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Onshore down under

One year on: The event horizon

Oil & gas sector

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The evolution of the Australian onshore unconventional sector is nearing the sharp end. JVs are largely bedded down, key work programmes are mapped and funded, and the next two years is about execution. In this report we update our August 2013 report by tracking progress of a subset of onshore players. We review macro developments, track well and seismic activity and compare deal flow with our previous report. We also analyse equity performance, and assess how the market has moved relative to company progress. Short-term investor focus appears to be on take-over targets, but we think that focus will revert to activity. With the Cooper Basin programmes in full swing, the event horizon may not be far off. Medium-term focus is on those driving the activity, while investing in the resource plays is more about longer-term positioning.

Year in review: No easy wins, as discounts widen

The regulatory environment, approvals process, weather and geology have hampered some companies, while scale and budget have shown to be a strong advantage for others. The commodity markets remain supportive for the onshore push, although signs are emerging that the opportunity is not limitless. To date not all well results have dazzled, and against a backdrop of waxing and waning investor interest the equity prices have been punished at times. Most stocks have gone south, trading at increased discounts to consensus, and even steeper discounts to industry deal valuations. Value creation will be less about simply owning the acreage or doing a deal, and more about finding a pathway to commercialisation, in an activity where scale is a big advantage.

What's next? Charging the Cooper Basin

We think it is too early to identify any basin or acreage play that is superior, but rather see the forward work programmes as indicators of where "the code" might be cracked, and who is best positioned. Based on known work programmes, the Cooper Basin will continue to set the pace, and this is underpinned by IOCs with deep pockets and technical expertise. Companies with exposure include **Drillsearch**, **Senex**, **Icon**, **Strike Energy**, **Cooper Energy** and to a lesser extent **New Standard Energy** and **Ambassador**. Not too far behind, are the work programmes of **Central Petroleum** and **PetroFrontier** in the Georgina and Amadeus Basins in NT.

Investment themes

In our view the safest money in the subset remains in companies with existing production and growth options including unconventional acreage upside – such as **AWE**, **Drillsearch** and **Senex**, alongside those riding the coat tails, such as **Icon**. We think investing in acreage plays over the next one to two years is about positioning rather than looking for short-term gains. If in the event the code is cracked these will be the plays to hold. Examples include **Buru**, **New Standard**, **Central**, **Empire**, **PetroFrontier** and **Armour**. Ambassador and WestSide were attractive investments, with strategic acreage in the Cooper and Bowen basins respectively, which was valued far more highly by industry than the equity markets.

Companies in this report

Ambassador Oil and Gas	AQO-AU
Armour Energy	AJQ-AU
AWE	AWE-AU
Buru Energy	BRU-AU
Central Petroleum	CTP-AU
Cooper Energy	COE-AU
Drillsearch	DLS-AU
Empire Oil & Gas	EGO-AU
Exoma Energy	EXE-AU
Icon Energy	ICN-AU
Linc Energy	TI6 (SGX)
Lakes Oil*	LKO-AU
Metgasco	MEL-AU
New Standard Energy*	NSE-AU
Norwest Energy*	NWE-AU
PetroFrontier	PFC-V
Real Energy	RLE-AU
Senex Energy	SXY-AU
Strike Energy	STX-AU
WestSide Corporation*	WCL-AU

*Denotes Edison client

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Introduction: One year on

In August 2013 we undertook a deep dive into the Australian continent to assess the investment opportunities in the onshore oil and gas sector (click for report). We profiled an onshore unconventional sector that was nascent when compared with the onshore North American sector, and particularly in the above ground setting. We observed deep equity market discounts to assessed value setting in, in the absence of deal flow or takeover activity.

In this report we track progress since then, and provide updates on some of the key themes we described in the previous report. We cover macro, regulatory, and technical developments, and then focus in on the progress of the companies themselves, completing the report with analysis and commentary of investment themes. The report is not exhaustive, but we have tried to provide representative coverage of the sector and its achievements in the last 12 months, and the outlook.

Our coverage universe (Exhibit 1) has also expanded, picking up newcomer Real Energy in addition to niche players Lakes Oil, WestSide Corporation and Ambassador Oil & Gas that were not featured in our previous report. As before, we prefer to look at the universe through the lens of play maturity and activity, a concept we believe is increasingly important as the market develops at markedly different rates.

Exhibit 1: Our onshore player universe

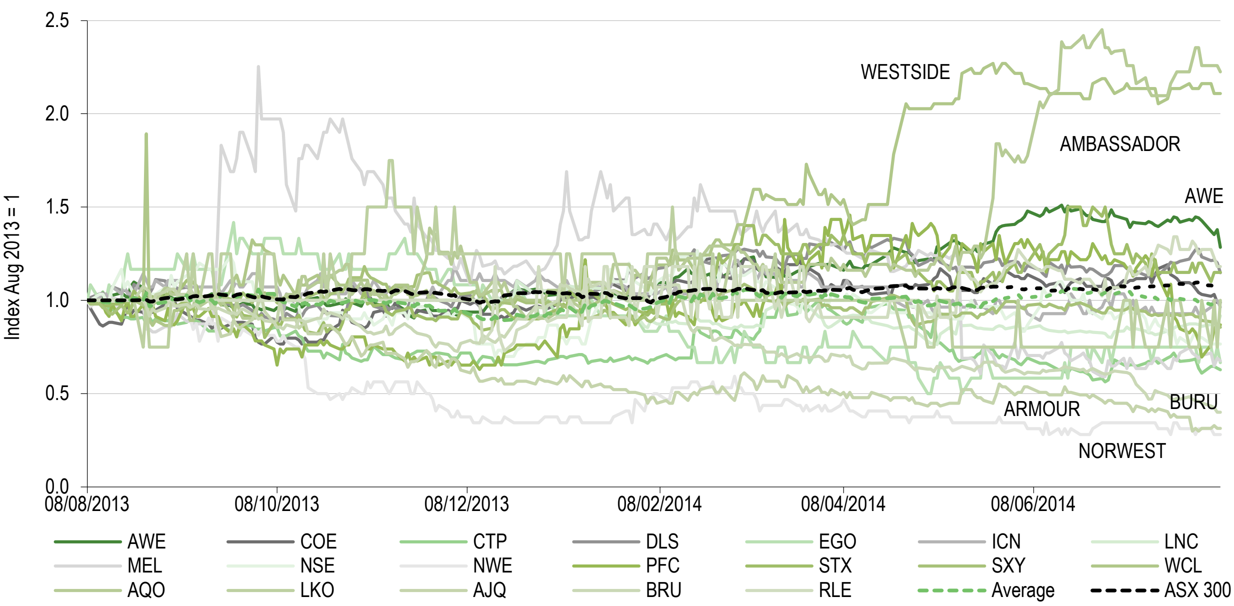
Non-producing, large acreage footprint, frontier region explorers	Explorers with acreage footprints targeted at established regions	Frontier explorers but with material conventional exploration success	Explorers with modest existing conventional producing bases in Australia or elsewhere	Large, international producers with material onshore Australian exploration interests	Large, established onshore producers
Armour Energy	Icon Energy	WestSide Corporation	Cooper Energy	AWE	Drillsearch
Exoma	Metgasco	Ambassador Oil & Gas	Empire Oil and Gas	Linc Energy	Senex
PetroFrontier	Norwest Energy		Strike Energy		
	Lakes Oil		Buru Energy		
	Real Energy		New Standard Energy		
			Central Petroleum		

