

Bowen Basin

SE QUEENSLAND,
ONSHORE

Reservoir:
Showgrounds, Aldebaran
and Catherine sandstones.

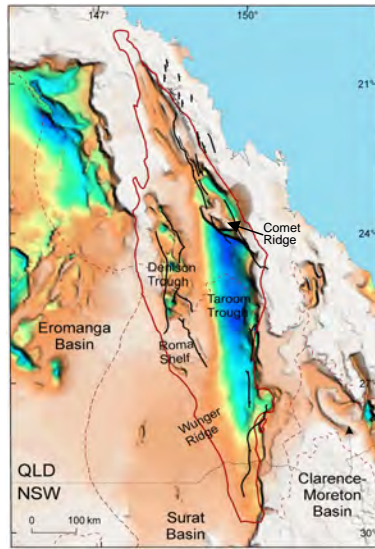
Seal:
Snake Creek Mudstone/
Moolayember, Bandanna,
formations and Black Alley
Shale

HYDROCARBON POTENTIAL

CATEGORY 1 and 2 (OGRA 2005)

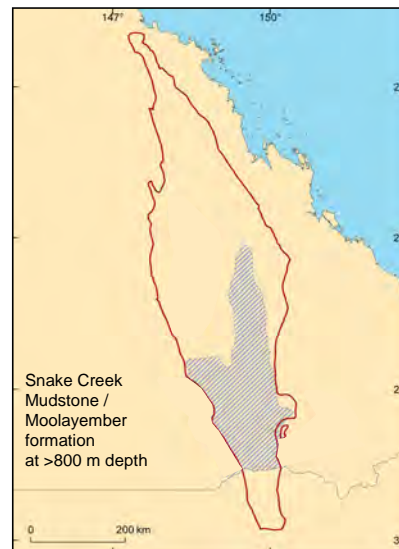
Crude oil	MMBL	7.92
Condensate	MMBL	2.37
LPG	MMBL	2.8
Sales gas	Tcf	0.39

STRUCTURAL ELEMENTS



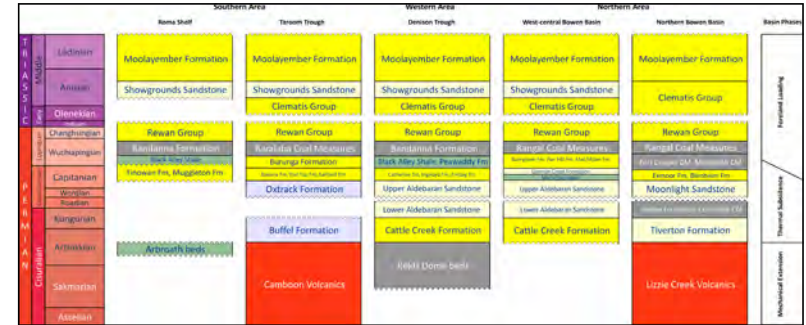
Modified OZ SEE-BASE™ (2005) image

REGIONAL SEAL AREA



(Bradshaw et al., 2009)

STRATIGRAPHY

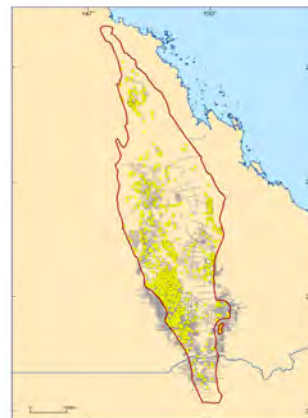


(Bradshaw et al., 2009)

