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Australian shale overview

A sleeping giant

Stock	Price	Target	Rating
BPT	$1.42	N/R	N/R
DLS	$0.78	N/R	N/R
ICN	$0.18	N/R	N/R
SXY	$0.65	N/R	N/R
STO	$13.00	N/R	N/R
NSE	$0.32	N/R	N/R
BRU	$1.30	N/R	N/R
AWE	$1.46	N/R	N/R
NWE	$0.03	N/R	N/R
SNE	$0.14	N/R	N/R
COE	$0.38	N/R	N/R

We are becoming more positive about the potential for shale as a new source of gas, and possibly oil, in the known hydrocarbon basins around Australia. A growing number of companies are getting involved in the evaluation of the shale potential and their share prices are generally rising. The industry has also been buoyed by the recent entry of multi-national companies like ConocoPhillips, BG and Mitsubishi who are willing to spend $100's of millions on the early work needed. The current state of play for the shale gas industry reminds us of the early days of the CSG industry, before any major M&A activity occurred. The success of the Australian shale gas industry hinges around three key issues:

Geologically, the Australian continent has a number of basins with shales containing the requisite amount of organic content, and the right history of burial and temperature conditions. An equally true statement is that a number of shales don't have these characteristics, so the geology is important.

Technically, the Australian shales should be able to be fracked in line with the US successes, but it's too early to tell. More work is needed.

Commercially, developing shale gas in Australia may be the biggest challenge ahead for the industry. The cost structure is very high and the domestic gas market has been low priced to date. While both costs and prices are likely to change for the better over the medium to longer term, it is likely that the bulk of future Australian shale gas will need to be exported as LNG. This means that huge reserves have to be proven up and large capital investment and long lead times are to be expected.

Four basins stand out as having shale potential and a range of Australian listed oil and gas companies are actively pursuing such targets. The potential resources shown in Table 1 are huge, in fact larger than all the conventional gas reserves found in Australia to date. However, we stress that they are speculative in nature and that the stocks discussed in this report are provided for information purposes and should not be construed as investment recommendations.

Table 1 – Australian basins with shale potential

Cooper Basin	Canning Basin	Perth Basin	Otway Basin
Beach Energy (BPT) Drillsearch Energy (DLS) Icon Energy (ICN) Senex Energy (SXY) Santos (STO)	New Standard Energy (NSE) Buru Energy (BRU)	AWE (AWE) Norwest Energy (NWE)	Somerton Energy (SNE) Cooper Energy (COE)
Permian age	Ordovician age	Permian/Triassic	Cretaceous age
3.7m acres*	30m acres*	1.4m acres*	1.1m acres*
2,000-4,000m depth	1,000-5,000m depth	1,000-5,000m depth	500-3,000m depth
100m thick	80m thick	150m thick	85m thick
Moderate overpressure	Normal pressure	Normal pressure	Normal pressure
Risked gas 85Tcf	**Risked gas 230Tcf**	**Risked gas 60Tcf**	**Risked gas 15Tcf**

SOURCE: US ENERGY INFORMATION AGENCY & GEOSCIENCE AUSTRALIA

* Prospective area

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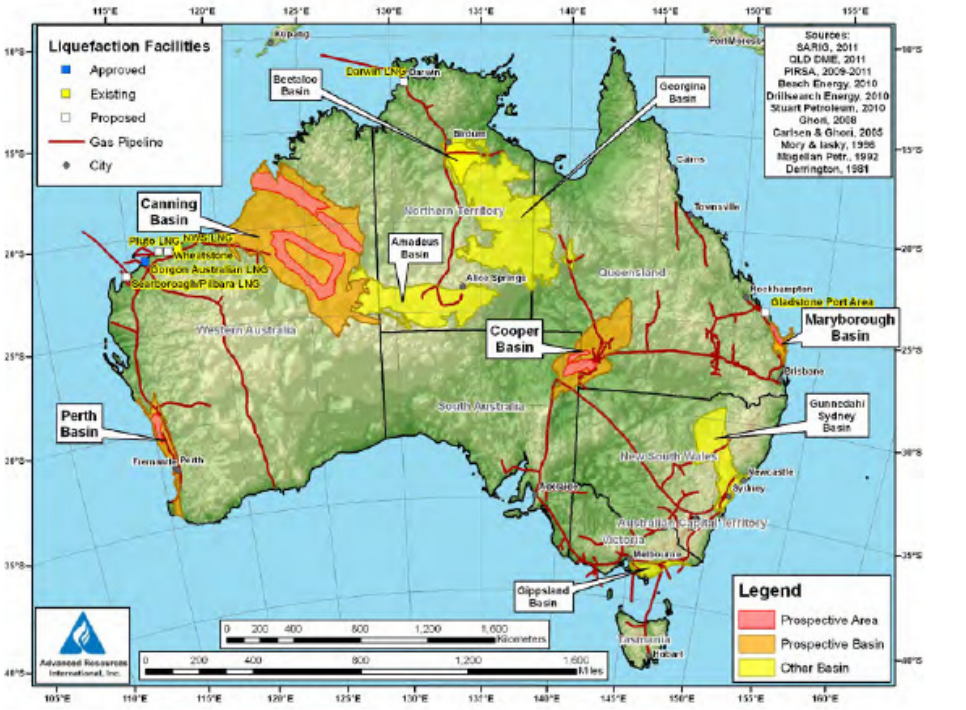
Aussie shale theme to strengthen

Australia has entered a new era of oil and gas exploration. Inspired by the US shale gas boom in recent years, Australian companies and an increasing number of international oil and gas companies have commenced the evaluation process of our shale potential.

The process is likely to be long and costly, however, the identified resource potential is huge and a very attractive prize for those succeeding in defining a commercial reserve.

The US Energy Intelligence Agency (EIA) published a major report on "World Shale Gas Resources" in February this year, where the Australian chapter focused on four basins, as shown on the map in Fig 1. (www.eia.gov/analysis/studies/worldshalegas/)

Figure 1 - Australia's prospective shale gas basins, LNG plants & gas pipelines



SOURCE: US EIA

Some bullish points for the Australian shale industry

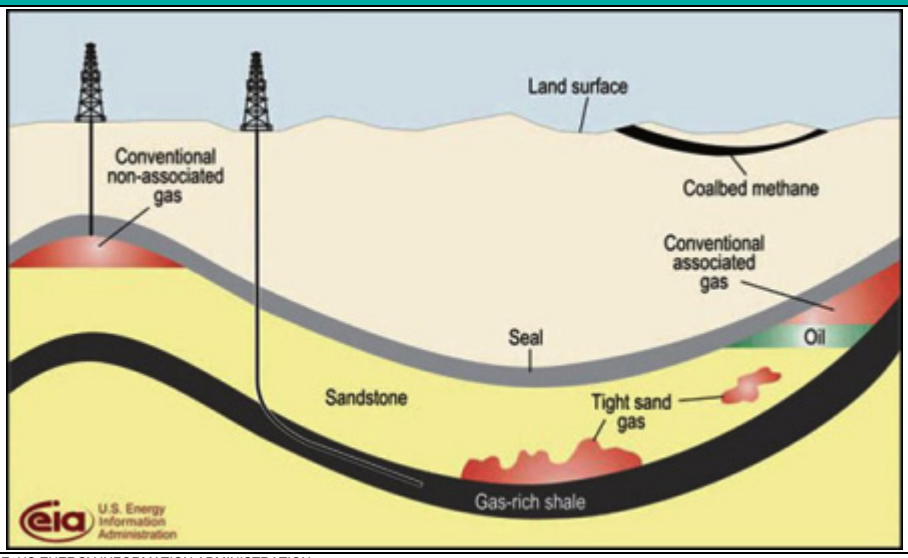
It's not hard to see a shale boom take place in Australia, particularly for gas:

- Australia has large conventional gas reserves – hence we have source rocks.
- The potential reserves are huge. The Canning basin has risked potential of 230Tcf and to put that into perspective, the giant NW Shelf project is based on 30Tcf and the new Gorgon project has 40Tcf, while the Pluto project is based on 4Tcf. Even the Otway basin with 15Tcf of risked gas potential would be a huge project.
- The learning curve for the technology is flattening thanks to the US experience.
- Pipeline infrastructure is in place for some basins, and with declining capacity utilisation notable in the Cooper basin as conventional production is falling.
- The new LNG industry based on CSG (CBM) is at risk of not delivering the required quantities of gas supply.
- The introduction of a carbon tax from July 2012 will stimulate more demand for gas fired power generation.
- The international industry is entering Australia with significant investments.

Some background

An old saying in the oil and gas industry is that “a good place to look for oil and gas is in or near an existing field”. The shale gas industry has essentially followed that principle in the US, where most of the successes in shale exploitation have been in existing petroleum regions. The conventional oil and gas targets that the industry has been working on for the last 150 years have depended on a nearby source rock, which usually is a shale with high organic content. These shales also needed to have been subjected to the right amount of temperature and pressure regimes over the geological time scales to generate oil and gas. The shales also had to spend the right amount of time in the “kitchen” or the organic matter would not have been cooked, or it could become over-cooked.

Figure 2 - Shale gas schematic



SOURCE: US ENERGY INFORMATION ADMINISTRATION

While the industry has always known about source rocks as oily or gassy, they have not been able to extract the hydrocarbons at commercial rates until recent years. The application of fracking technology and horizontal drilling has changed all that. In the US, shale gas now contributes 30% of all gas supply and it’s predicted to exceed 50% within 10 years. Shale oil production has been more challenging, but it is now growing faster than the natural declines in the US conventional oil fields, and some observers believe that the US will become the world’s largest oil producer again, all driven by shale.

It’s early days for shale in Australia

The Australian shale gas industry is undoubtedly at a very early stage of evaluation. There have only been three wells drilled with the specific purpose of evaluating the hydrocarbon potential of shales in the country. Two of them were drilled by Beach (BPT) in the Cooper basin and one by AWE (AWE) and Norwest Energy (NWE) in the Perth basin. Only one, Holdfast-1 has been fracked by BPT and it was over a very large interval which may have included some productive sandstone reservoirs. This means that the 2mmcfd gas flow - whilst encouraging - may not be representative of the shales. A lot more work needs to be done, and that is what the industry is embarking on over the next few years.

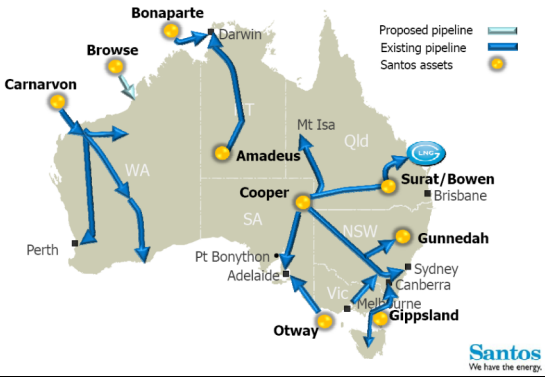
This report is written to highlight which companies are involved and what the potential upside could be. We believe that Australian shale gas will be a positive investment theme for the next few years, but a range of uncertainties exist so any investments will be of a speculative nature.

The Cooper Basin

The Cooper Basin stands out as the most prospective and commercially viable for shale development in Australia and it is no surprise that this region has had most of the activities to date. The EIA estimates 342Tcf of GIP (gas-in-place) with a risked recoverable of 85Tcf. The basin is very large, spanning 32m acres (130,000km^2) and contains four major deep troughs with shale gas potential. The Cooper Basin is Australia's most mature onshore region with production from conventional oil and gas over the last 40 years. As such, an extensive pipeline network is already in place. The region supplies gas to the SA, NSW, Qld and Vic markets and liquids are exported via a processing plant at Port Bonython, see figure 3.