Source: Edison Investment Research

Macro environment: Above ground remains challenging

The macro environment for the onshore Australian oil and gas industry in many respects has grown more challenging over the last 12 months. This has been reflected in equity prices, which have remained subdued (Exhibit 2). The selection has moderately underperformed the ASX 300 Index, but with a large variation between those companies currently under takeover offer (WestSide and Ambassador) and those grappling with the sharp end of acreage plays.

Exhibit 2: 12-month equity price performance, individual and average



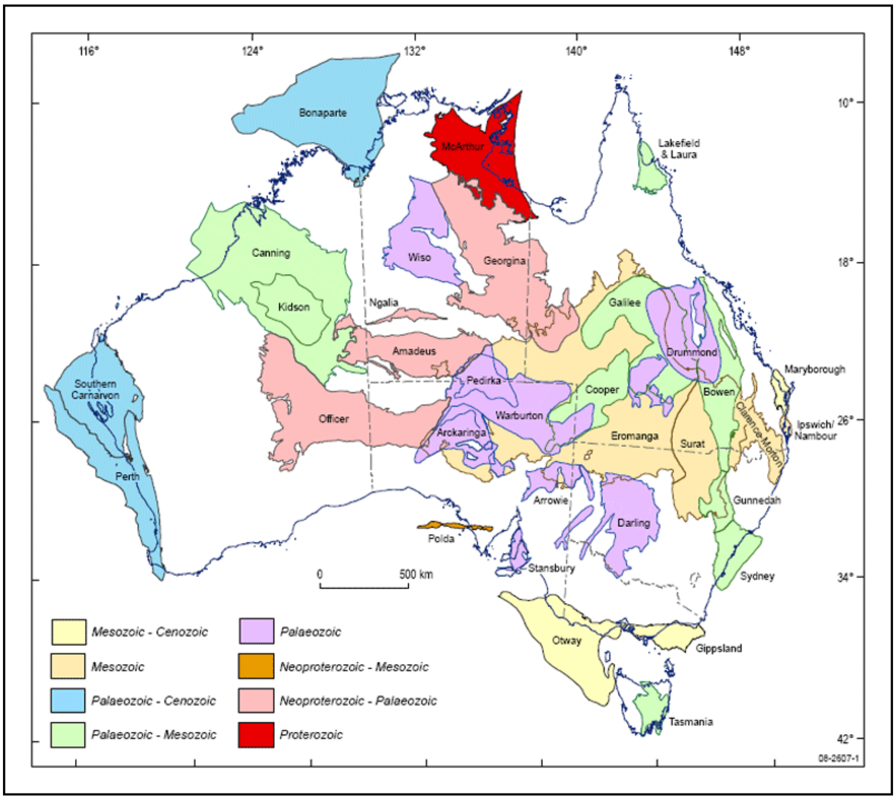
Source: Thomson One

The overall market opportunity does remain large, with many domestic gas contracts set to roll off in the next three to four years, and long-term gas-short LNG projects about to commence operation. At the same time, domestic gas prices are rising and international oil benchmark prices remain near annual average highs, which provide all-important incentives for the drill bit. However, the domestic opportunity is becoming incrementally smaller over time. The larger players are increasing their control over available gas and liquids supply options, some end-user contracts have already been renewed, gas-short LNG projects are striking deals (eg with Beach Energy, WestSide and Drillsearch), capital costs for development remain elevated and offshore competitors are making progress towards the export market. The tightening east coast gas market, driven by the Gladstone LNG projects, is now well known by the industry and competition is intensifying to feed the demand. The big-player advantage in the larger retail and export markets, and with infrastructure, has led many of the smaller players in remote onshore locations to seek engagement with local mines or other energy users on future supply agreements, to justify the next stages of their development.

The regulatory divide between south-eastern Australia and the other states and territories has widened, not narrowed. In some parts of NSW and Victoria, drilling activity remains suspended under a cloud of community unrest over environmental impacts and particularly concerns over water. Those with resources in remote, low populated areas and with low competition from other land uses retain the regulatory advantage.

On the ground, the domestic onshore industry has made stepwise progress. There are many unique basins (Exhibit 3) and vast amounts of acreage, and that requires a lot of work. The bigger players have dominated activity, with bigger budgets, more drilling and seismic. Technical validation is slowly unfolding in the unconventional space, and there have also been a handful of conventional developments. The modest pace towards large-scale onshore production ex CSG reflects the ‘science experiment’ nature of the unconventional projects, with plenty of time spent on geological understanding, programme design and results analysis at this stage. The wins to date have been incremental – wells tested or added to production are typically small, and without any of the ‘knock-out’ winning blows that can occur in the early stages offshore.

Exhibit 3: Australia’s onshore basins



Source: Geoscience Australia

Interest from the bigger local players in undeveloped acreage remains strong, as shown by a continuation of permit farm-ins, although the IOC farm-in activity has become a little more subdued. Many JVs are bedded down and they are moving into the early stages of work programmes. Many projects operated by small caps now have a large JV partner with technical expertise and deep pockets, particularly in the Cooper Basin. Scale and funding have indeed shown to be an important part of moving onshore projects forward – a large JV bestows technical expertise, funding and a potential pathway to market. Importantly, nearly all recent onshore deals are farm-ins, which are based on work programmes and past costs reimbursement, less on upfront cash investment, and staged so they can be exited. Importantly, to date the farm-in IOCs remain committed to their work programmes.

In summary, we believe that above ground, rather than below ground considerations remain most challenging for the onshore industry (but not to belittle the sizeable below ground task at hand). The business of taking a remote project from acreage to commercialisation is risky, and some companies have sought to supplement their Australian onshore positions with those overseas, for example the move by New Standard Energy into the US, in the hope of garnering expertise, and cash flow.