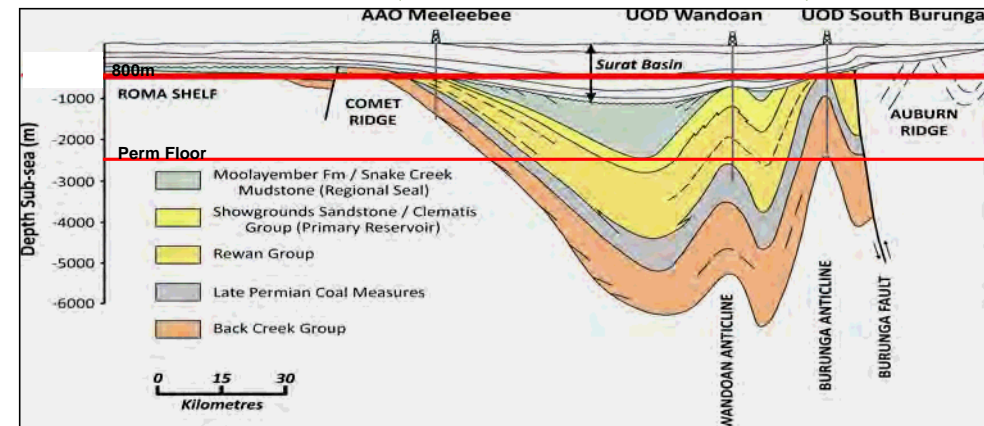
OIL AND GAS FIELDS



WELLS AND SEISMIC COVERAGE

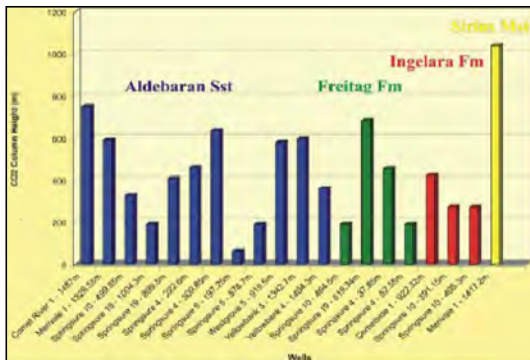


REGIONAL CROSS SECTION (LOCATION IN OIL AND GAS FIELDS MAP)



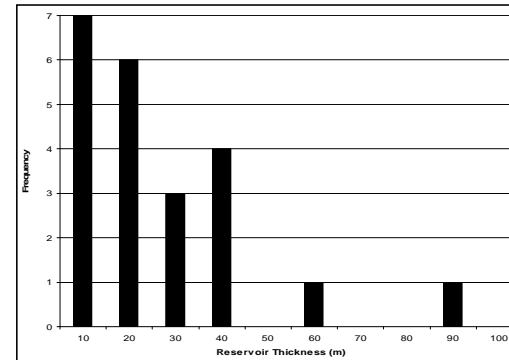
(After Bradshaw et al., 2009)

TOP SEAL POTENTIAL

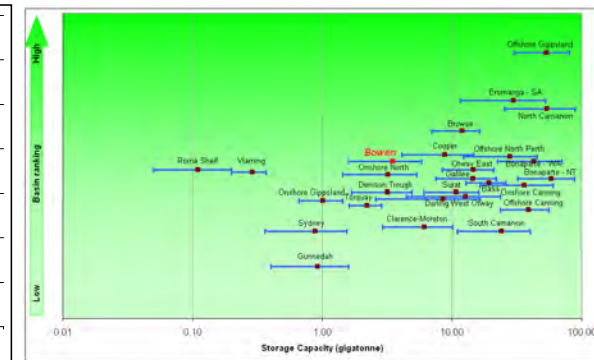


(After Royal, 2005)