While conventional production has been declining, the basin's unconventional potential, particularly shale, has sparked much interest from Australian and international explorers. The enormous potential in the Cooper Basin leads us to believe that there will be increasing corporate and operational activities in this region giving rise to Australia's next energy boom.

Figure 3 – Australian basins and major transmission pipelines



SOURCE: COMPANY DATA

Geology

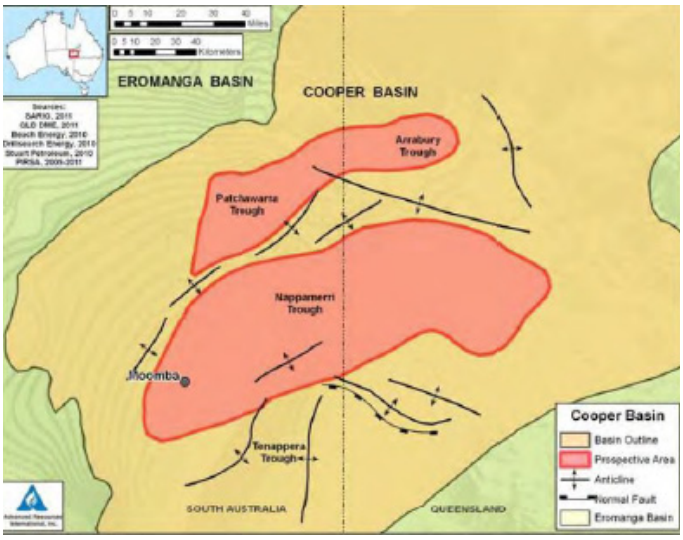
The Cooper Basin contains four major deep troughs with shale gas potential, Nappamerri, Patchawarra, Tenappera and Arrabury. See figure 4. The largest and most prospective for shale development is the Nappamerri Trough that spans 3.7m acres (15,000km^2) and 3,000m deep.

The Roseneath, Epsilon and Murteree (REM) sequence (figure 5) has been identified as the best shale exploration targets in the Nappamerri Trough but also cover portions of the Arrabury and Tenappera Troughs within the Cooper Basin. The shale targets are the Roseneath and Murteree shales and these are separated by a layer of sandstones, siltstones and coals of the Epsilon formation. This structure is analogous to an "Oreo" biscuit, where the "sweet" production zone is sandwiched between two source-rich shales.

The average thickness of the REM sequence in the western Nappamerri Trough is 300m and becomes thicker to the east and north where maximum thickness reaches 550m.

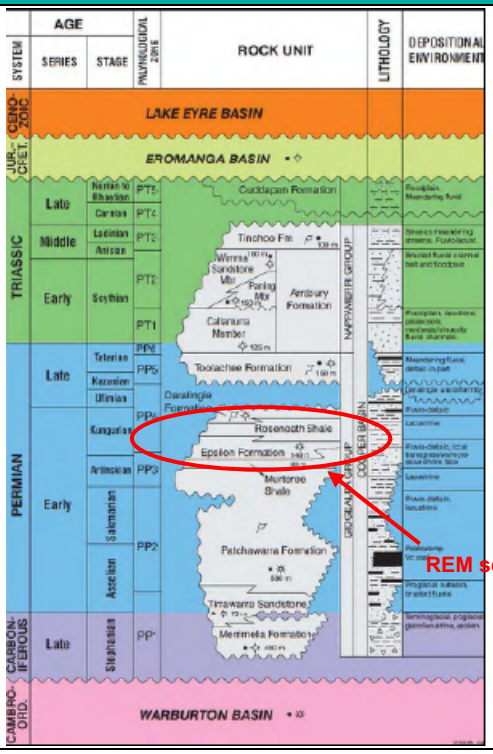
The key geological risk in the Cooper Basin is that it contains a high level of CO_2, tight sandstones in the Epsilon formation contain 8% to 24% of CO_2 and gas produced from the Patchawarra sandstone contains a higher level of CO_2 at 40%. This would mean extra gas treatment (and cost) will be required.

Figure 4 – Major troughs in the Cooper Basin



SOURCE: EIA

Figure 5 - Stratigraphy of the Cooper Basin



SOURCE: EIA

Resources

The REM formations have favourable thickness, moderate total organic content (TOC), high thermal maturity and overpressured. The lithology also appears brittle which means the shale could respond well to fracture stimulation.

The Murteree shale (M) is relatively uniform in thickness, averaging 50m across the Cooper Basin and reaches a thickness of 80m in the Nappamerri Trough with TOC of c.2.5%.

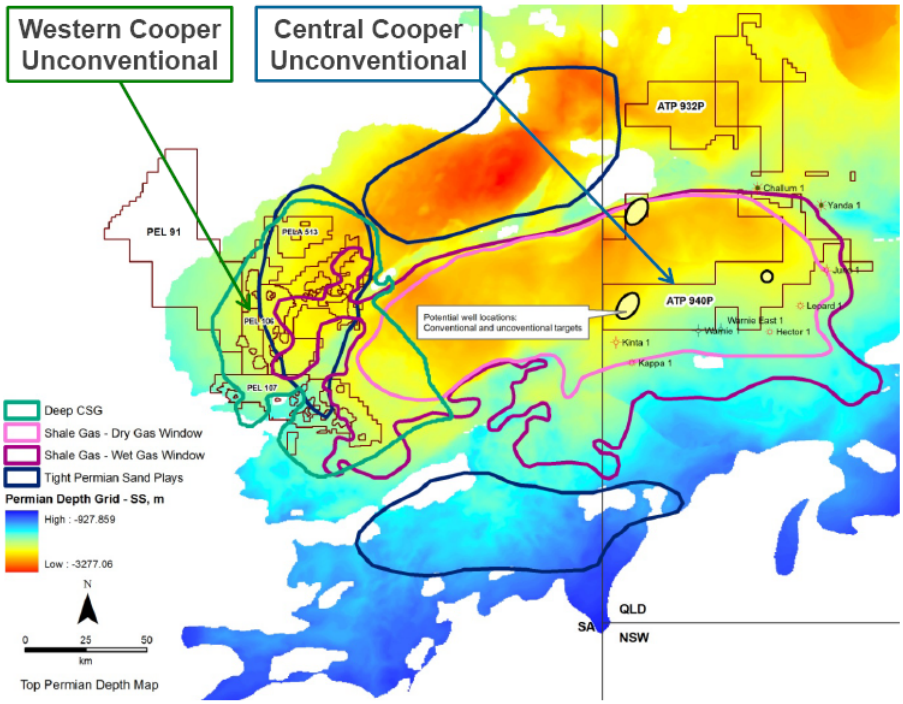
The Epsilon formation (E) is made of low-permeability sandstone averaging about 50m thick and reaching a maximum of 150m in the Nappamerri Trough.

The Roseneath shale (R) is not as extensive as the Murteree shale, averaging 37m thick and reaching a maximum of 100m.

The thermal maturity (R_o of 3-4%) of the REM sequence suggests most of the Nappamerri Trough is gas prone but flanks of the central shale gas fairway is considered to be in the wet gas window. As such there is a potential that gas from the shales and tight sandstones will come with liquids, see figure 6.

Adjusting for the high levels of CO_2, the EIA estimates the REM sequence has a prospective area of 3.5m acres (14,000km^2), and a risked shale GIP of 342Tcf with a risked recoverable of 85Tcf!

Figure 6 - Cooper Basin shale gas – wet and dry gas windows

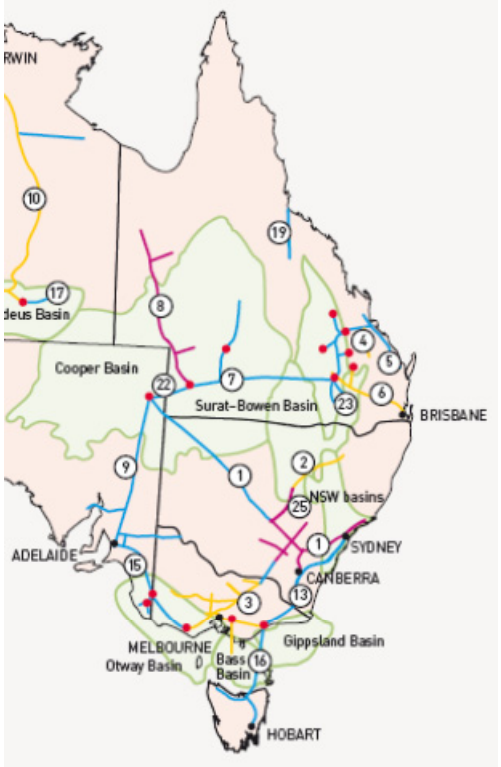


SOURCE: COMPANY DATA

Infrastructure

The Cooper Basin is well connected to the SA, NSW, Qld and Vic markets via an extensive pipeline network, shown in figure 7.

Figure 7 - Eastern Australia gas transmission pipelines



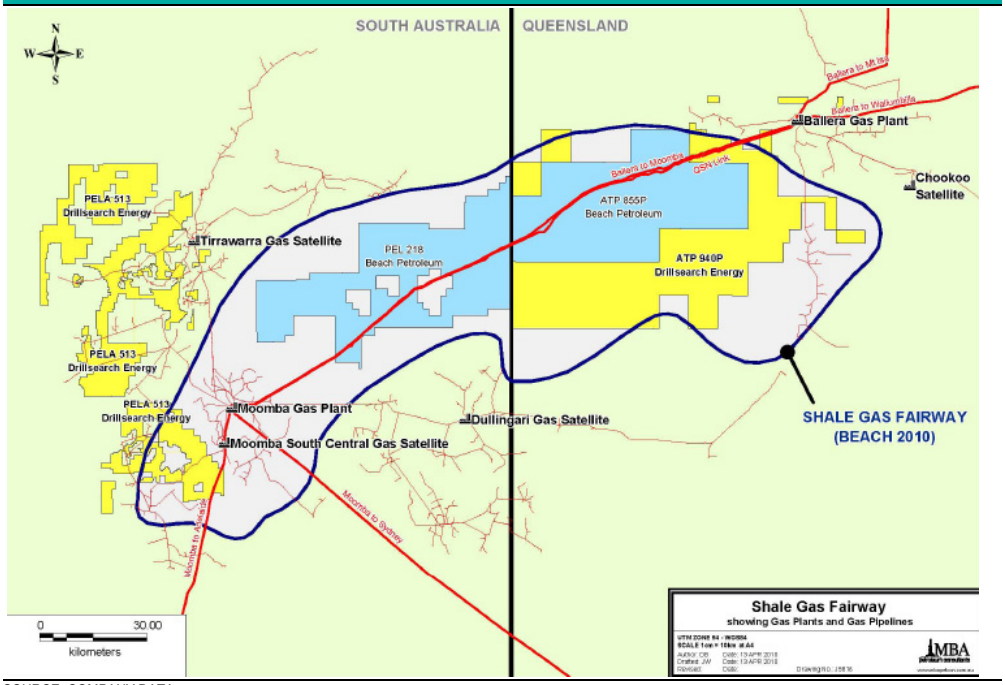
SOURCE: COMPANY DATA

Players

The companies most active or have a significant acreage exposure in the shale gas fairway (Nappamerri Trough) in the Copper Basin are BPT, DLS, ICN, SXY and STO.