Technical progress is being made

At the larger end of town, Santos continues to add vertical shale gas and tight sands wells to production in the Cooper Basin, adding another well in 2013. To date, Santos has effectively employed scale to the task of onshore E&P. Santos has the financial might, a considerable and growing acreage footprint across Australia and also control of remote processing and transport infrastructure. Santos now has two vertical unconventional wells on production in the Cooper Basin, with both wells within 2km of existing Santos-controlled infrastructure. Santos's progress shows that control of the above ground environment can have an important bearing on near-term monetisation of onshore unconventional assets.

The aim of many of the smaller onshore players is to demonstrate the technical feasibility of their projects, and then to define a resource position and pathway to commercialisation. Technical validation is particularly important for unconventional oil and gas, where the geology may be untested, lateral reservoir continuity is required, and there is no history of production. Project proponents need to undertake lengthy work programmes in order to justify subsequent stages of development, hopefully bringing in a large partner in the process. In some of the frontier regions, the investment prospect simply remains acreage.

For the most part, where it has been tested in onshore Australia, the concept of unconventional oil and gas production has been demonstrated to work on a technical level, with rocks fracking and flowing gas. The well count has grown, and plenty of flow rates have been reported. Santos, Beach Energy and Armour Energy have taken the next step of fracking horizontal wells, however with mixed results. The next one to two years will be pivotal for the unconventional sector as the work programmes to further test production potential begin to unfold.

Costs still remain high due to the bespoke nature of unconventional drilling activity in the Australian setting, the small number of rigs available and lack of personnel with the appropriate skills. Industry anecdotes point to typical costs for a multi-stage fracked vertical well in the order of A$10-20m, compared with costs as low as <US$5m for a fracked vertical well in the US. The concept of large-scale onshore unconventional production in Australia will require a step shift in production infrastructure and support services, as seen in the US. Encouragingly, a new services provider with unconventional specialist crew and equipment (Exhibit 4), Condor Energy, has recently been established to meet the growing demand for these services.

Exhibit 4: Condor Energy frack spread

Source: Condor Energy website

Condor's first engagement is the fracture stimulation and flow testing of a series of vertical wells in Cooper Basin ATP 855 for the Beach Energy/Chevron/Icon Energy JV in H214.

Regulatory divide widens

The regulatory environment has eased in some regions, and tightened in others. The settings at the Commonwealth level remain broadly supportive of exploration and production activity. However, state and territory governments are very sensitive to localised issues, particularly where community unrest is well publicised. The most remote regions typically have the least regulatory issues, but are also typically the farthest from market and infrastructure.

NSW and Victoria continue their shifts against projects near populated or prime agricultural regions. In May 2014 the NSW government suspended Metgasco's plans to drill at the Bentley site in northern NSW, citing inadequate community consultation prior to commencing drilling. This occurred as police were about to break up a multi-week blockade of the site by thousands of protestors at the Rosella E-1 site. Metgasco is currently appealing the decision in the NSW Supreme Court. A fluid and uncertain regulatory environment in NSW has also led Santos and Dart Energy to suspend their programmes in that state.

There is currently a moratorium on onshore drilling in Victoria. Organisations such as 'Lock the Gate', founded in the Hunter Valley and regional Queensland, have spread their activities into Victoria, tapping into local concerns from landholders and communities about the environmental and social impacts of drilling in those areas. We think that it will be a long road ahead until community perceptions about the effects of deep fracking are addressed, through demonstration and a clean industry 'track record', or by education and engagement.

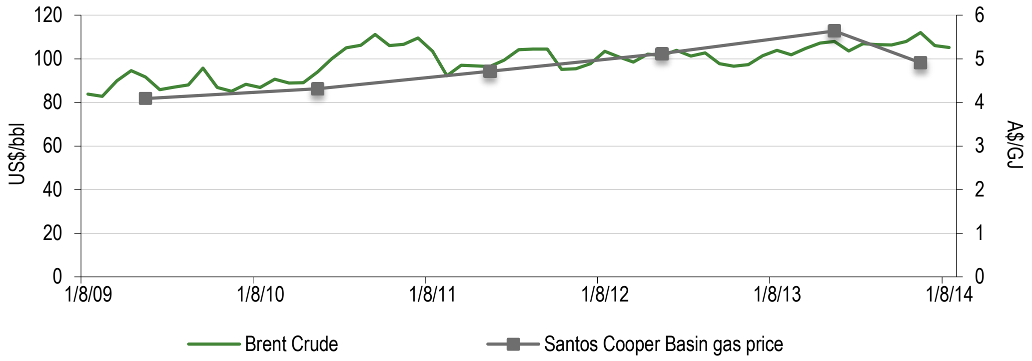
In some areas there have been improvements. In Queensland, reforms to tenure include extension of licence terms, deferral of mandatory relinquishments, more flexibility in amending work programmes and a simplified application process.

In summary, we see the contrast between regulatory environments across the different regions, as growing rather than narrowing. In the east and south-east, community opposition to drilling activity has become more organised and widespread, leading to a volatile environment for potential operators. In some of the more remote regions, operators are quietly going about their work.

Market supports activity for now

The oil and gas pricing environment remains supportive for onshore E&P activity in Australia. Gas prices have been steadily increasing over time, as the first gas from the Queensland LNG projects nears, opening up pricing linkages to export markets. Recent anecdotes on domestic contract pricing suggest an increase in oil-linked mechanisms, in light of the oil-linked nature of LNG prices. A recent deal between WestSide and the gas-short GLNG was struck at A$9.28/GJ, which is a large step uplift from the historical prices shown in Exhibit 5. As more deals are struck at these higher prices, the trend of average prices will begin to rise. Oil prices themselves have remained range-bound near to historic annual average highs, with many Australian producers achieving a premium to the Brent benchmark, which is also supportive of exploration activity for conventional and unconventional liquids.

Exhibit 5: Historical Brent crude prices and Cooper Basin gas prices



Source: Thomson One, Santos quarterly reports

In the next five years, most east coast gas supply contracts are set to roll off. This is occurring at a time when the more mature south-eastern Australian gas fields, such as BassGas, Longtom and Otway, are exhibiting declining production. Energy users are already voicing concerns over the economic impacts of higher gas prices when these supply contracts are re-negotiated. This allows the opportunity for new or prospective resource owners to engage directly with small to medium-sized end-users on future supply agreements, while the larger players are focused on LNG projects and the major gas consumers and retailers. This trend has been evident with the likes of Armour Energy, Strike Energy, Buru Energy and Lakes Oil maintaining discussions with local gas consumers on future gas supply arrangements. Where liquids are present, we think this enhances the likelihood of commercialisation, as there is a deeper market for liquids both domestically and for export. Once the majority of supply contracts have been renegotiated, the market opportunity will shift to potential LNG project-backfill and greenfield LNG projects.

