CARNARVON PETROLEUM LTD (CVN)

By the time I get to Phoenix………

The Phoenix South well (CVN 20% interest, carried to a cap of US$70m, Apache as operator) represents a significant catalyst for the share price of Carnarvon Petroleum (CVN). The target, to be drilled in late 2Q 2014, is near a known gas discovery, on improved seismic data and has significant follow on potential (other nearby targets). We understand the well will be drilled before the end of June. We concede that market appetite for oil explorers is poor at the moment but will hopefully improve for CVN as we get closer to drilling. Meanwhile CVN’s activity in Thailand continues and has been largely unaffected by the current political turmoil. We value CVN at 20c and maintain our Speculative Buy recommendation.

Phoenix South……….worth waiting for

The Phoenix South prospect is described by CVN as a multi tcf prospect targeting gas in the lower Triassic reservoirs. The target will be drilled on 3D seismic data less than 13 km from a known gas discovery (Phoenix 1). Apache (40% interest and operator) have taken possession of the “Atwood Eagle” semi-submersible drill rig for a work program that will include drilling Phoenix South. At this stage Apache has indicated they will spud the well before the end of June (expected to take 60 days to reach target depth).

Rights issue plus farm-down

In what we see as a positive development, CVN announced in late 2013 that it had raised A$3m via a rights issue in addition to receiving an increased spending cap on the Phoenix South (A$70m) well. In return Apache receive the option (exercise before 3rd July 2014) to farm into a 40% interest in two adjacent blocks (WA-436-P and WA-438-P). Given the Phoenix South well was likely to exceed the original US$50m cap CVN needed to firm up its balance sheet before the commencement of drilling. We understand the operator wants the option to drill beyond the deeper target at 4600m if gas is present.

Thailand - slow and steady

The Thailand development and exploration story continues its steady evolution. The current political turmoil in Thailand has had little impact on CVN’s in country activities with oil still being trucked to the refinery in Bangkok.

Valuation and Balance sheet

CVN closed the December quarter with A$21m in cash, helped by the raising of just over A$3m from an entitlement issue in late 2013. Importantly the shortfall from the entitlement issue will not be placed. In the near term we think the share price can reach pre-rights levels (7.5c – 8c) as the pre-well excitement builds. Our 20c valuation of the stock assigns an 11c value to the 2P reserves in Thailand and 9c for the risked value of Phoenix South. We value the 12.2mbbl 2P reserves in Thailand at US$8/bbl. For Phoenix South we value the prospective gas resource at US$1/GJ and assume a 20% chance of success. As with all off-shore exploration plays there is significant risk of failure.

Hartleys Brief Investment Conclusion

Oil and gas producer / explorer with assets in Thailand and Australia

Chairman & CEO:
Adrian Cook
CEO
Peter Leonhardt
Chairman

Valuation Summary

<table>
<thead>
<tr>
<th></th>
<th>$m</th>
<th>$ps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt (Dec ’13)</td>
<td>- fully diluted</td>
<td>$59.2m</td>
</tr>
<tr>
<td>Market Cap</td>
<td>$38.2m</td>
<td></td>
</tr>
<tr>
<td>Sub total</td>
<td>$0.00</td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>106</td>
<td>0.11</td>
</tr>
<tr>
<td>EV</td>
<td>87</td>
<td>0.09</td>
</tr>
<tr>
<td>2P Reserve (oil mmmbbl)</td>
<td>12.22</td>
<td></td>
</tr>
<tr>
<td>EV / 2P Reserve ($/bbl)</td>
<td>53.12</td>
<td></td>
</tr>
</tbody>
</table>

Source: Hartleys Research

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Simon Andrew
Energy Analyst
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SUMMARY MODEL

Carnarvon Petroleum (CVN) is a conventional producer and explorer. Its key assets are on-shore Thailand and off-shore north-west Australia. In partnering with Town Gas (HK listed), CVN hopes to add to existing production from the Phetchabun Basin in Central Thailand. In Australia, Apache plan to drill a high impact exploration well on the Phoenix South target (expected spud by the end of June).