BPT owns 100% of PEL 218 in the SA Cooper Basin with excellent results to date. It also operates and owns 60% of the adjacent ATP 855P with ICN in Qld. DLS' ATP 940 located below ATP 855P was farmed into by BG subsidiary QGC via a $130m JV agreement. SXY's exposure to the fairway is on the lower edge of the SA Cooper Basin south of Moomba. STO via the SACB JV (66.6%) and SWQ JV (60.1%) also has significant exposure to the fairway. The SACB JV licenses surround BPT's PEL 218 on the SA Cooper Basin and the SWQ JV licenses around BPT/ICN's ATP 855P and DLS/QGC's ATP 940 on the Qld side.

Figure 8 - Major players in the Nappamerri Trough



SOURCE: COMPANY DATA

Activities to date

In August 2011, **BPT** drilled two vertical wells (Encounter-1 and Holdfast-1) in PEL 218 and booked 2Tcf of contingent resource based on a restricted area of 100km^2 around each well.

STO development well (Moomba-185) was deepened to core REM shales. The company has reported the desorption test indicates results commensurate with US producing shale gas basins in July 2011.

SXY drilled one well in PEL 516 (Vintage Crop-1) testing the Roseneath and Murteree formations for shale gas in May 2011. MHA estimates 38 to 60Tcf GIP in the Alluga Trough and the Mettika Embayment within the PEL 516 shales.

In July 2011, BG Group subsidiary QGC and **DLS** formed a $130m JV to explore and develop unconventional shale and tight gas resources in DLS's largest license (ATP 940) in the Cooper Basin. The JV involves QGC farming into 60% of the permit area in the Nappamerri Trough.

ICN finalised a farm-in agreement with BPT for the latter to take 40% interest in ICN's license (ATP 855P) in the Cooper Basin in July 2011. Following the acquisition of Adelaide Energy, BPT owns 60% of ATP 855P.

Beach Energy (BPT)

Recommendation
N/R
Price
$1.42
Target (12 months)
N/R

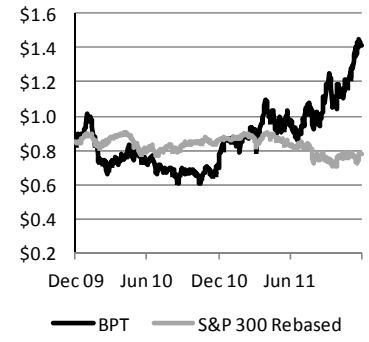
Expected Return	
Capital growth	N/A
Dividend yield	N/A
Total expected return	N/A

Company Data & Ratios	
Enterprise value	$1.41b
Market cap	$1.57b
Issued capital	1,108m
Free float	100%
Avg. daily vol. (52wk)	5.4m
12 month price range	$0.69 - $1.47
GICS sector	Energy

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	1.17	1.11	0.70
Absolute (%)	20.94	27.48	103.60
Rel market (%)	18.06	27.99	112.04

Absolute Price



SOURCE: IRESS

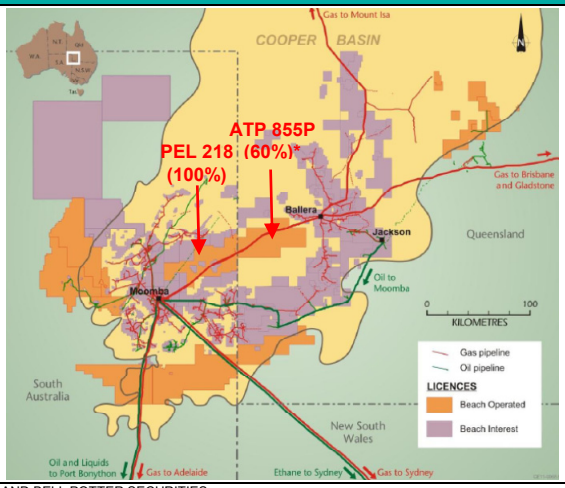
Australia's first mover in the shale game

BPT is considered a first mover in Australian shale having amassed significant acreages in the Cooper Basin and recently further consolidated its presence via the acquisitions of Impress Energy and Adelaide Energy. The company's recent success in PEL 218 has attracted much interest in the basin's unconventional potential and added over 50% to the share price in the last 6 months. BPT also owns 56.2% of Somerton Energy (SNE) which focuses on prospects within the Otway Basin.

Assets description

BPT's sole ownership in PEL 218 lies in the central part of the Nappamerri Trough. Following the acquisition of Adelaide Energy, BPT will also hold 60% operating interest in the adjacent ATP 855P. These licenses are well located with raw and sales gas pipelines crossing the acreages with current excess capacity and compression capability. See figure 9.

Figure 9 – BPT position in the Cooper Basin (* Post acquisition completion of ADE by BPT)



SOURCE: COMPANY DATA AND BELL POTTER SECURITIES

Two vertical wells drilled in PEL 218 (1,600km^2 or 395,000 acres) targeting the REM sequence have shown the shales and other formations tested are very thick and the gas saturated section has the potential to be over 1km. A maximum flow rate of 2mmcf/d was also achieved in the fracture stimulated Holdfast-1 well. This led to the booking of 2Tcf of contingent resource based on a restricted area of 100km^2 around each well. The company has estimated a potential GIP of 300Tcf across PEL 218 and recoverable gas of up to 60Tcf (that's equivalent to12 Pluto LNG trains!).

Development program

BPT plans to conduct a 7-zone fracture stimulation on Encounter-1 in 4Q11 followed by independent reserves and resource certification in 1Q12. BPT expects to complete three horizontal wells in PEL 218 and ATP 855P as well as five vertical wells in PEL 218 in 2012 using two new rigs secured from North America.

Funding capacity

BPT has $53m cash and a $150m finance facility. A $355m capex program for FY12 is planned and $54m has been spent up to September quarter.

Drillsearch Energy (DLS)

Recommendation
N/R
Price
$0.78
Target (12 months)
N/R

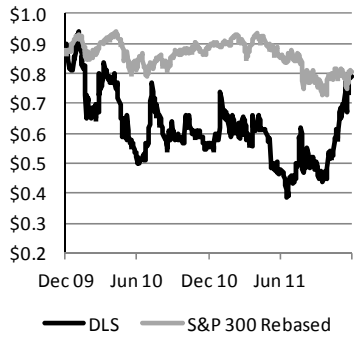
Expected Return	
Capital growth	N/A
Dividend yield	N/A
Total expected return	N/A

Company Data & Ratios	
Enterprise value	$186m
Market cap	$237m
Issued capital	305m
Free float	100%
Avg. daily vol. (52wk)	1.1m
12 month price range	$0.37 - $0.82
GICS sector	Energy

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	0.59	0.51	0.56
Absolute (%)	35.04	54.90	41.45
Rel market (%)	32.16	55.42	49.89

Absolute Price



SOURCE: IRESS

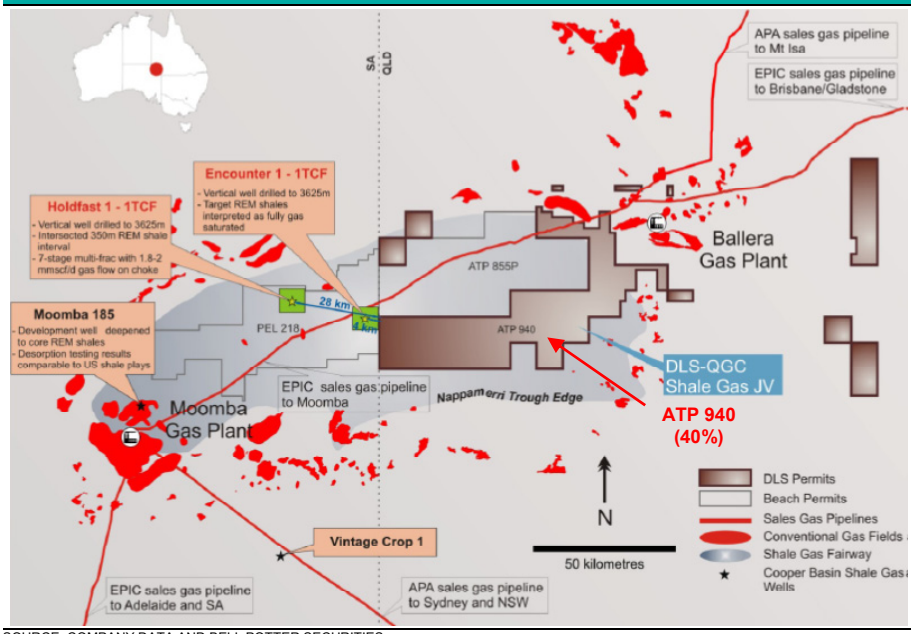
Shale potential attracts BG farm-in

DLS has a significant net acreage position of 5.7m acres (23,000km^2) in the Cooper Basin via 15 licenses. In July 2011, BG subsidiary QGC farmed into DLS' shale gas play through a five year $130m exploration and pilot appraisal program. DLS has retained a 40% operating interest in one of the three largest blocks in the prospective Nappamerri Trough. It will be 90% carried for the first $100m spend and pay for its share of the balance from the funding received from QGC of past costs and the exercise of c.30m options (exercise price $0.62/sh expiring February 2012).

Assets description

The JV's shale gas fairway spans 500,000 acres (2,000km^2). Previous wells drilled in surrounding acreage have intersected some of the most liquids-rich gas conventional fields in the basin and BPT is testing the REM formation in the adjacent PEL 218 with some encouraging initial results. As such, the main focus for the JV is exploring and developing shale in the fairway.

Figure 10 - DLS position in the Cooper Basin



SOURCE: COMPANY DATA AND BELL POTTER SECURITIES

ATP 940 project area stakeholders include one grazing company and one landowner (STO). The license is well-located with the Ballera-Moomba pipeline intersecting the license. The EIA has estimated the JV area has a potential 48Tcf of GIP or 24bcf/km^2.

Development program

The company expects to complete two fracture stimulated vertical wells and flow tested by end 2012. This will be followed by two vertical and two horizontal fracture stimulated appraisal wells for pilot production.

Funding capacity

DLS has $45m cash and will be largely spent by end FY12 in the development of existing conventional discoveries and exploration activities. It expects to be self-funded from September quarter 2012 from the Western Flank Oil and Wet Gas production.