RESERVOIR THICKNESS

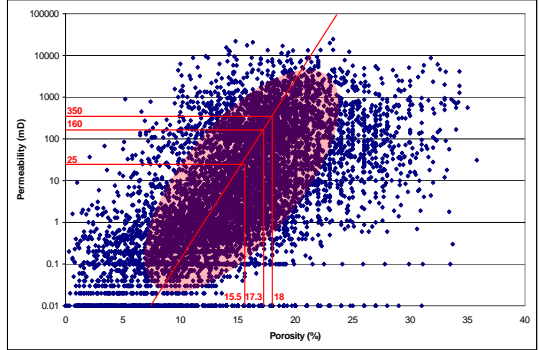


BASIN RANKING VS. CAPACITY

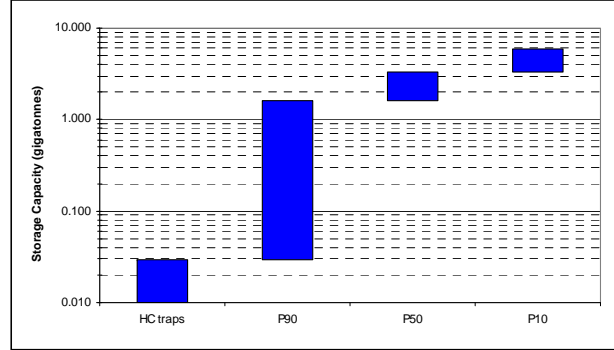


Bowen Basin

POROSITY VS. PERMEABILITY *Values from basin-wide dataset



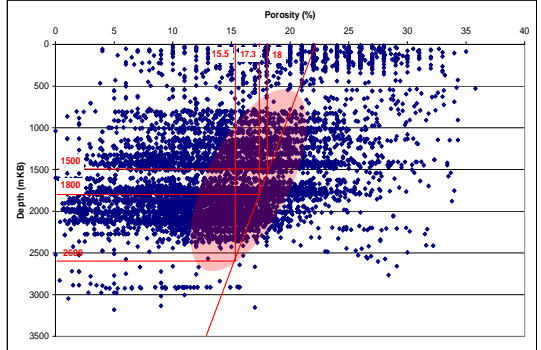
STORAGE CAPACITY



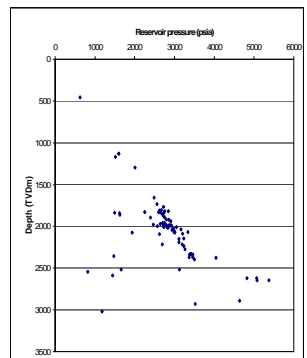
BASIN RANKING

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	Good	3	0.04
Geothermal	Cold Basin	3	0.05
Hydrocarbon potential	Small	2	0.05
Maturity	Mature	4	0.05
Coal and CBM	Deep	3	0.00
Reservoir	Good	4	0.16
Seal	Good	4	0.18
Reservoir/Seal Pairs	Excellent	4	0.03
Onshore/Offshore	Onshore	3	0.00
Climate	Subtropical	4	0.00
Accessibility	Acceptable	3	0.00
Infrastructure	Moderate	3	0.00
CO ₂ sources	Moderate	3	0.00
Knowledge level	Good	3	0.05
Data availability	Good	3	0.05
Overall Ranking			8

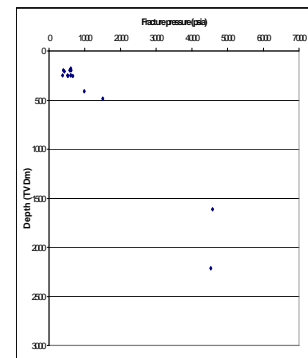
POROSITY VS. DEPTH



RESERVOIR PRESSURE VS. DEPTH *CSIRO PressurePlot



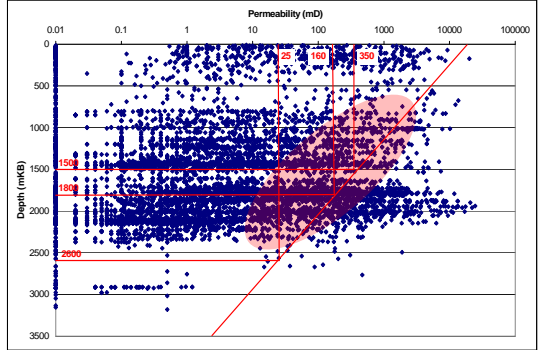
FRACTURE PRESSURE VS. DEPTH *CSIRO PressurePlot



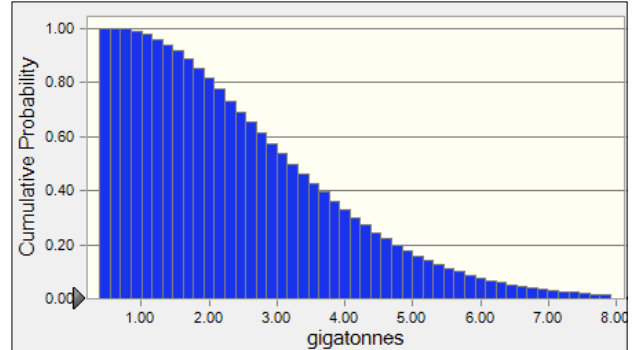
STORAGE CAPACITY ESTIMATE

Parameter	Unit	Score (P90)	Score (P50)	Score (P10)	Distribution
Area of storage region	km ²	20000	30000	50000	Triangular
Gross thickness of saline formation	m	5	20	60	Triangular
Average porosity of saline formation over thickness interval	%	12	15	18	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	1.6	3.3	5.9	

PERMEABILITY VS. DEPTH



STORAGE CAPACITY CURVE



POTENTIAL INJECTION PARAMETERS

Parameter	Unit	Shallow	Mid-Depth	Deep
Depth base seal	m	1490	1750	2500
Formation thickness	m	10	50	100
Injection depth	m	1500	1800	2600
Porosity	%	18	17.3	15.5
Absolute permeability	mD	350	160	25
Formation pressure	psia	2200	2640	3810
Fracture pressure	psia	3610	4340	6260

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 CO₂ 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 CO₂ 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 CO₂ avoided, calculated using the net present value of cash flows over a 25 year asset life.

REFERENCES

Bradshaw, B.E., Spencer, L.K., Lahtinen, A.C., Khider, K., Ryan, D.J., Colwell, J.B., Chirinos, A. and Bradshaw, J., 2009. Queensland carbon dioxide geological storage atlas.

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Petroleum and Marine Division, Geoscience Australia, 2007. Oil and Gas Resources of Australia 2005. Geoscience Australia, Canberra.

Royal, B., 2005. A status report: Geological sequestration in depleted gas fields and dry structures; examples from SE Queensland. Thesis (PhD), Australia School of Petroleum, University of Adelaide. CO2CRC Report number RPT05-0019.