In the longer term, the Queensland LNG projects may indeed require gas back-fill to extend their lives. However, this is likely decades away as near- to medium-term commitments are largely satisfied. In addition, the IOCs that have recently farmed into acreage onshore Australia may be seeking to establish greenfield LNG projects. However, the opportunity for such projects is not limitless, with growing competition from the US, East Africa and PNG, and a challenging cost environment in Australia. For example, in 2013 Woodside decided not to proceed with a land-based LNG development of its offshore Browse field, in favour of potential FLNG, and in early 2014 Santos opted out of undertaking its Bonaparte LNG project. Both decisions were based on costs.

On the domestic gas demand side, recent growth has been weaker than expected. This stems from the abolition of the carbon price and the subsequent lower future requirement for gas-fired electricity generation in Australia's electricity markets. In addition, growth in electricity demand itself has slowed as some large manufacturers have recently closed their Australian operations, plus energy efficiency in buildings is improving, accompanied by the aggressive rollout of solar PV and wind generation, reducing the demand on the traditional coal and gas-fired electricity supply.

Against this backdrop, there is growing competition among potential gas suppliers to meet demand, as evidenced by the activity described in this report. A key uncertainty is whether NSW CSG production will take place; if it does, it will be a material supplier. In summary, the market opportunity is presently large, and oil and gas prices are supportive, but a large range of contenders including the incumbents Santos and Origin, and super major-backed JVs in the Cooper Basin, are vying for the prize. While remaining supportive, the market environment is now bestowing a time discipline on the onshore players to execute on work programmes and commercialise resources.

Progress over the last 12 months is mixed

Having considered the macro scene, we now turn to the group of companies from our 2013 report and assess how they have progressed against stated and updated strategic and operational objectives.

Overview

Our selection of companies is a spectrum from frontier explorers to mature producers (Exhibit 6), and their recent activities vary accordingly. The selection has generally made progress towards their stated objectives in the last 12 months. However, the macro drivers discussed in the previous section have certainly had an impact on the ground, both positively and negatively.

In addition to the 16 companies we considered in 2013, in our analysis this year we also include:

- Lakes Oil, which along with Metgasco epitomises players with attractive geology but that are stymied by regulatory intransigence;
- WestSide Corporation, which has been one of the biggest beneficiaries from the captive market of Queensland LNG precipitating a potential takeover from Chinese conglomerate Landbridge;
- Ambassador Oil & Gas, having both conventional (Cooper wet gas) and unconventional (tight sands, shale and coal formations of the Patchawarra Trough), exposing it to a competitive bidding process that includes both Drillsearch and US independent Magnum Hunter; and
- Real Energy, an emerging company with three permits in the north-east of the Cooper/Eromanga Basin that are prospective for conventional and unconventional gas and liquids, with one permit being adjacent to gas-producing permits. Real is progressing from seismic survey to drilling at its permits.

Exhibit 6: Our onshore player universe

Non-producing, large acreage footprint, frontier region explorers	Explorers with acreage footprints targeted at established regions	Frontier explorers but with material conventional exploration success	Explorers with modest existing conventional producing bases in Australia or elsewhere	Large, international producers with material onshore Australian exploration interests	Large, established onshore producers
Armour Energy	Icon Energy	WestSide Corporation	Cooper Energy	AWE	Drillsearch
Exoma	Metgasco	Ambassador Oil & Gas	Empire Oil and Gas	Linc Energy	Senex
PetroFrontier	Norwest Energy		Strike Energy		
	Lakes Oil		Buru Energy		
	Real Energy		New Standard Energy		
			Central Petroleum		

Source: Edison Investment Research

The themes of weather, geology, approval processes, regulatory and community issues, and time spent trying to negotiate farm-downs, are all present in our update. Some companies have accelerated their activity, while others have paused to reconsider their approach or have been derailed by the regulatory process. Some have necessarily shifted strategy. The latter has taken place by acquisitions, drilling deferrals or geographic repositioning. Some companies have recognised the long timeframes required to commercialise large, frontier regions and have simply opted to acquire near-development or producing assets in the interim, such as Central Petroleum with its Palm Valley and Dingo acquisitions in NT (to complement their recent Surprise discovery) and New Standard Energy's acquisition of producing assets in the US. Ambassador Oil and Gas has also recently acquired US acreage, in the Rocky Mountains region. This shows that companies are not necessarily hostage to their own organic growth timelines, and will act opportunistically to keep the progress meter ticking over. Many smaller companies carry the title of 'producer' as a badge of honour, and see it as a graduation through the ranks. Cooper Energy has also acquired 2C resources through its purchase of ROC's interest in the non-producing BMG field, offshore Gippsland Basin. This continues Cooper's push into offshore assets in Australia, and in Tunisia.

Regulatory and community attitudes may ease in time through community education, scientific research into water quality impacts, or social engagement. In the near term, they can be a showstopper for companies operating in affected regions.

The Cooper Basin, otherwise a quiet desert-like setting in central Australia, remains the locus of onshore activity. The established players in the basin, such as Santos, Beach Energy, Drillsearch and Senex, continue to grow their conventional reserves base and boost production and are commencing their JV-partnered unconventional exploration and testing programmes. The Cooper Basin accounts for the majority of recent drilling activity for conventional and unconventional targets alike. Most of the conventional discoveries are indeed incremental, and produce from small or discrete reservoirs at aggressive early rates, declining quickly, hence requiring ongoing drilling to maintain steady or growing aggregate production rates.

In the last 12 months, Lakes Oil and New Standard Energy have joined the herd into the Cooper Basin. In the case of Lakes Oil, this followed regulatory delays on its Victorian permits. For New Standard, the move diversifies its asset base from high-risk frontier exploration in the Canning Basin, into better-known areas. Metgasco, stalled in NE NSW under a regulatory/community cloud, may also seek a similar move should the quagmire continue.

Four companies have recently entered into the production phase: Buru Energy, Central Petroleum, Empire Oil and Gas and New Standard Energy. This will generate near-term cash flow to assist with funding their longer-term, mostly unconventional gas ambitions. This is the now well-worn path of Beach Energy, Drillsearch and Senex, which are growing production from conventional oil and gas projects in the Cooper Basin, while simultaneously undertaking their considerable unconventional gas work programmes.