Icon Energy (ICN)

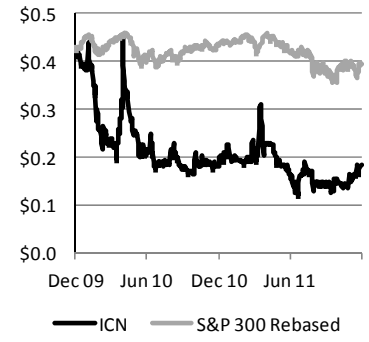
Recommendation
N/R
Price
$0.18
Target (12 months)
N/R

Expected Return	
Capital growth	N/A
Dividend yield	N/A
Total expected return	N/A
Company Data & Ratios	
Enterprise value	$69m
Market cap	$84m
Issued capital	469m
Free float	100%
Avg. daily vol. (52wk)	1.3m
12 month price range	$0.12 - $0.33
GICS sector	Energy

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	0.14	0.15	0.18
Absolute (%)	37.04	27.59	2.78
Rel market (%)	34.15	28.10	11.22

Absolute Price



SOURCE: IRESS

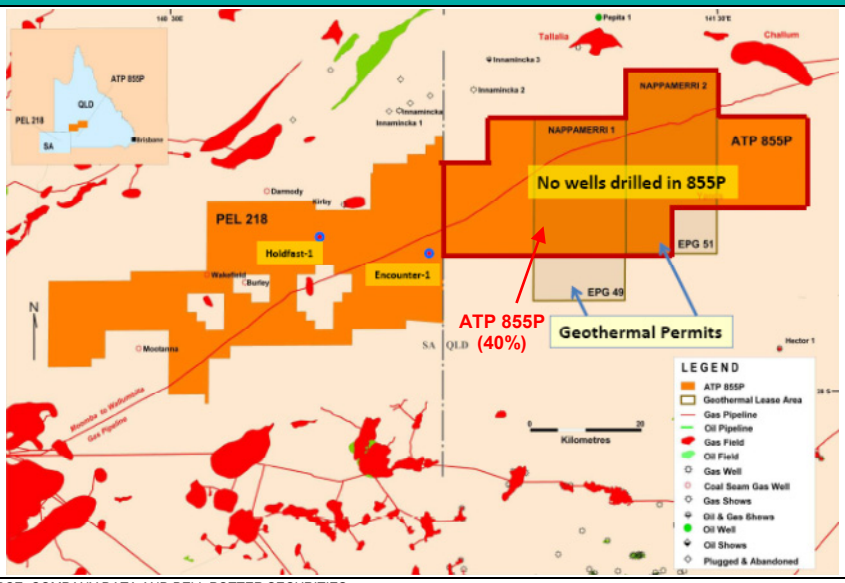
Key exposure to the prospective Nappamerri Trough

ICN is an oil and gas exploration company with licenses in the Cooper, Surat and Gippsland Basins. The company is focusing on proving up c.2.3Tcf of 2P reserves to satisfy gas sales agreements with China's Shantou SinoEnergy and Qld's Stanwell. ICN has 40% interest in one of the three largest licenses in the Cooper basin for prospective shale. We believe the commercialisation of this could include LNG export via the existing LNG contract or an acquisition by BPT, the operator and majority holder of the license.

Assets description

ICN has 40% interest in ATP 855P with operator BPT owning 40%. The remaining interest is held by Adelaide Energy (under compulsory acquisition by BPT). ATP 855P is adjacent to BPT operated PEL 218 where 2Tcf of contingent resource has been booked. No wells have been drilled on the license but encouragingly seismic data shows the REM sequence targeted by the adjacent PEL 218 is 20 to 30% thicker in ATP 855P. However shale characteristics are not known until coring is completed so we do not have any information on the gas content and the quality of the shale.

Figure 11 - ICN position in the Cooper Basin



SOURCE: COMPANY DATA AND BELL POTTER SECURITIES

Development program

BPT has secured the Ensign #65 rig to drill a horizontal pilot unconventional well in ATP 855P targeting the REM sequence. The new build 1,500 HP rig will arrive in Australia from North America in April 2012 and will commence drilling in ATP 855P by June 2012. Based on EIA's assessment, ICN has estimated a potential recoverable amount of c.20Tcf from ATP 855P.

Funding capacity

The company currently has a cash position of $14m. BPT will fund ICN's share of the drilling capex estimated at $16m (gross). As part of the farm-in agreement, ICN will pay a $1.75m contribution plus its share of fracture stimulation, completing and flow testing of the well, which we estimate at c.$2m net.

Senex Energy (SXY)

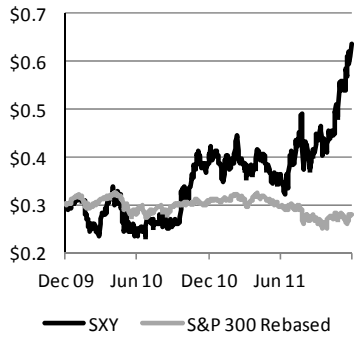
Recommendation
N/R
Price
$0.65
Target (12 months)
N/R

Expected Return	
Capital growth	N/A
Dividend yield	N/A
Total expected return	N/A
Company Data & Ratios	
Enterprise value	$555m
Market cap	$592m
Issued capital	918m
Free float	100%
Avg. daily vol. (52wk)	1.3m
12 month price range	$0.30 - $0.65
GICS sector	Energy

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	0.50	0.42	0.38
Absolute (%)	28.28	53.01	65.65
Rel market (%)	25.40	53.53	74.09

Absolute Price



SOURCE: IRESS

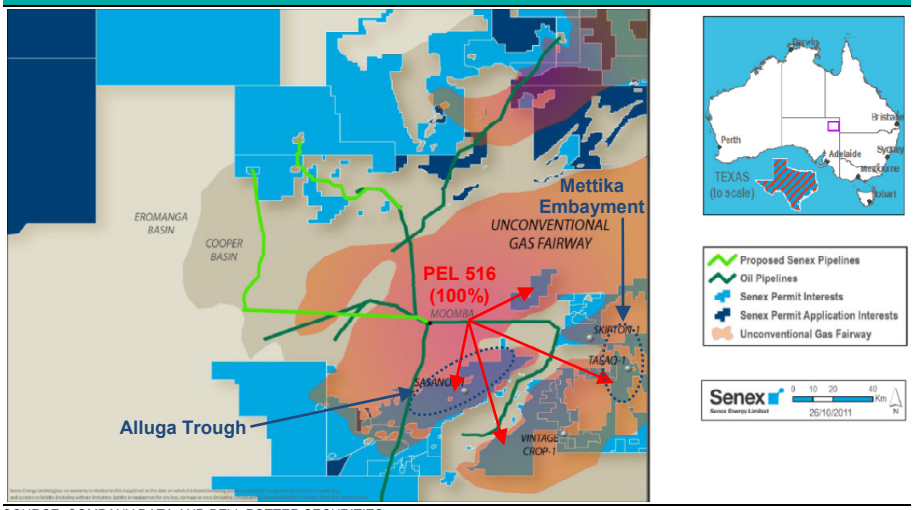
Big potential with well-located licenses

SXY has further consolidated its significant acreage in the South Australian Cooper Basin following the merger with Stuart Petroleum in May 2011. Immediately following the merger, the company commenced exploration drilling in the 100% owned PEL 516. The Vintage Crop-1 well targeted oil-bearing zones before deepened to evaluate the unconventional gas potential of the underlying coals and shales. The encouraging results have led to a dedicated assessment of the unconventional gas potential of SXY's Cooper Basin acreage.

Asset description

PEL 516 spans 620,000 acres (2,500km^2) and is located on the edge of the Nappamerri Trough, see figure 12. The Vintage-Crop 1 well intersecting the REM shale formation revealed good gas shows throughout all cored sections as well as the presence of liquids-rich gas. The preliminary results also showed favourable mineralogy and encouragingly the shale gas content is prognosed to be similar to commercial North American shale plays.

Figure 12 – SXY position in the Cooper Basin



SOURCE: COMPANY DATA AND BELL POTTER SECURITIES

PEL 516 is well-located with existing gas and liquids pipelines running across the licence. MHA had previously estimated 38 to 60Tcf of GIP in the Alluga Trough and the Mettika Embayment (figure 12) within the PEL 516 shales and an additional 25 to 39Tcf GIP within other areas of the license.

Development program

SXY will drill the first of three unconventional wells in PEL 516 in late 2011/early 2012. Following fracture stimulation and flow testing, the company expects to book contingent resource by end FY12. The drilling is expected to be c.$15m and subject to the availability of rigs.

Funding capacity

SXY currently has c.$94m cash and no debt. A 1-for-5 rights issue was completed in September 2011 to raise c.$53m.

Santos (STO)

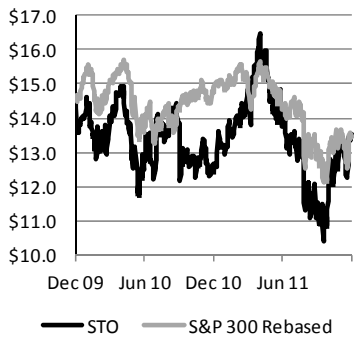
Recommendation
N/R
Price
$13.00
Target (12 months)
N/R

Expected Return	
Capital growth	N/A
Dividend yield	N/A
Total expected return	N/A
Company Data & Ratios	
Enterprise value	$12.0b
Market cap	$12.2b
Issued capital	941m
Free float	100%
Avg. daily vol. (52wk)	4.6m
12 month price range	$10.1 - $16.9
GICS sector	Energy

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	12.68	12.06	12.57
Absolute (%)	6.62	12.11	7.56
Rel market (%)	3.74	12.62	16.00

Absolute Price



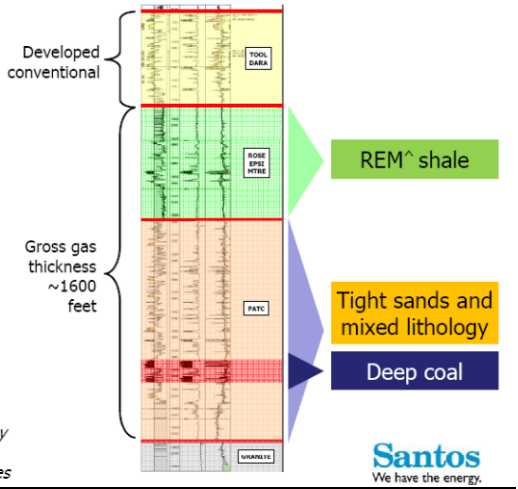
SOURCE: IRESS

STO sees Cooper born again

A pioneer in Australian CSG with a 30% stake in Gladstone LNG, STO has recently reinforced its exposure to shale potential in the Cooper Basin. The company expects its current 2Tcf of 2C unconventional resource in the Cooper Basin to double by 2015. While shale attributes only 30% of the current 2C resource, this is expected to grow as the upcoming drilling program gets underway.

Figure 13 – STO unconventional resource target in the Cooper Basin

Resource potential* (PJ)		
URG plays	Booked 2C	2015 2C Target
REM^ shale	684	
Tight sands and mixed lithology	1,075	
Deep coal	586	
Total	2,345	4,800



* Santos share (YE2010), independently certified by Degolyer and MacNaughton
^ REM – Roseneath, Epsilon and Muturee shale zones

SOURCE: COMPANY DATA

Assets description

STO is the operator of the SACB JV (66.6%) and SWQ JV (60.1%) with BPT and ORG owning the remaining interests. Within the Nappamerri Trough, SACB JV licenses surround BPT's PEL 218 on the SA side of the Cooper Basin and the SWQ JV licenses around BPT/ICN's ATP 855P and DLS/QGC's ATP 940 on the Qld side. Given these are already producing licenses in a mature basin, existing pipeline and compression facilities are already in place for gas and oil processing.

Development program

STO is expected to drill one dedicated vertical well, fracture stimulated in 2012 followed by its first fracture stimulated horizontal well in 2013. The company hopes to make reserve bookings in 2013 followed by production in 2015.

Funding capacity

STO has c$3.6b in cash and c.$2b of undrawn debt facility not dedicated to the PNG LNG project.