**Key Market Information**

<table>
<thead>
<tr>
<th>Projects</th>
<th>Interest</th>
<th>Partners</th>
<th>Net acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1A</td>
<td>Phetchabun</td>
<td>Carnarvon</td>
<td>40%</td>
</tr>
<tr>
<td>L33/43</td>
<td>Phetchabun</td>
<td>Carnarvon</td>
<td>40%</td>
</tr>
<tr>
<td>L44/43</td>
<td>Phetchabun</td>
<td>Carnarvon</td>
<td>40%</td>
</tr>
<tr>
<td>L52/50, &amp; L53/50</td>
<td>Surat-Khiensa</td>
<td>Carnarvon</td>
<td>100%</td>
</tr>
<tr>
<td>EP321</td>
<td>Perth</td>
<td>Carnarvon</td>
<td>3%</td>
</tr>
<tr>
<td>EP407</td>
<td>Perth</td>
<td>Carnarvon</td>
<td>3%</td>
</tr>
<tr>
<td>WA-435-P</td>
<td>Roebuck</td>
<td>Carnarvon</td>
<td>20%</td>
</tr>
<tr>
<td>WA-437-P</td>
<td>Australia</td>
<td>Finder Exploration</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JX Nippon</td>
<td>20%</td>
</tr>
<tr>
<td>WA-436-P</td>
<td>Roebuck</td>
<td>Carnarvon</td>
<td>50%</td>
</tr>
<tr>
<td>WA-438-P</td>
<td>Australia</td>
<td>Finder Exploration</td>
<td>50%</td>
</tr>
<tr>
<td>WA-443-P</td>
<td>Roebuck</td>
<td>Carnarvon</td>
<td>100%</td>
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**Quarterly Cash Flow**

<table>
<thead>
<tr>
<th>FY13</th>
<th>FY14</th>
</tr>
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<tbody>
<tr>
<td>3Q</td>
<td>4Q</td>
</tr>
<tr>
<td>Production</td>
<td></td>
</tr>
<tr>
<td>Net bbl</td>
<td>48,299</td>
</tr>
<tr>
<td>Gross field boe/d</td>
<td>1,354</td>
</tr>
<tr>
<td>Realised Price</td>
<td>96</td>
</tr>
<tr>
<td>Cash (Beginning)</td>
<td>16.4</td>
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<tr>
<td>A$m</td>
<td>Operating Cash flow</td>
</tr>
<tr>
<td>Exploration / Development</td>
<td>-2.4</td>
</tr>
<tr>
<td>Corporate overheads</td>
<td>-1.8</td>
</tr>
<tr>
<td>Other</td>
<td>6.0</td>
</tr>
<tr>
<td>Cash (End)</td>
<td>21.1</td>
</tr>
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</table>

**Valuation Summary**

<table>
<thead>
<tr>
<th></th>
<th>A$m</th>
<th>Ac/share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>106</td>
<td>0.11</td>
</tr>
<tr>
<td>Phoenix South</td>
<td>87</td>
<td>0.09</td>
</tr>
<tr>
<td>Sub-total</td>
<td>193</td>
<td>0.20</td>
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**Investment Summary**

CVN has a number of projects ongoing in both Thailand and Australia. In Thailand, it has a 40% interest in the SW1A and L33/43 projects in the Phetchabun Basin, and a 40% interest in the L44/43 project. In Australia, it has a 20% interest in the Roebuck basin and a 50% interest in the Roebuck and Roebuck wells. It also has a 20% interest in the JX Nippon Finder Exploration well in the North Sea.

**Expected News flow**

- **1Q CY14:** Further drill results expected from Thailand
- **2Q CY14:** Phoenix South spud

**Comments**

The key catalyst for the CVN stock price is the spudding of the Phoenix South well. This company expects this to occur by the end of June CVN is carried to a cap of A$70m for this well.