The sector is making some technical progress, and the results to date are supportive of the continued push to commercialise Australia's onshore unconventional resources. Where fracking is the objective, the rocks have shown to be frackable. This was previously established in the Cooper Basin, and is now true for Armour Energy in the Nicholson Basin (QLD), and Norwest Energy/AWE in the Onshore Perth Basin. However, it is a slow grind; in many cases this is indeed still in 'science experiment' phase, with much to be learnt about the respective basin and regional to local structural geological settings, well behaviour, and in particular the location of 'sweet spots' where drilling should be focused. More drilling is needed, and estimated ultimate recoveries (EURs), final investment decisions (FIDs) and commercial production are generally a long way off. Some, such as Buru and Armour, are returning to 3D seismic, post-drilling, to refine their understanding of the geology, and to define their next drilling targets. These are necessary steps, but do not set investors' pulses racing in the near term.

Notably, the early stage/exploration companies continue to aggressively market their future gas output, years prior to production. End-users are becoming involved via purchase options, share issues, project funding and pre-paid gas (PPG) arrangements. These are concerted efforts on behalf of the small upstream players to de-risk and commercialise their frontier or unconventional acreage, despite significant uncertainties or technical challenges ahead. On the flipside, the early participation by end users shows that there is a clear requirement for long-term gas supply, and end-users are more than willing to enter the supply chain to ensure security of supply. Companies in this category include Strike Energy, Armour Energy, Empire Oil and Gas, and Central Petroleum. Empire has been successful in obtaining direct financing participation by Alcoa and ERM Power in the construction of its processing plant, overcoming the funding challenge.

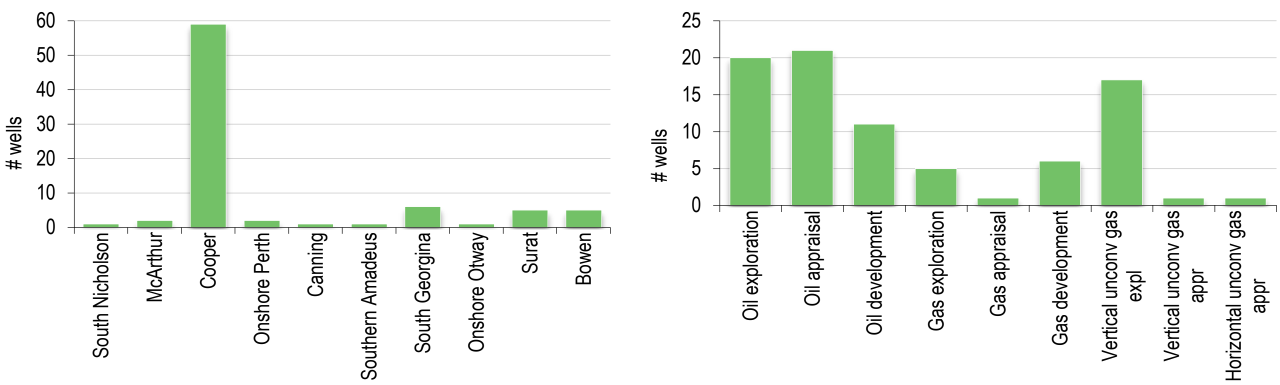
Farm-down push continues. As discussed in the following section on deal flow, the onshore Australian sector has been 'match-making' in the last few years. It is not so much speed dating, but many companies are in a hurry to partner up with larger, well-heeled counterparties for the long, unconventional night ahead. Those who are dateless are still in discussions. As with recent iterations, such as Beach-Chevron, Drillsearch-QGC and Senex-Origin, the outcomes can be unpredictable and can stun the investment community when they are announced, by virtue of the size of the deal and quality of the JV partner. Most of the world's biggest names are either in partnership already, or are rumoured to be walking the back blocks with the rulers out. This suggests that those with global reach, deep pockets and a long-term view are attracted to the Australian continent and that should be positive for those still seeking to farm-down part of their holdings. That includes Armour, Buru and Strike.

Almost all of the selected companies have a heavy workload ahead of them. The activity is taking place, but it is a slow and steady burn, without any clear knockout blows to report. Encouragingly, across the board the large JV partners, including the world's largest energy companies, remain committed and are progressing to the next stages of their Australian onshore programmes.

Drilling and seismic watch

Exhibit 7 shows a summary of the drilling activity undertaken in the last 12 months across the company selection (a more detailed "well tracker" is provided in Exhibit 18). The activity reflects the early stage nature of much of the work on unconventional projects, and the incremental nature of conventional developments; many wells need to be drilled to grow production. On unconventional, companies are working to understand geology, technical parameters of reservoirs and wells, and flow rates, and are attempting to book resources.

Exhibit 7: Wells drilled by onshore basin (left) and by type (right) in the last 12 months



Source: Company reports

The Cooper Basin continues to dominate drilling activity, and this reflects the relentless drilling surge by Drillsearch and Senex, mainly on the western flank. Importantly, a high proportion of the activity is in-field appraisal of existing discoveries, with small parcels of additional oil reserves added, often within 1-2km of other wells. Unconventional gas drilling also accounts for a reasonable share of the activity, with this activity spread across the basins, but again mainly concentrated on the Cooper Basin.

Complementing the drill activity has been seismic, as shown in Exhibit 8.

Exhibit 8: Major onshore seismic surveys in the last 12 months

Company	Date	Location	Permit	Type	Length or area	Comments
PetroFrontier	6/09/2013	South Georgina Basin	Various	2D	304km	"Amy" 2D seismic programme across Southern Georgina Basin permits
Buru	Oct-13	Ungani Trend	Multiple	3D	241km²	Basis for Ungani 3 exploration well location
Central	16/10/2013	South Georgina Basin	ATPs 909, 911 and 912	2D	984km	
Empire	Nov-13	Onshore Perth Basin	EP 389/Red Gully	3D		"Wannamal" 3D helicopter survey to delineate drilling targets near the Red Gully processing facility.
Buru	25/11/2013	Fitzroy Blocks, Canning Basin	EP 457	2D	361km	234km "Frome Rocks" 2D seismic over the Ungani Trend
Buru	Dec qtr '13	Southern Canning Basin	Covering eight permits	Airborne	43,951km²	
Drillsearch	Jul-14	Cooper Basin	PEL 513, PEL 632	3D	329km²	"Jacenza" 3D survey, commenced in July 2014
Drillsearch/ Senex	June qtr '14	Cooper Basin	PEL 182	3D	209km²	"Dundinna" 3D survey
Drillsearch	June qtr '14	Cooper Basin	ATP 924P	3D	126km²	"Taj" 3D survey covering the Hurron North prospect
Drillsearch	June qtr '14	Cooper Basin	ATP 924P	3D	150km²	"Hurron" 3D survey covering Hurron prospect
Drillsearch	Mar-14	Cooper Basin	PEL 101	3D		"Coolibah" 3D survey
Cooper	March qtr '14	Onshore Otway Basin	PEP 151	2D	112km	

Source: Company announcements, Edison Investment Research

Onshore seismic surveys, and 3D in particular, have been used to great effect by Drillsearch and Senex in the Cooper Basin in recent years. High-resolution 3D seismic has proved very effective for identifying the discrete, stratigraphic oil traps common in the Namur and Birkhead sandstones, which have underpinned strong growth in oil production on the Cooper Basin western flank, for both companies. This model is now being rolled out to other parts of the Cooper Basin, to identify drilling targets overlooked in previous 2D surveys, many undertaken decades ago. Other companies are also increasingly relying on seismic to better understand the continuity of their unconventional oil and gas formations over multiple permits, and also to try and identify "sweet spots" where future drilling activity should be focused. This is exemplified by large surveys undertaken by PetroFrontier, Buru, Central Petroleum, Cooper Energy and Empire.