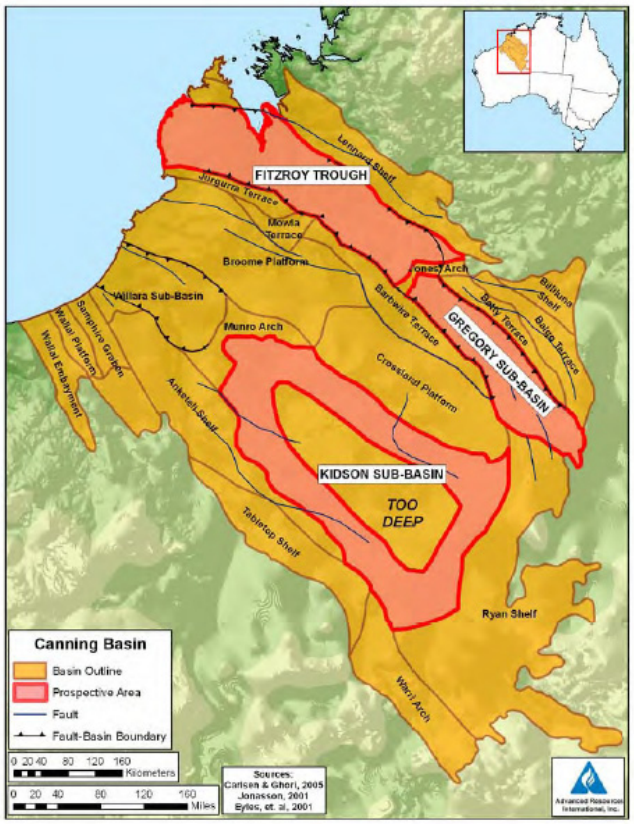
The Canning Basin

The Canning basin is located in the north of Western Australia and is a very large sedimentary basin made up of several sub basins. The onshore portion covers 470,000km^2 or 116m acres. The area is very remote, with low population density and little or no industrial activity. Even mining activity is largely absent. The Pilbara iron ore district is located 400-500km to the south-west. The town of Broome is located on the Kimberley coast and is essentially a tourist town and has a pearling industry.

The Canning has only been lightly explored over the decades, with limited success in a conventional oil & gas sense. The only commercial discoveries were at Blina and a few smaller fields which found a couple of mmbbl of oil in the 1980s. The oil had to be trucked over 2,200km to the BP refinery in Perth at a very high cost. The nearest gas pipeline is at Port Hedland, about 600km to the south-west.

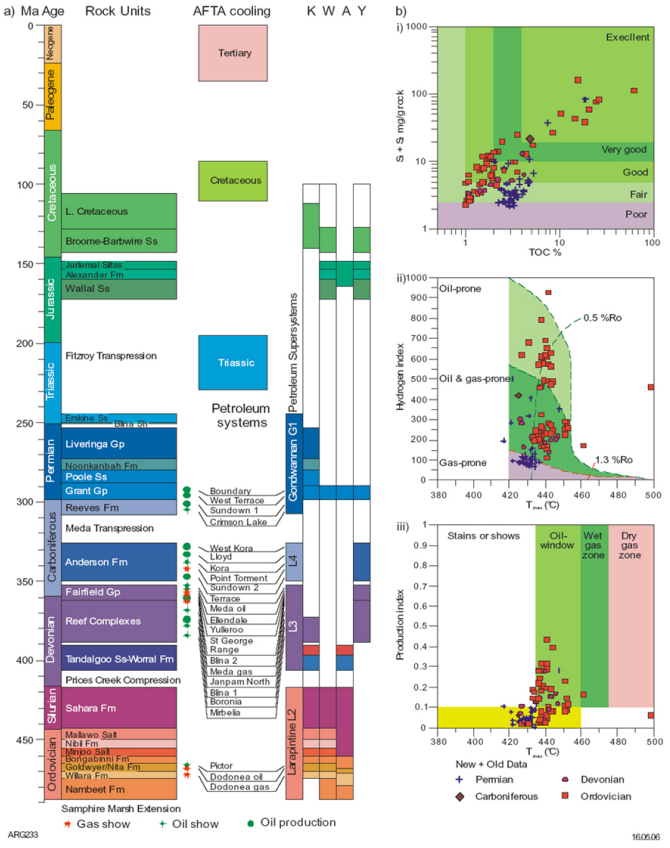
The potential of the Canning has been recognised for a long time though and two companies have built dominant acreage positions in recent years, namely Buru Energy (BRU) and New Standard Energy (NSE). Mitsubishi has joined BRU through a $150m farm-in program which has recently made a conventional oil discovery at Ungani, which looks promising. Likewise, NSE has been joined by ConocoPhillips who will spend $109m to earn up to 75% in NSE's acreage. These companies are attracted to the huge resource potential of the Canning, whilst recognising that it is frontier exploration and has a high risk of failure.

Figure 14 - Canning basin location



SOURCE: US ENERGY INTELLIGENCE AGENCY

Figure 15 - Canning basin stratigraphy



SOURCE: US ENERGY INTELLIGENCE AGENCY

Geology

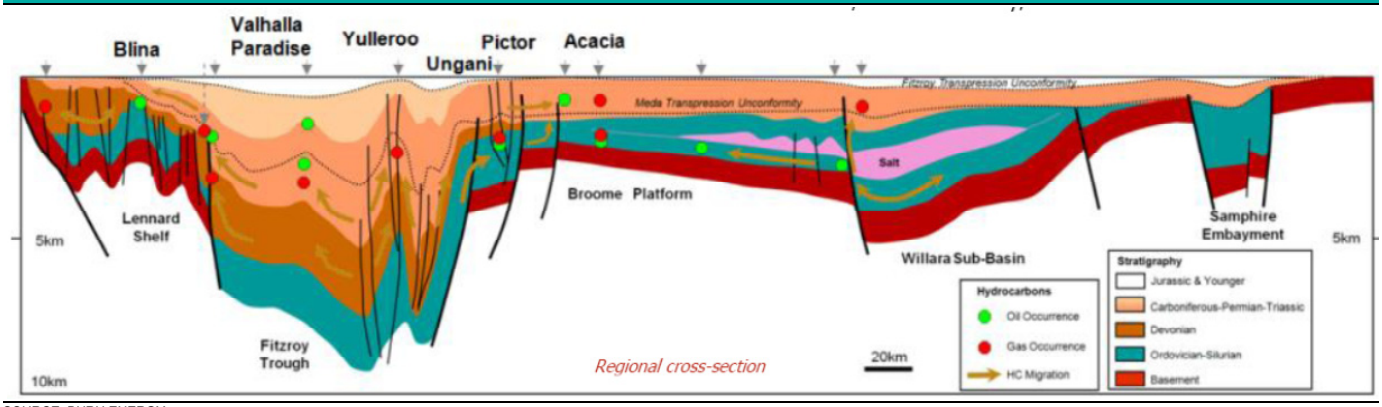
The Canning basin is a large intracratonic rift basin with sediments from Ordovician (~500M years old) to Cretaceous age (~120M years). In the deepest part of the basin sediments are estimated to be 18km thick!

From an unconventional petroleum perspective, the two most prospective shales are the Ordovician Goldwyer formation and the Carboniferous Laurel formation. There have only been 60 wells drilled in the basin, most of them on regional highs so there is very limited data on these shales.

Nevertheless the Goldwyer shale is known to be highly fossiliferous with an average thickness of 400m. Total Organic Content (TOC) typically varies from 1% to 5% but can be as high as 10%. The Goldwyer shale has all the hallmarks of an excellent source rock but it shows significant variability both vertically and laterally, so is likely to have sweet spots across the exploration play.

The conventional oil & gas discoveries made to date are thought to have been sourced from the Laurel formation, particularly in the Fitzroy Trough to the north.

Figure 16 - Canning basin cross section



SOURCE: BURU ENERGY

Resources

The Goldwyer and Laurel formations are prospective over a large part of the Canning basin, but regional highs and the deepest part of the Kidston sub-basin will be less prospective. The EIA estimates a resource of 41Bcf/km^2 in the Goldwyer sequence.

With a prospective area of 124,000km^2, ARI estimates that the Goldwyer has a risked completable shale gas-in-place of 764Tcf and risked recoverable resources of 229Tcf. This is a massive number and highly speculative but demonstrates the potential upside.

Infrastructure

The Canning basin has virtually no infrastructure to support the oil & gas industry. Even the road network is limited and of relatively low standard. A gas development would need to be of some scale before a pipeline to Port Hedland/Dampier could be contemplated as this would cost in excess of $500m to construct.

For oil, trucking costs to Perth are $25-30/bbl although export through the ports of Derby or Broome may become a more cost effective and sensible option. If Woodside's James Price Point LNG precinct north of Broome goes ahead, this could become the best option as they will have significant associated liquids production in the LNG process.

Activities to date

No shale specific wells have been drilled in the Canning. All the data gathered by the industry comes from the 60 odd conventional exploration wells drilled over recent decades.

BRU has drilled 7 wells in the last two years, all of them addressing conventional targets. The recent discovery of oil in a carbonate reservoir at Ungani-1 and -2 is exciting, but the size of the discovery is still very difficult to ascertain. Best estimates suggest a wide range of 1-20mmbbl, which at the upper end would make Ungani the biggest onshore discovery in Australia since the Eromanga basin find at Jackson in 1981.

BRU is also optimistic that the 1967 gas discovery at Yulleroo can be commercialised through fracking of the tight sandstone reservoir. A resource of 352PJ and 13mmboe of liquids has been independently indicated, which would be enough to justify a pipeline to Dampier. Other discoveries at Valhalla, Paradise and Pictor will be followed up in 2012.

Seismic coverage over the Canning basin remains sparse. Most prospects have been drilled on widely spaced 2D seismic lines but large seismic programs are being undertaken through the new exploration campaigns of NSE and BRU, including some 3D seismic on the Yulleroo and Ungani discoveries.

New Standard Energy (NSE)

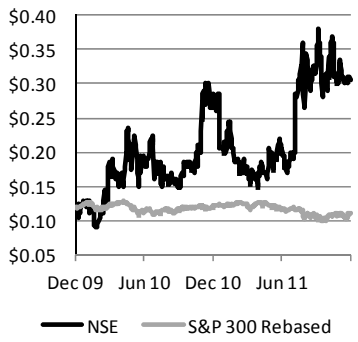
Recommendation
N/R
Price
$0.32
Target (12 months)
N/R

Expected Return	
Capital growth	N/A
Dividend yield	N/A
Total expected return	N/A
Company Data & Ratios	
Enterprise value	$76m
Market cap	$90m
Issued capital	283m
Free float	100%
Avg. daily vol. (52wk)	0.6m
12 month price range	$0.15 - $0.39
GICS sector	Energy

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	0.31	0.33	0.27
Absolute (%)	0.00	-6.15	15.09
Rel market (%)	-2.88	-5.64	23.53

Absolute Price



SOURCE: IRESS

The Canning shale play

NSE is an exploration company primarily focused on the shale potential of the southern Canning basin. The company has licenses covering 11m acres (45,000km^2) out of the 30m acres of potentially prospective ground in the Canning. The main shale target is the Ordovician Goldwyer formation which is 200-600m thick. The technically risked recoverable potential of the Goldwyer shale is +200Tcf, which is a huge number.