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Sources: IRESS, Company Information, Hartley's Research

Last Updated: 11/02/2014
PHOENIX SOUTH

Phoenix South is a stacked reservoir target located near known gas discoveries (Phoenix 1 and Phoenix 2). The target features an anticlinal trap with a fault boundary on the western side. The aim will be to drill through the top of the anticline and then through a 2,000m column containing multiple stacked shale-sand pairs. The primary shale-sand pair targets are located at a depth of 4,100m to 4,600m.

The Phoenix 1 and 2 wells demonstrated a proven petroleum system. BP drilled the Phoenix 1 well in 1980 and recorded a 110m net gas bearing section with low porosity. The operator was encouraged enough to proceed to drilling Phoenix 2 in 1982. This well contained a much thinner sand section and therefore the well was plugged. Core taken from Phoenix 1 has since been tested and displayed moderate porosity and permeability.

At the time of drilling Phoenix 1 and 2 the Phoenix South structure was known about but was sitting within an adjacent block held by another operator and was therefore never drilled. Also noteworthy was that at the time offshore gas was essentially stranded because of a lack of infrastructure and depressed prices.

As with any gas discovery the challenge will be reservoir quality. Our literature search suggests that porosity and permeability may be hurdles to commercial production especially from the deeper sand sections.

The Australian Government data release for the 2008 Offshore Acreage release quotes the following from Smith et al (1999) “However, the interpreted gas column at Phoenix 1 suggests there is an active Triassic petroleum system in the area, and there is potential for this play to be exploited in stratigraphically equivalent structures that may have favourable porosity and permeability.”

The illustration in figure 1 highlights the significant acreage position that CVN has acquired in the off-shore Canning Basin. This provides The Company with options for further development work (hopefully post a Phoenix South discovery) and also farm-out potential.

Fig. 1: Acreage Target Map

Source: Company Presentation
VALUATION AND RISKS

Our 12-month target price for CVN is 20c. This consists of 11c for the value of the Thai reserves and 9c for the Phoenix South exploration potential. Our assumptions are shown in Figure 2.

**Fig. 2: CVN Valuation**

<table>
<thead>
<tr>
<th>Current W.I.</th>
<th>Operator</th>
<th>Gross bcf</th>
<th>Net bcf</th>
<th>CoS %</th>
<th>NPV/boe US$/Gj</th>
<th>Risked A$m</th>
<th>Un-Risked A$m</th>
<th>Value per share (A$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix South</td>
<td>Apache</td>
<td>2,000</td>
<td>400</td>
<td>20%</td>
<td>1</td>
<td>87</td>
<td>435</td>
<td>0.09 0.44</td>
</tr>
<tr>
<td>Thailand</td>
<td>Town Gas</td>
<td>31</td>
<td>12.2</td>
<td>100%</td>
<td>8</td>
<td>106</td>
<td>106</td>
<td>0.11 0.11</td>
</tr>
</tbody>
</table>

Source: Hartleys Research

RISKS

The key risks for PCL (like most oil & gas exploration companies) is making an economic discovery and obtaining the funding for ongoing exploration. Other risks include delays, key person risk, country/sovereign risk, weather, JV partner obligations, cost inflation. Investing in explorers is very risky given the exploration value of the company in essence assumes that the market will recognise a portion of potential value before the results of an exploration program are known, conscious that the ultimate chance of success is low (typically 1%-20%) and that failure is much more likely, in most cases. Other risks are earnings disappointments given the industry is volatile and earnings can disappoint due to cost overruns, project delays, cost inflation, environmental regulations, resource estimate errors and management performance and contract negotiation skills. High financial leverage (if it exists at that time) would add to the problem.
APPENDIX 1: PHOENIX 1 AND 2


Phoenix 1 (1980)

