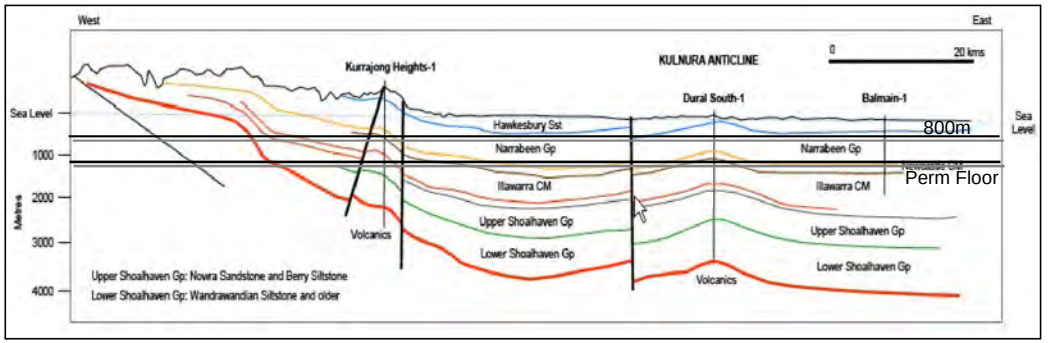
OIL AND GAS FIELDS

WELLS AND SEISMIC COVERAGE

RESERVOIR THICKNESS

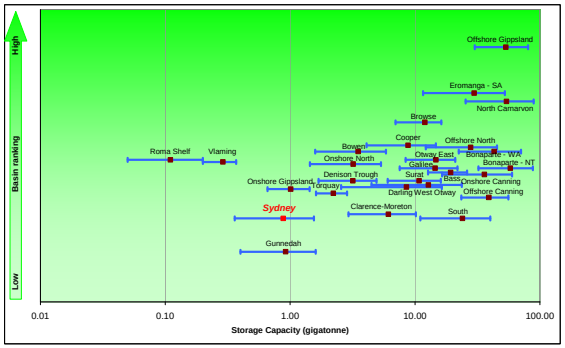


REGIONAL CROSS SECTION (LOCATION IN OIL AND GAS FIELDS MAP)



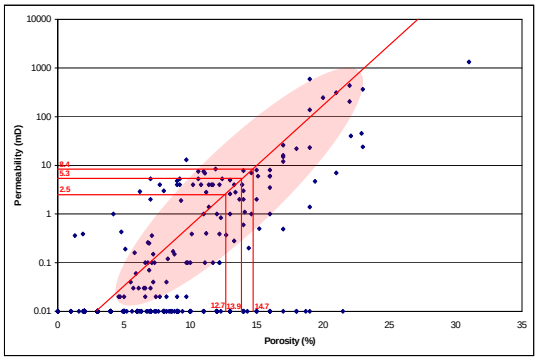
(After Blevin et al., 2007)