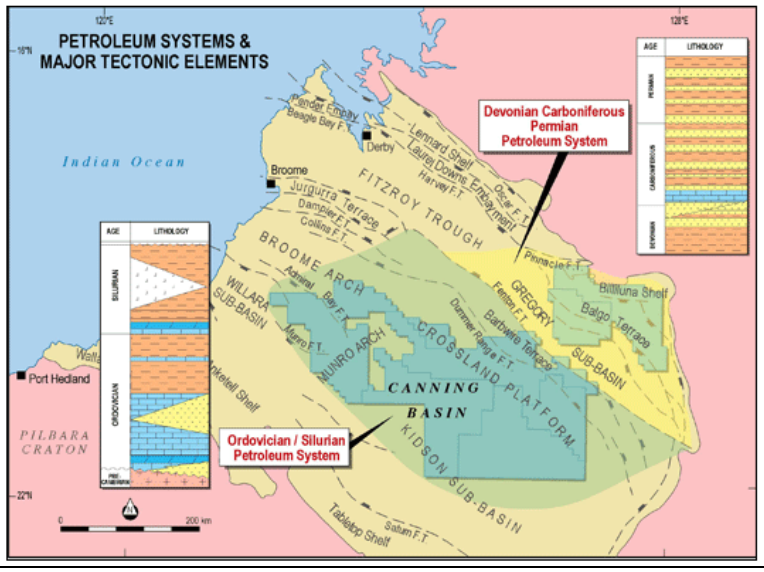
Conoco has farmed in for the upside

ConocoPhillips has agreed to a 4 phased farm-in worth US$109.5m to earn 75% of NSE's 100% owned licenses. Conoco is a world leader in shale technology, having been an early entrant to the Eagleford and Bakken shale plays in the US. Conoco is reportedly excited about the potential of the Canning, seeing some similarities to the liquids rich Eagleford play in Texas.

Drilling in 2012

NSE and Conoco will drill 3 vertical wells in 2012, which will be the first wells designed to drill into the deeper part of the basin for the purpose of evaluating the Goldwyer shale. All three locations are targeting the liquids rich gas window of the Goldwyer This drilling is forecast to cost US$26-28.5m with NSE as operator, and any cost overruns funded by the company. Assuming that Conoco proceeds to the second stage of the farm-in, the JV plans 2 more vertical wells and 1 horizontal well to be drilled in the 2013 drilling season (April-November).

Figure 17 - Canning basin



SOURCE: NSE

Funding

NSE has cash of $30m and holds $20m worth of 15m BRU shares putting the company in a comfortable funding position for the next couple of years.

Buru Energy (BRU)

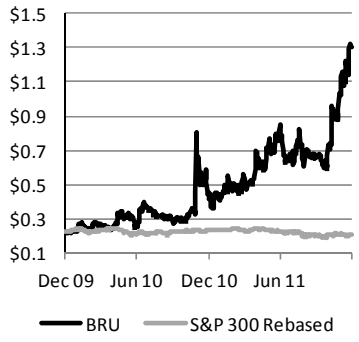
Recommendation
N/R
Price
$1.30
Target (12 months)
N/R

Expected Return	
Capital growth	N/A
Dividend yield	N/A
Total expected return	N/A
Company Data & Ratios	
Enterprise value	$252m
Market cap	$279m
Issued capital	215m
Free float	93%
Avg. daily vol. (52wk)	0.6m
12 month price range	$0.36 - $1.37
GICS sector	Energy

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	0.89	0.68	0.53
Absolute (%)	46.07	92.59	145.28
Rel market (%)	43.18	93.11	153.72

Absolute Price



SOURCE: IRESS

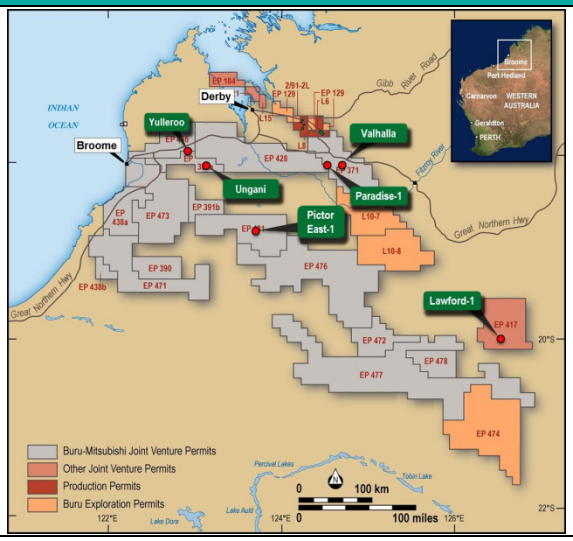
Buru is a big bet on the Canning

The single focus of BRU is on the Canning basin, and founding Chairman Eric Streitberg has accumulated the most comprehensive database of geological data in an effort to explore in the best possible scientific manner. The efforts have so far been concentrated on the conventional targets, but good shale potential exists too. The company's ambition is to become WA's biggest domestic gas and oil supplier by 2015.

Mitsubishi has come in as a partner

BRU has been joined in the Canning by Japan's Mitsubishi. The farm-in agreement has been augmented so that Mitsubishi will spend $150m to earn 50% interest in 13 licenses held by BRU. This year's drilling program has achieved some success.

Figure 18 - Canning basin



SOURCE: BRU

The Ungani oil discovery looks exciting

Ungani-1 was drilled in October 2011 and tested oil at 1,600bopd from a 57m gross oil column in a carbonate reservoir. An immediate appraisal well, Ungani-2 has also found oil but reserve estimates range from 0.5 to 20mmbbl. The seismic coverage is not providing a good idea of the sub-surface and no OWC has been found. When Ungani-2 is completed, extended production testing will show how the reservoir behaves.

Yulleroo gas

The Yulleroo gas discovery was made in 1967, but the tight sandstone and low gas prices made it uneconomic. The field has been assessed to have 352PJ of gas and 13mmbbl of liquids which would be large enough to warrant a pipeline to demand centres in the southern part of WA. This needs to be confirmed by fracking in 2012.

Ongoing drilling program

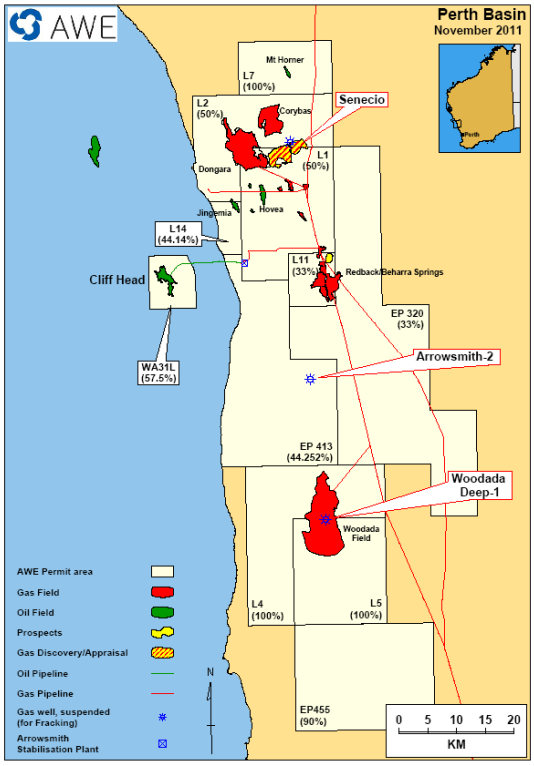
BRU has $35m of cash and the majority of its exploration expenditure funded by Mitsubishi. Even though the wet season has started, drilling activity will continue at Ungani and Yulleroo, with 2012 drilling planned for Valhalla, Paradise and Pictor.

The Perth Basin

The Perth basin is a north-south trending sedimentary basin hugging the south-western coast of Western Australia. The onshore portion extends over an area of about 32,000km^2 or 8m acres. It has a number of conventional oil and gas fields, most of them onshore and modest in size (1-5mmbbl, 5-15Bcf). The only offshore development has occurred at Cliff Head, a 15mmbbl oil field which is still producing at 2,800bopd. Gas production from the onshore fields approximate 16TJ/day, with some associated liquids.

The proximity to the gas market in Perth 200-300km to the south and a tightening gas supply situation has made new sources of gas commercially attractive. Gas prices for new contracts are in the $6-10/GJ range but new conventional discoveries have been harder to find. This has shifted the industry's attention to the shale potential and the tight sandstone reservoirs as well.

Figure 19 - Perth Basin



SOURCE: AWE

Geology

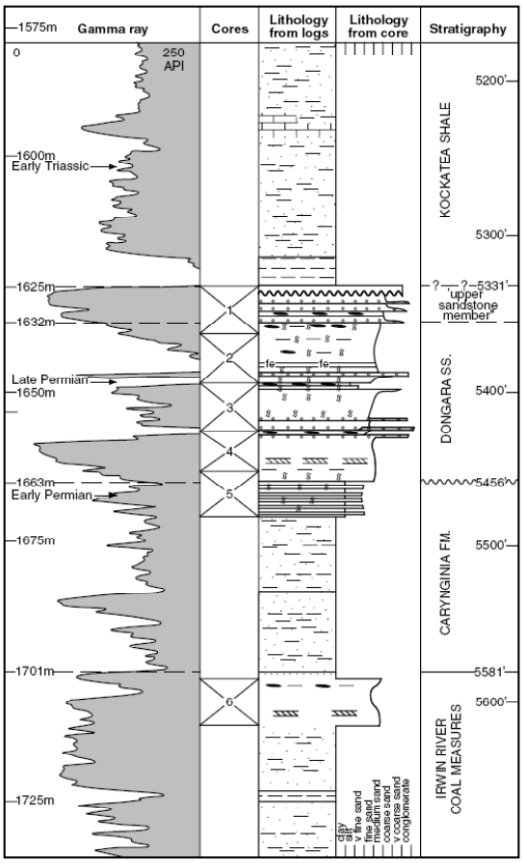
The Perth basin contains two main organic rich shales, namely the Permian Caringinya and the Triassic Kockatea. The thickest and most prospective part of the basin appears to be in the north over the Dandaragan Trough which is approximately 500km long and 45km wide.

The Kockatea shale is considered the primary source rock for the existing oil and gas fields. It is up to 1,000m thick but typically averages around 700m. The organic content is variable but the Hovea member is quite good with an average TOC of +5%. On the other hand, the Hovea member is relatively high in clay content at 24-42%, which may make it ductile and less conducive to fracking.

The Caringynia shale conformably underlies the Kockatea shale, and is just as widespread in the northern Perth basin but not quite as thick, typically 200-300m. Some sampling of organic content has been as high as 11% but an average is probably more like 4%.

Both the Kockatea and the Caringynia shales are thought to primarily be in the mature gas generation window rather than oil prone, but some locations may be suitable for liquids rich gas or oil.

Figure 20 - Perth Basin stratigraphy



SOURCE: GEOLOGICAL SURVEY WA

Resources

The recoverable resource potential for both shales are around 30Tcf each from a risked GIP estimate of 100Tcf.

Infrastructure

The Perth basin is well served by two gas pipelines to the Perth market. The Parmelia gas pipeline was the first pipeline completed in 1971 to take gas from the gas discoveries at Dongara and Woodada, and later Beharra Springs and associated fields. Capacity is 65TJ/day which is much smaller than the 650TJ/day Dampier to Bunbury pipeline (DBNGP) which was built in the 1980s to take NW Shelf gas to the Perth markets, including Alcoa's alumina refineries. The Parmelia pipeline is not fully utilised whereas the BDNGP is close to full, with significant capacity expansions undertaken over the years.

Oil production from the Perth basin is trucked to BP's Kwinana refinery south of Perth.