Company operational update: Plenty of activity

In this section we review company-specific activity over the last 12 months.

As discussed in the previous section, there has been mixed progress across the selection. As a general observation, the unconventional development process at the smaller end, lacking scale, can be prone to delays and blowouts in time schedules. Where there are a small number of wells in focus, or even one, any delay due to weather, the approvals process or technical issues will clearly stand out. Onshore work programmes undertaken by Norwest, Buru, New Standard and Armour fall into this category, with geology, weather, and equipment delays affecting work programmes. In the case of Metgasco and Lakes Oil, there is a clear regulatory blocker that has halted their respective work programmes. As a result, Lakes Oil has farmed into Cooper/Eromanga Basin acreage in Queensland and plans to drill a well in its "Eagle Prospect" in onshore California, US.

In the Onshore Perth Basin (WA), **AWE** and **Norwest Energy** have undertaken production logging to identify the main producing zones in the multi-stage fracked vertical Arrowsmith-2 well. The Carynginia Formation and Irwin River Coal Measures accounted for the majority of gas flowed to date, and one of these layers will be the target for a horizontal well (Arrowsmith-3) planned after completion of further 3D seismic in late 2014. It is an unexciting time for shareholders, as shown by Norwest's share price performance in the last 12 months, and certainly not a dial-mover for AWE, but it reflects the incremental, stepwise realities of unconventional petroleum development. Some changes in the scheduling sees this 3D seismic pushed out from initial guidance of 2013 due to the time spent on testing Arrowsmith-2, equipment delays, weather and the regulatory approvals process.

AWE recently commenced a three-well unconventional gas programme across the Onshore Perth Basin, consisting of the Drover-1 (EP455), Senecio-3 (L1/L2) and Irwin prospect (EP320) wells.

Following the results of the Ungani 3 appraisal well in the Canning Basin (WA), **Buru Energy** released its "Crusader" rig rather than proceed with more oil drilling in H114. The Ungani 3 well did not flow as expected, due to lower porosity in the Ungani Dolomite at the well location, which prompted Buru to revisit and reprocess 3D seismic analysis prior to drilling other targets. Two oil exploration wells were subsequently deferred. On the production front, Buru has commenced shipments of oil into Thailand and Singapore from the Ungani 1 well, through the Port of Wyndham. Buru has also adjusted down its 2015 oil export target from the Ungani Field to 3-5mb/d, from the previous target of ~15mb/d.

Buru is about to embark on an appraisal and testing programme for its expansive Canning Basin wet gas prospects, by undertaking fracks and flow testing of successful exploration wells in the Laurel Formation. The programme has been delayed due to the approvals process and some environmental appeals. Buru has an enormous Canning Basin footprint, and the programme will go some way to establishing technical feasibility, and potentially resources. Oil well testing activity is also planned, including the Ungani North 1 and Paradise 1 wells, signifying a slight shift in strategy towards lower-risk oil objectives.

Senex continues its charge in the Cooper Basin, with 30 oil wells drilled in FY14, with some of these wells brought to production at the Spitfire, Mustang, Burruna and Acrasia fields. Oil production and reserves are growing, which is helping Senex to boost cash levels as focus shifts towards its unconventional gas programme with Origin Energy (see Deal wrap).

Central Petroleum has acquired the Palm Valley and Dingo Field assets of Magellan, which include production, processing and transport infrastructure, and a gas sales agreement (GSA) with a local utility from 2015. The deal substantially boosts Central's 2P reserves from ~1mmboe to ~10mmboe. Central has mostly debt funded (~A$50m) the acquisition and development, which includes building a 50km gas pipeline into Alice Springs. NT government production and pipeline approvals for the Dingo Field have been granted. Central is clearly very keen to place itself in the ranks of Australian producers, and the acquisition complements its recent Surprise oil discovery, which is now producing, and the Mt Kitty gas discovery well, which flowed at 0.5mmscf/day on first flow.

Central is also partnered with Santos and Total across its very large acreage holding in the Amadeus, Pedirka, Southern Georgina and Wiso basins, and the Lander Trough in NT. Santos recently elected to continue to Stage 2 of its work programme in the southern Amadeus Basin with Central (see Deal wrap). Santos and Total will bring up to A$300m in exploration funding to the permits, over three years.

Empire Oil and Gas has recently commissioned the Red Gully gas/condensate facility in the Onshore Perth Basin. Empire is sharing the construction budget with its main customer, Alcoa, which is an attractive development model that shares costs and risks, and with guaranteed off take. Empire has also involved another customer, ERM Power, via the use of a debt facility. Empire's forward strategy is to continue exploring in the Onshore Perth Basin, with 3D seismic and two wells planned in 2014 and 2015. Empire is also seeking to sell down part or all of its Carnarvon Basin interests to free up cash. Empire has experienced a corporate upheaval in the last 12 months, with most of its directors replaced, legal stoushes within the company and with shareholders, accompanied by commissioning issues at Red Gully and a sobering assessment of the company's finances by new management. Empire is now exploring the possible sale of the Red Gully facility to raise funds for its exploration programme. The new facility owner would process Red Gully gas under a tolling arrangement. Empire is also considering increased use of debt via a reserves-backed facility, if reserves can be booked at Red Gully. While this has been taking place, Empire's upcoming onshore Perth Basin exploration programme has been pushed back to 2015 and 2016.

New Standard Energy (NSE) experienced a challenging 12 months in the Canning Basin, which saw a partial sell-down by ConocoPhillips, technical issues on one of its key wells, and its share price hammered. In June 2014 NSE advised that it has deferred all further drilling in the Canning and Carnarvon Basins (WA) until late 2015, due to delays in receiving stakeholder approvals.