BASIN RANKING VS. CAPACITY

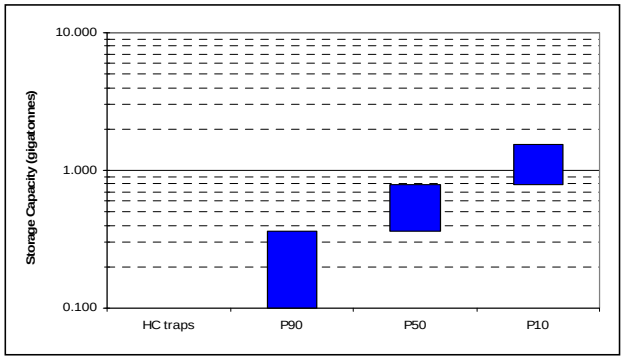


Sydney Basin

POROSITY VS. PERMEABILITY *Values from basin-wide dataset



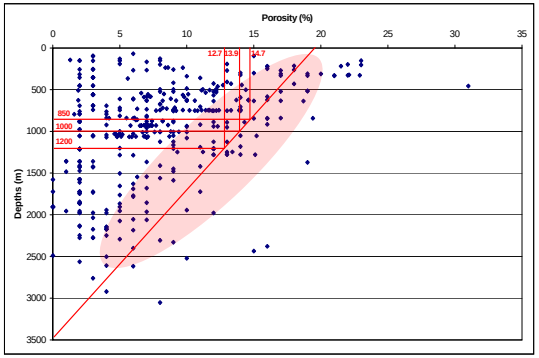
STORAGE CAPACITY



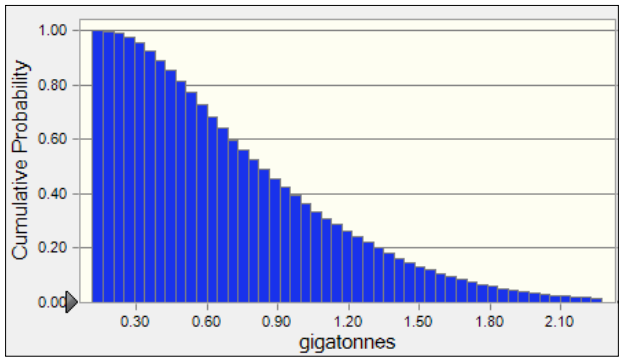
BASIN RANKING

Category	Description	Score	Weighting
Tectonics (Seismicity)	Medium/Low	4	0.00
Size	Large	3	0.06
Depth	Intermediate	3	0.10
Type	Non-marine and Marine	2	0.04
Faulting intensity	Moderate	2	0.14
Hydrogeology	Intermediate	2	0.04
Geothermal	Cold Basin	3	0.05
Hydrocarbon potential	Medium	3	0.05
Maturity	Developing	3	0.05
Coal and CBM	Shallow	2	0.00
Reservoir	Poor	3	0.16
Seal	Poor	3	0.18
Reservoir/Seal Pairs	Poor	2	0.03
Onshore/Offshore	Onshore	3	0.00
Climate	Temperate	5	0.00
Accessibility	Easy	4	0.00
Infrastructure	Extensive	4	0.00
CO_2 sources	Major	4	0.00
Knowledge level	Good	3	0.05
Data availability	Good	3	0.05
Overall Ranking			**31**

POROSITY VS. DEPTH



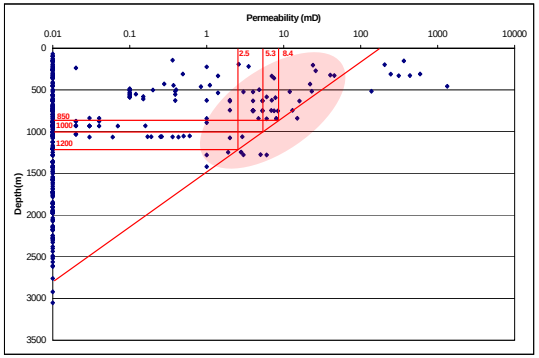
STORAGE CAPACITY CURVE



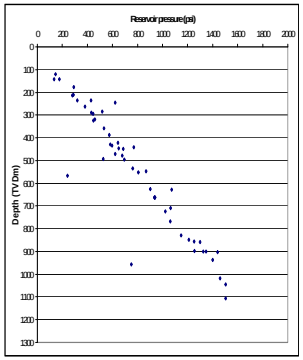
STORAGE CAPACITY ESTIMATE

Parameter	Unit	Score (P90)	Score (P50)	Score (P10)	Distribution
Area of storage region	km^2	1000	3000	5000	Triangular
Gross thickness of saline formation	m	20	50	200	Triangular
Average porosity of saline formation over thickness interval	%	12	14	16	Triangular
Density of CO_2 at average reservoir conditions	$tonne/m^3$	0.5	0.6	0.7	Triangular
E-storage efficiency factor (% of total pore volume)	%	4	4	4	
Calculated storage potential	gigatonnes	0.4	0.8	1.6	

PERMEABILITY VS. DEPTH



RESERVOIR PRESSURE VS. DEPTH *CSIRO PressurePlot



Insufficient data for the following items:

- Fracture Pressure vs. Depth Graph
- Top Seal Potential Graph

POTENTIAL INJECTION PARAMETERS

Parameter	Unit	Shallow	Mid-Depth	Deep
Depth base seal	m	800	800	800
Formation thickness	m	50	200	400
Injection depth	m	850	1000	1200
Porosity	%	14.7	13.9	12.7
Absolute permeability	mD	8.4	5.3	2.5
Formation pressure	psia	1250	1470	1760
Fracture pressure	psia	2040	2400	2870

DISCLAIMER

The purpose of these montages is to aid a high level evaluation of the geological storage potential of Australia's sedimentary basins for future CO_2 emissions. The evaluations are based on core analysis and other data derived from Geoscience Australia and other sources. However due to time constraints, it has not been possible to carry out the detailed evaluation of the data, which will be required for the next phase of analysis.

In this exercise, we sought to recognise a range of characteristics within each basin by identifying three sets of parameters at different locations and depths in the basin. The intent is to generate an indication of a range of storage capacity and potential injection rates. These capacities and rates are being used in high level reservoir modelling work to generate injection tariffs* and capacity estimates. All of this work feeds into a process that provides indicative, conceptual transport and storage tariffs for CO_2 emissions captured in various parts of Australia.

This 'top down', simplistic approach seeks to describe the magnitude and range of potential costs for transport and storage in Australia, at a 'conceptual' level of accuracy. Clearly, any final investment decision would call on an increased understanding and level of accuracy through the usual project development process.

* Cost per tonne of CO_2 avoided, calculated using the net present value of cash flows over a 25 year asset life.

REFERENCES

Alder, J.D., Hawley, S., Maung, T., Scott, J., Shaw, R.D., Sinelnikov, A. and Kouzmina, G. 1998. Prospectivity of the offshore Sydney Basin: a new perspective. The APPEA Journal 38, p. 68-92.

Blevin et al., 2007. Sydney Basin Reservoir Prediction Study and GIS, Project MR705, Confidential Report to NSW DPI and Macquarie Energy by FrOG Tech Pty Ltd.

Stewart, R. and Adler, D. (eds), 1995. New South Wales Petroleum Potential-Bulletin New South Wales. Department of Mineral Resources. Coal and Petroleum Geology Branch. Bulletin 1, 5-36.