Activities to date

AWE is the only company that has taken a pro-active approach to evaluating the shale potential in the Perth basin, although partners such as Origin Energy and Norwest Energy are also involved. Arrowsmith-2, Woodada Deep and Senecio have all been drilled in the last 18 months for the purpose of gathering data on the shales, as well as evaluating tight sandstone and the conventional targets. The focus is on the Caringynia shale and while a range of information has been gathered, the company has been frustrated by delays to approve fracking of the key zones of interest. The company had initially received the ok to frack from the EPA but an appeal by a third party has caused delays. We understand that the WA Minister for the Environment is supposed to rule on the matter this month.

AWE has stated that their acreage has the potential to hold 13-20Tcf of gas-in-place, and if a recovery rate of 10-30% is used, the reserves possibilities range from 1-6Tcf.

AWE Limited (AWE)

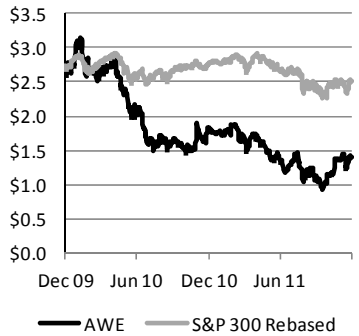
Recommendation
N/R
Price
$1.46
Target (12 months)
N/R

Expected Return	
Capital growth	N/A
Dividend yield	N/A
Total expected return	N/A
Company Data & Ratios	
Enterprise value	$626m
Market cap	$759m
Issued capital	522m
Free float	100%
Avg. daily vol. (52wk)	2.4m
12 month price range	$0.91 - $1.89
GICS sector	Energy

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	1.36	1.19	1.69
Absolute (%)	3.32	18.14	-16.91
Rel market (%)	0.44	18.66	-8.47

Absolute Price

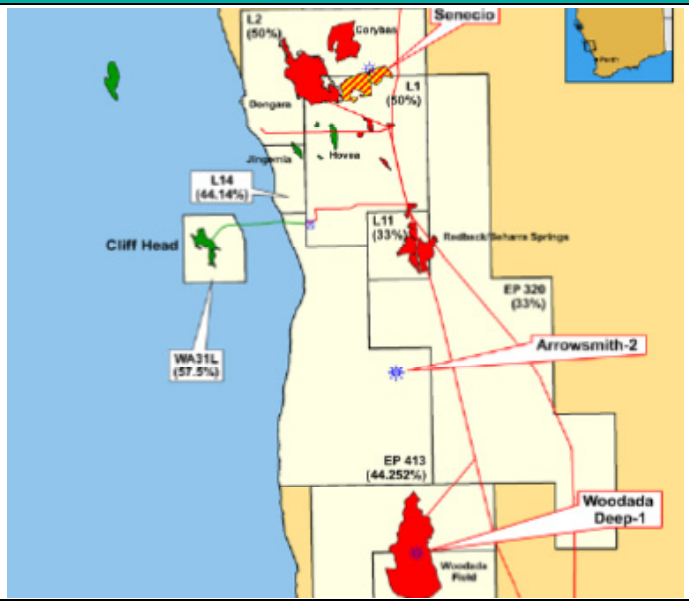


SOURCE: IRESS

Almost 1m acres in the Perth basin

AWE has a significant acreage position in the onshore Perth basin with about 1.4m acres gross (5,750km^2) or 0.8m net acres. However, AWE's main assets are in the offshore gas projects at BassGas and Casino in Bass Strait, plus the Tui oil field offshore New Zealand and Cliff Head offshore Perth. The Sugarloaf project in the Eagleford shale in Texas is one of the better growth assets but it's only 10% of a small area. The success of Sugarloaf has led to AWE's review of the shale potential in the Perth basin.

Figure 21 – AWE's Perth Basin activities



SOURCE: AWE

Shale is a small part of current portfolio but upside is big

Total 2P reserves for AWE amount to 66mmboe with an additional contingent resource of 78mmboe. These numbers excludes any shale potential from the Perth basin as it is too early to classify the resource potential. However, AWE has stated that the gas-in-place within their acreage is 13-20Tcf and if a recovery rate of 10-30% is used, the reserves possibilities range from 1-6Tcf. This equates to 150mmboe to 1Bboe of potential so the upside potential is evident.

Planned activities

AWE has drilled three wells in the Perth basin to evaluate the characteristics of the shales. The main focus in on the Carynginia shale of Permian age but the overlying Kockatea shale also offers potential. The plan was for AWE to frack all three wells at Woodada Deep, Arrowsmith-2 and Senecio earlier this year but an environmental group has challenged the EPA approvals to frack, and the issue awaits resolution from the WA Minister for the Environment. Presumably this will be forthcoming, and this critical part of the shale evaluation should be conducted some time in 2012.

Norwest Energy (NWE)

Recommendation
N/R
Price
$0.03
Target (12 months)
N/R

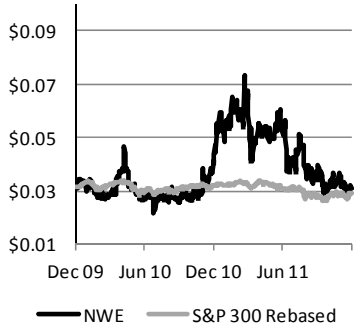
Expected Return	
Capital growth	N/A
Dividend yield	N/A
Total expected return	N/A

Company Data & Ratios	
Enterprise value	$25m
Market cap	$24m
Issued capital	777m
Free float	100%
Avg. daily vol. (52wk)	3.9m
12 month price range	$0.028 - $0.079
GICS sector	Energy

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	0.03	0.04	0.04
Absolute (%)	-10.52	-13.01	-17.59
Rel market (%)	-13.41	-12.50	-9.15

Absolute Price



SOURCE: IRESS

Perth basin shale and conventional play

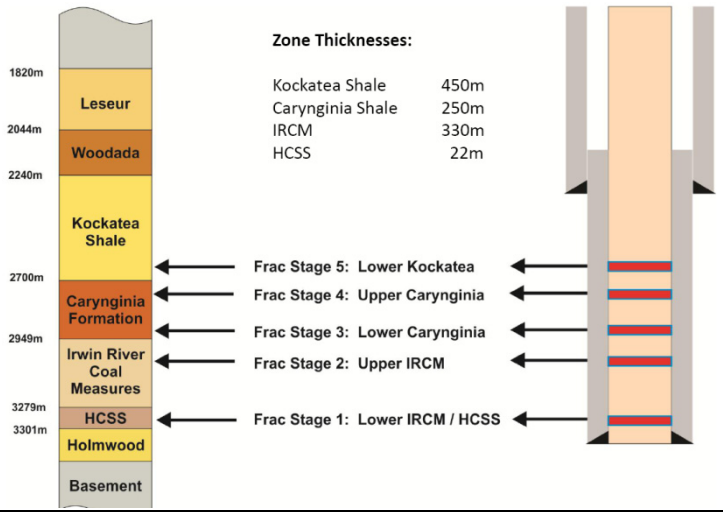
NWE has the onshore Perth basin as its primary focus. Originally chasing conventional targets, the evolution of fracking technology and horizontal drilling capabilities has shifted the company's strategy to the upside potential evident in the shales of the Perth basin. The company holds 5 licenses with 260,000 net acres in the Perth basin (1,060km^2) and has drilled the first shale specific well at Arrowsmith-2.

Testing has been delayed

NWE (28%) and its partners AWE (44%) and Bharat PetroResources (28%) completed the drilling of Arrowsmith-2 in June this year. It is a vertical well delineating the primary Carynginia shale as well as the Kockatea shale and the Irwin River Coal Measures which represent secondary objectives. A testing program of several fracks has been delayed as the EPA's approval has been challenged. A final decision rests with the WA Minister for the Environment, but the timing is uncertain.

The purpose of the fracking program is to determine which zone is the best one(s) for production purposes, and the slide below shows the key tests to be conducted.

Figure 22 – NWE's fracking plans at Arrowsmith-2



SOURCE: NWE

Upcoming activity and funding

The Arrowsmith fracking plans represent the key activity for NWE in the year ahead. The company holds other Perth basin acreage and some UK licences as well, but this consists mainly of desk studies and some seismic.

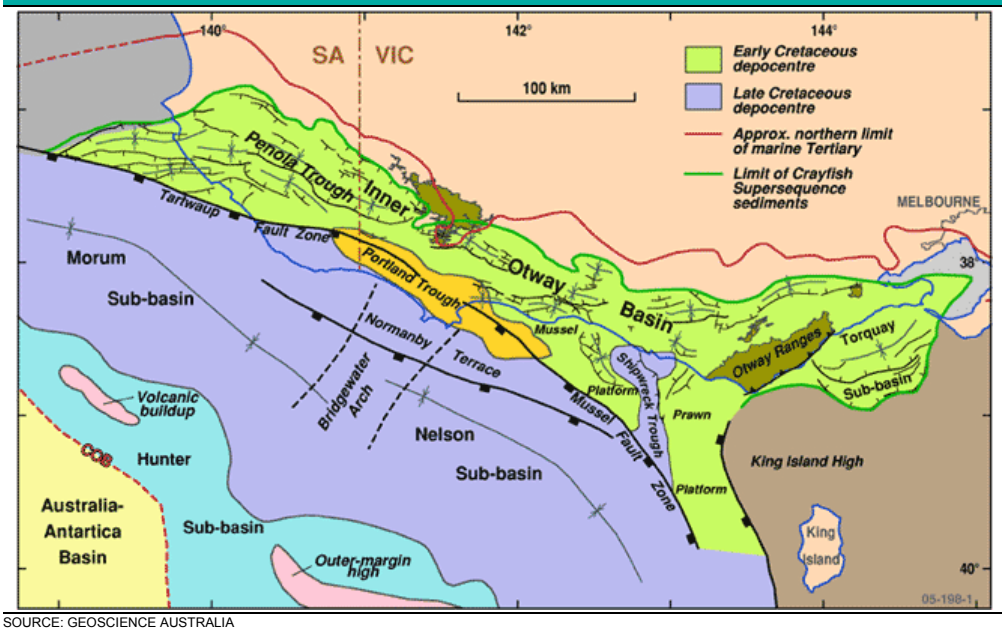
The company recently raised $2.9m through a 1 for 8 rights issue at $0.03/share. These funds will be sufficient to cover the company's share of the fracking costs and other working capital for the next 6-12 months.

The Otway Basin

The Otway basin is located in western Victoria and southern South Australia. Most of the basin sediments are located offshore, but the onshore portion extends over an area of about 25,000km^2 or 6m acres. The offshore area has seen the development of gas discoveries at Casino, Henry, Geographe and Thylacine while the onshore has had modest success, with the Katnook gas field the largest discovery at 35PJ.

The area is well located for the large gas consuming centres in Melbourne and Adelaide, with existing pipeline infrastructure in place.