New Standard has re-emerged with a new strategy that is not so Canning-focused, and perhaps not even so Australia-focused. As we reported in our February initiation, NSE has partnered with US-based Magnum Hunter Resources (MHR) in PEL 570 in the Cooper Basin and also purchased MHR's interests in three permits in the liquids-rich Atascosa Project in the Eagle Ford in Texas, US. The US projects have minor existing production, however NSE expects production uplift to come through the application of modern production techniques such as zipper-fracking, and improved well completion. NSE has new management, and access to up to US$45m in debt to help fund its next round of drilling in the US. In its June quarter report, New Standard advised that its farm-in commitment seismic and well in PEL 570 have been deferred, as a result of the takeover battle for JV partner Ambassador Oil and Gas.

Strike Energy is currently executing a strategy of near-term US onshore production and long-term domestic unconventional production. It has interests in producing assets in the Eagle Ford, Permian Basin and Eaglewood in the US. However, during the June quarter Strike sold down a partial interest in the Eagle Ford. This is part of a longer-term strategy to minimise investment in these overseas projects, and ultimately focus on the Cooper Basin. Strike has completed two, two-stage vertical fracked wells in PEL 96 in the Southern Cooper Basin, Le Chiffre 1 and Klebb1, which confirmed gas-to-surface flow via fracking of the deep rocks and coals of the Patchawarra and Toolachee formations. Strike has been busy on the marketing front, with GSA options struck with Orora, Orica and Austral Bricks, and sale of 2.5 million Strike shares to Orica in May 2014 to assist with financing. Orica's participation in the financing of Strike's work programme shows that end users are eager to secure long-term gas supply, and will participate to that end. Strike's next steps are further testing in PEL 96, and testing of the Davenport-1 well in PEL 94. There is plenty of commercial interest in the gas, should it be deemed technically feasible and commercial.

Metgasco finds itself in Q314 with large gas reserves that are tantalisingly close to a gas-short market (NSW), but stalled in a regulatory deadlock. Metgasco is at the 'eastern front' of the Australian regulatory battlefield, as discussed in the first section. At the time of our last sector report, Metgasco had suspended its activities in the Clarence Morton Basin and had retrenched most of its employees. In May, Metgasco was preparing to drill the Rosella Well, when the NSW government reversed its approval for the well, forcing another suspension of activity. This followed weeks of rowdy protests by environmentalists and community members at the gates of the rural property where drilling was to take place. Metgasco commenced legal action against the NSW government in early July. In the meantime, 338PJ of 2P reserves and 2,373PJ of 2C contingent resources lie dormant.

At this stage, Metgasco is 100% focused on its three Clarence Morton tenements, and its immediate operational focus is to try to restart its activities there. In recent releases the company has flagged it is open to opportunities outside NSW, but these are not yet specified. Metgasco is one of the more advanced companies on a reserves and resources basis, however there is clearly a strong regulatory showstopper in place at the moment.

Exoma Energy is still considering its next steps, and the expiration of its Galilee Basin permits has led it back into the permit renewals/approvals process to retain its permits.

Icon Energy is deep in the Cooper Basin action with permit holdings including the ATP 855 Beach Energy-Chevron JV in the Nappamerri Trough shale gas "fairway". This sees a constant newsflow for all concerned, from the aggressive drilling/fracking activity underway in that part of the world. In ATP 855, the JV has sunk a series of vertical exploration wells to define the extent of a basin-centred unconventional gas play. Most of these have encountered gas and were reported as discoveries. The next steps will be fracking and flow testing of the wells to confirm the unconventional production concept. Icon advises it expects this to commence in H214. There is now good coverage by vertical wells across ATP 855, which, once tested, will give a view on the likely production potential and resources. Operator Beach has already booked 2C contingent resources in PEL 218 next door. At time of writing Icon held ~A$27m cash (including an R&D rebate in July 2014), which will get a workout in H214 once fracking of the Hervey-1, Geoffrey-1, Redland-1 and Etty-1 wells commences. According to DeGolyer and McNaughton, the P50 gross unconventional prospective resource in ATP 855 is 28tcf, of which Icon's (35.1%) share is 10tcf. Following testing, the JV will hope to book 2C contingent resources. The work will be undertaken by a newly formed company, Condor Services, which was set up with North American equipment to cater for the demand for hydraulic stimulation services in Australia. Icon has also deferred its Victorian work programme in 100%-owned permits PEP 170, 172, 173.

Armour Energy is working to unlock the resource potential of multiple basins across northern Queensland and Northern Territory. The activity underway includes seismic, exploration drilling and well testing. In the last 12 months Armour has booked contingent resources, and has grown its prospective resource inventory by identifying more drilling targets. Armour has a first-mover advantage in what could be a large Northern Australian petroleum province, with 100% ownership.

Armour has also completed the first horizontal fracture-stimulated well in Australia. Twelve sections were fracked in the Egilabria 2 well in August/September 2013 and gas flowed to surface with a resultant flare. A pressure build up test was undertaken through to early 2014, with results yet to be released. Armour has since booked a maiden 154bcf shale gas resource from the Egilabria 2 well. There is no doubt there are large hydrocarbon systems across these basins, with large gas and oil intersections, and very high organic content (>10%) in the basal shale layers. Technical validation now hinges on recovery and flow rates.

The drilling of Otway-1, in JV with Lakes Oil, has been deferred until "at least" 2015 due to a Victorian government onshore drilling moratorium. Outside of the focus list of companies, but notable, was the entry into the Cooper-Eromanga Basin by Lakes Oil. This is in response to the Victorian government's moratorium, which extends a previous halt to all fracture stimulation activities.

At present, Armour has trimmed its expenses, cut headcount from 37 to seven, and is seeking a farm-in partner for its 100% owned NT and QLD permits. This will see a lull in ground activity in the coming quarters.

Drillsearch has progressed further down the exploration, production and shale gas path than many, holding conventional oil and wet gas production assets, a shale gas JV with a super major and extensive acreage across the Cooper Basin. Drillsearch has partnered, explored and acquired its way up the small-cap hierarchy to appear on the radar of institutional investors in 2013. The company has not slowed down, and has one of the most active newsflows in the sector. Drillsearch recently announced its acquisition of Ambassador Oil and Gas, which will expand Drillsearch's Cooper Basin footprint even further.

In the last 12 months, Drillsearch has continued to grow its reserves, production and has commenced drilling in its shale gas JV with QGC (BG-owned) in ATP 940P in the Cooper Basin. Drillsearch is prosecuting a three-pronged strategy of oil (near-term), wet gas (medium-term) and shale gas (longer-term), and the cards are essentially lined up for the work to proceed. Enough weaponry is being thrown at the task, such that no one will die wondering if the time series model works. The prolific western flank oil fields of PEL 91 continue to yield new, albeit incremental, additional wells to production, and each quarter sees new discoveries. Shale gas is now in focus, with the Drillsearch/QGC JV terms for ATP 940P renegotiated in March this year. The renegotiations confirm QGC's financial participation in the JV, and as a potential end-user for the gas, although timelines have been compressed with more wells front-loaded into the programme. Time is money, particularly with first gas from QGC/BG's Curtis Island LNG project fast approaching. Two vertical shale wells, Charal-1 and Anakin-1, have been drilled and await fracking in H214.