Phoenix 1 was drilled by BP Petroleum Development Australia Pty Ltd to test an interpreted large northeast-southwest trending, elongate anticline transected by a series of north-northeast - south-southwest trending faults. These faults were interpreted to have formed four main culminations, with Phoenix 1 in the most central of these. More recent seismic data suggest, however, that structuring in the area is more complex (Apache, 1995). The primary objective of the well was Middle to Late Triassic sandstones of the Keraudren Formation, while Middle Jurassic sandstones directly below the Callovian breakup unconformity were a secondary target, but seismic data indicated a lack of closure at that level. The well reached a total depth of 4880 mRT (Figure 6); exceeding the planned total depth of 4450 m after gas-bearing Middle Triassic sandstones were intersected. Reservoirs in the Keraudren Formation provided good hydrocarbon indications. Despite good reservoir characteristics in the upper Keraudren sandstones (average porosity of 14%, range 19% decreasing with depth to 12%), hydrocarbon shows were limited to oil staining and cut fluorescence. The lower Keraudren Formation sandstone reservoirs exhibited gas shows and fluorescence (all sandstones below 4223 mRT are gas bearing; net gas-bearing pay is estimated to be 110.5 m), but logs and core analysis indicate very low porosity (average porosity of 9%, range 4% to 15%).

Hydrocarbon types in the lower Keraudren Formation sandstones show fractionation with depth, which suggests intra-formational sourcing of gas and existence of discrete reservoirs that are not in communication due to intercalated sealing shales. Drilling was suspended without testing when it was deemed unsafe to continue operations with the available pressure-control equipment. The well was re-entered and abandoned by BP Petroleum Development Australia Pty Ltd without further drilling or testing in January 1983.

Phoenix 2 (1982)

Phoenix 2 was drilled by BP Petroleum Development Australia Pty Ltd to test Triassic sandstones in a fault block that forms part of the 'Phoenix structure'. The well reached a total depth of 4967 mRT (Figure 6). The sedimentary succession intersected in Phoenix 2 is very similar to that in Phoenix 1, but the basal 591 m of Early to Middle Triassic claystone is interpreted to represent an equivalent of the Locker Shale (interpreted to be part of the lower Keraudren Formation in Phoenix 1). Gas is interpreted to be present at low saturations in thin zones within the primary objective sandstones, which have extremely low permeabilities and generally poor reservoir qualities. Oil indications, such as natural fluorescence and possible staining, were also identified. The targeted reservoirs showed significantly lower permeabilities compared to Phoenix 1, and had therefore lower hydrocarbon saturations. Calculations, based on low permeabilities, indicated that commercial hydrocarbon flows could not be obtained from the reservoir sandstones, therefore no production testing was carried out.
Modelling by Lisk et al (2000) suggests the Triassic Keraudren Formation is mature for gas/condensate and minor oil generation in the deep sections of the Bedout Sub-basin. This unit is mature in Phoenix 1 and predominantly gas prone, with fluorescence and oil staining assessed by Forth and Jourdan (1982) to be sourced from thin shales in the unit. The Keraudren Formation at Phoenix 2 is overall early mature for oil and predominantly gas prone, but one thin zone is modelled to be capable of generating light oil. Modelling indicates that the Keraudren Formation would be more generative down-dip in the deeper part of the basin where maturity levels are higher (Lisk et al, 2000).

**Fig. 3: Stratigraphic Column – Phoenix 1 and 2**

Source: Australian Government and Smith et al, 1999
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uncertain or distant event. Analyst will often indicate a
price level at which it may become a “Buy”.
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balanced.
Reduce /  It is anticipated to be unlikely that there will be gains over
Take profits  the investment time horizon but there is a possibility of
some price weakness over that period.
Sell  Significant price depreciation anticipated.
No Rating  No recommendation.
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Buy  on a risk/reward basis, an investment is attractive, there
is at least one identifiable risk that has a meaningful
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investment is considered high risk.

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