Figure 23 - Otway Basin



SOURCE: GEOSCIENCE AUSTRALIA

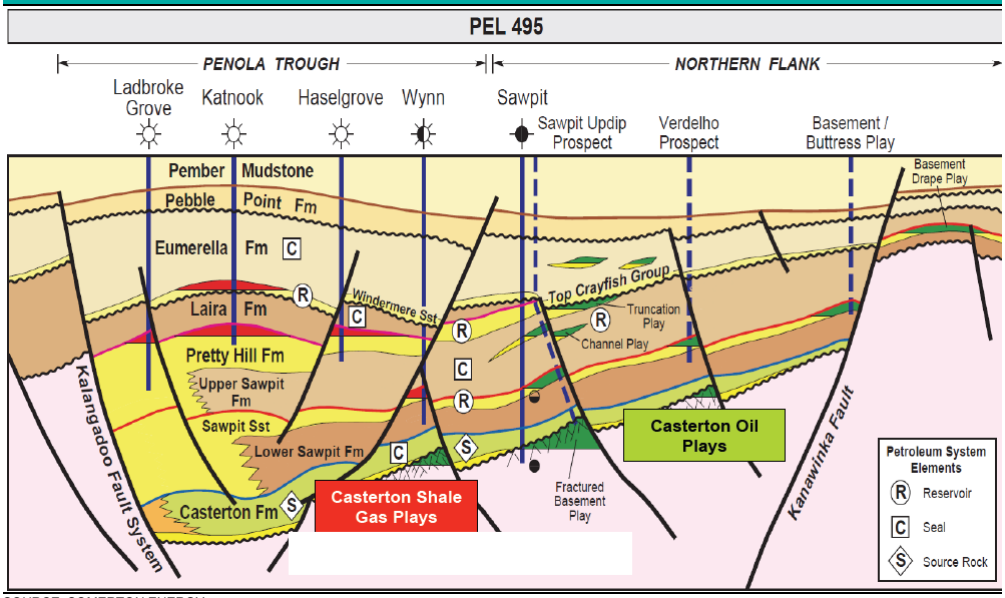
Geology

The Otway basin is a rift basin created at the time that the Australian continent separated from Antarctica. It is similar to the Gippsland basin in south-eastern Victoria but has been far less prospective for hydrocarbon discoveries. The exploration history of the Otway basin is relatively modest, with about 150 wells drilled. Of these, only 10 appear to have penetrated the Casterton shale which is the main unconventional target.

The Casterton shale of Late Jurassic/Early Cretaceous age is the primary source rock for the existing gas fields. It is up to 300m thick but is estimated to average 85m. The organic content is variable but has an average TOC of 2%. The shale gets thicker in the basin troughs, and needs to be located in the deeper parts of these troughs to be in a sufficient pressure regime amenable to fracking, and hence productive capacity.

The Casterton shale is thought to be in the mature gas generation window rather than oil prone, which is also supported by the lack of oil discoveries in the basin. It's also worth noting that some of the conventional gas discoveries have had high CO_2 content, which is due to the volcanic activity in more recent geological times. The Ladbroke Grove gas discovery had 54% CO_2, which rendered it uneconomic.

Figure 24 - Otway Basin - Penola Trough stratigraphy



SOURCE: SOMERTON ENERGY

Resources

Somerton Energy (SNE) has stated that the basin has gas-in-place estimate of 14-48Tcf. This could translate into a recoverable resource potential of around 1-15Tcf.

Infrastructure

The Otway basin is well served by gas pipelines to both the Melbourne and Adelaide markets. There is also significant industrial demand in the region, with the Portland aluminium smelter particularly noteworthy.

Activities to date

All historical petroleum exploration in the Otway basin has been of the conventional variety. No companies have done any shale specific drilling or testing but this is about to change with the planned drilling of a well by SNE and its JV partner BPT, which is also a majority owner of SNE. The partners were planning to drill a well in 2011, but this appears to have been delayed until 2012.

Somerton Energy (SNE)

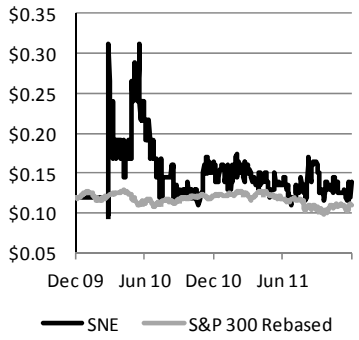
Recommendation
N/R
Price
$0.145
Target (12 months)
N/R

Expected Return	
Capital growth	N/A
Dividend yield	N/A
Total expected return	N/A
Company Data & Ratios	
Enterprise value	$11m
Market cap	$21m
Issued capital	142m
Free float	100%
Avg. daily vol. (52wk)	45,000
12 month price range	$0.11 - $0.18
GICS sector	Energy

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	0.13	0.17	0.15
Absolute (%)	12.00	-15.15	-6.67
Rel market (%)	9.12	-14.64	1.77

Absolute Price

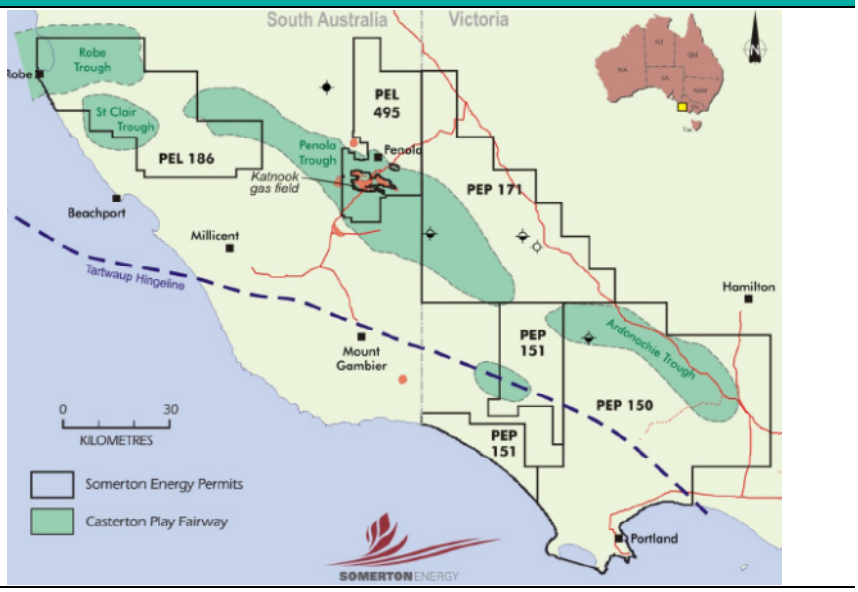


SOURCE: IRESS

THE Otway basin shale play

SNE is a small exploration company with a focus on the Otway basin of western Victoria. The Otway has a similar geological history to the Gippsland basin which has generated massive oil and gas deposits in Bass Strait, developed by ExxonMobil and BHP. The Otway has not replicated the same success, with only modest onshore field developments such as the 35Bcf Katnook gas field, and some larger fields offshore. SNE is optimistic that the shale potential of the Otway may be more successful. The company has 115,000 net acres of ground prospective for this shale play.

Figure 25 – SNE's Otway Basin shale play



SOURCE: SNE

The ingredients for good shale appear to be present

The Casterton formation is a shale considered to be the main source rock for the conventional fields in the Otway basin. It has only been penetrated by 10 exploration wells, with up to 300m of thickness but an average of 85m has been estimated. Organic content varies from 2-20% and the thermal maturity should have generated both gas and liquids rich gas, possibly oil. The gas-in-place has been estimated at 14-48Tcf (gross) with potentially recoverable resources of 1-14Tcf.

Planned activity – drilling two wells in 2012

SNE is planning to drill its first Casterton shale well in PEL186 (SNE 33% / BPT 67%) in early 2012. This is a bit of a family affair as BPT owns 56% of SNE. SNE and BPT have also farmed in to drill a combined conventional/Casterton shale well in PEL495 before mid 2012. The company has $8m of cash and will probably need to raise more equity funds in 2012.

Cooper Energy (COE)

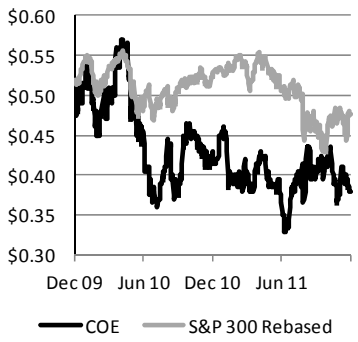
Recommendation
N/R
Price
$0.38
Target (12 months)
N/R

Expected Return	
Capital growth	**N/A**
Dividend yield	**N/A**
Total expected return	**N/A**
Company Data & Ratios	
Enterprise value	**$59m**
Market cap	**$111m**
Issued capital	**293m**
Free float	**100%**
Avg. daily vol. (52wk)	**0.8m**
12 month price range	**$0.33 - $0.46**
GICS sector	**Energy**

Price Performance

	(1m)	(3m)	(12m)
Price (A$)	0.37	0.41	0.42
Absolute (%)	2.70	-7.32	-9.52
Rel market (%)	-0.18	-6.80	-1.08

Absolute Price



SOURCE: IRESS

Otway and Cooper basin exposure plus Tunisia

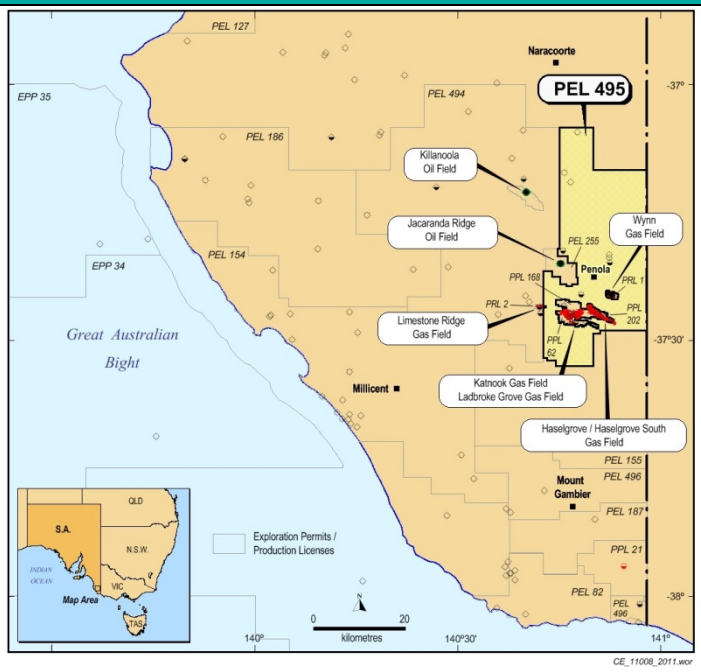
COE is best known for its Cooper basin oil production, which was a healthy 0.5mmbbl last year but the company's Otway acreage is also interesting for its shale potential. It is early days for the Otway shale story but it could be a nice "sleeper" asset for COE.

COE is currently undergoing significant corporate changes, with a new MD David Maxwell (ex BG and WPL) and a refreshed Board. The company has 2.5mmbbl of oil reserves in its Western flank oil fields of the Cooper basin, where it will continue to drill. The strategy is to retain the Cooper and Otway interests and a free carried exploration exposure to offshore Tunisia, where the prospects are large. Other assets such as Romania, Poland and Indonesia have been or will be disposed of.

The Otway basin shale

COE has farmed out its interest in the Otway basin license PEL495, which surrounds the old Katnook gas field. BPT and SNE have farmed in, with a well to be drilled in 2012, with COE retaining a 50% interest. The well will have a dual purpose, targeting both the conventional gas sandstones and the deeper Casterton shale.

Figure 26 – COE's Otway Basin shale play



SOURCE: COE

Planned activity and funding capacity

COE has a healthy cash balance of $72m plus cash flow from the Cooper oil production. Its main exploration commitments in Tunisia will be funded by farm-in partners and the Otway exploration also provides a free carry.

Recommendation structure

Spec Buy: Expect >30% total return on a 12 month view but carries significantly higher risk than its sector

Buy: Expect >15% total return on a 12 month view

Accumulate: Expect total return between 5% and 15% on a 12 month view

Hold: Expect total return between -5% and 5% on a 12 month view

Reduce: Expect total return between -15% and -5% on a 12 month view

Sell: Expect <-15% total return on a 12 month view

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