At end of June quarter, Drillsearch held A$152.4m in cash, which will see its commitments funded into 2016, and keep plenty of newsflow catalysts on the screens.

Cooper Energy is deep in the frantic pace of drilling in the Cooper Basin, via its association with Senex. Cooper has longer-term ambitions outside the Cooper, and in early 2014 Cooper acquired 65% of the Basker Manta Gummy (BMG) project, offshore Gippsland Basin, from ROC Oil. The project has sizeable gas and liquids resources, providing a big boost to Cooper's numbers, but has remained in non-production phase since 2010 due to technical issues, including complex geology, experienced at the time. Cooper Energy continues to explore for oil and gas in Tunisia and Indonesia. In April 2014, Cooper booked 11.3mmboe (net) 2C contingent resources at the Hammamet West Field, Tunisia.

Linc Energy was looking to farm-out part of its vast acreage holdings across the Arckaringa Basin, onshore South Australia. The strategy has now shifted to exploration drilling in order to prove up the tight liquids potential of the multiple permits, with three wells planned for 2H14. Linc is predominantly active offshore, with conventional and unconventional oil projects in North America, and various coal-to-energy projects in Europe, plus it is entitled to coal royalty streams in Australia.

Real Energy has completed reprocessing of seismic data across its two Cooper Basin permits ATP 927P and ATP 917P, and has identified three targets for an upcoming three-well drilling campaign set to commence in September 2014. The three wells will target Toolachee and Patchawarra Formation gas targets, near to recent discoveries by Santos in adjacent permits.

Progress across the company universe has clearly been uneven, with a strong skew towards the larger players operating in the Cooper Basin. Where some companies have not been able to move their projects forward, for a variety of reasons, they have often opted for acquisitions here or overseas, or indeed have become targets themselves, as discussed in the following section.

Deal wrap: Big ticket items moderating

The previous decade was characterised by two waves of major onshore Australia deal flow. The first was focused on Queensland CSG-to-LNG projects, and the second was a series of IOC onshore shale gas farm-ins during 2011-13. As such, in our last report we profiled the entry of global IOCs and the 'local' big end of town, into unconventional acreage owned by smaller companies across Australia's onshore basins.

The last 12 months has seen a slowing of new farm-ins by the offshore IOCs, with more activity by the larger local players such as Santos and Origin Energy, and consolidation at the medium to smaller end. This compares with the prior period that saw corporate activity from Chevron, QGC, Statoil, Hess and Total.

There remain plenty of dispersed interests across all of the basins, including the Cooper Basin, with microcaps maintaining junior shares in acreage that is growing in strategic importance. The last 12 months has seen consolidation of some of these interests underway, with the proposed takeover of Ambassador Oil and Gas by Drillsearch a recent example. The latter has now escalated into a competitive bidding process with US-based Magnum Hunter Resources. There is also plenty of cooperation on the ground, with Drillsearch and Beach Energy extending their Cooper Basin western flank partnership to other areas of the basin, and ongoing cooperation between Beach, Senex and Strike.

Some existing farm-in work programmes have been compressed or brought forward, with participants being all-too aware that falling behind the pack could lead to lost opportunities in future gas sales. This is the case on the QGC/Drillsearch deal, and also with Total and Central Petroleum. The major farm-in deals have been consummated by commencement of activities, and in some cases JVs have progressed into the second stages of their work programmes (eg Santos and Central).

Exhibit 9 summarises deals struck over the last 12 months.

Exhibit 9: Australian onshore deal flow in last 12 months

Date	Entrant	Vendor	Permits	$m (units specified)	Deal outline
04-Nov-13	Apache	Buru Energy	EP 390, 471, 473 and 438	A$25m	Apache will earn 50% interest in the "coastal" permits by funding A$25m programme including 175km 2D seismic and two exploration wells. Buru and Mitsubishi will each transfer 25%
04-Nov-13	Apache	Buru Energy	EP 472, 476, 477	A$7.2m cash upfront plus 80% of future costs	Apache granted option to earn up to 40% of the "Acacia" permits, from A$7.2m option fee. If exercised, Apache to fund 80% of two exploration wells, 80% of two appraisal wells if successful, and reimburse BRU for 100% of aeromag and EP 474 seismic costs.
28-Nov-13	Total	Central Petroleum	South Georgina Basin	US$190m	Total and CTP agreed to accelerate expenditure in Stage 1 of their November 2012 JV agreement, from US$60m to U$95m. Increased expenditure to be spent on multi-hole production tests for some wells. Total amount of deal remains unchanged.
10-Dec-13	New Standard Energy	Ambassador Oil and Gas	PEL 570	A$47m	NSE to pay A$1.6m up front, a further A$1m deferred and reimburse AQO for A$1.4m expenses. NSE then to spend up to A$42.5m over a five-year work programme (as operator) including 500km 3D seismic in 2014 and one well in 2015, to earn 52.5% equity in PEL 570.
23-Dec-13	Armour Energy	Lakes Oil	PRL-2	A$50m	Armour will earn 15% of PRL-2 by making "best endeavours" to undertake an A$10m work programme, and can earn an additional 35% within two years by undertaking a further A$40m work programme. Armour to become operator.
23-Dec-13	Buru	Key/Indigo	EP 438	Asset swap	Buru has 'swapped' its 80% interests in L15 and R1 for 25% of EP 438, with Buru to pay A$500k for remedial work required on the Buru permits. Following the transaction, Buru and Mitsubishi will transfer 50% of EP 438 to Apache, as per 4 Nov 2013 deal.
24-Feb-14	Origin Energy	Senex Energy	PELs 516, 115, 514 in Cooper-Eromanga Basins	ORG to pay first A$185m of work programme, with option for further ~$30m contribution	ORG to pay first A$185m of of work programme (Stage 1), with option for JV to contribute a further A$67m split by participating interest (Stage 2). SXY remains operator with ORG retaining right to assume operator in Stage 2. ORG to earn up to 50% interest in PELs 516 and 115, and 40% in PEL 514 by end of Stage 2. Stage 1 includes 300km 2D seismic, eight exploration/appraisal wells with fracking and flow testing (PELs 516 and 115) and 250km 3D seismic plus seven exploration/appraisal wells with fracking and flow testing (PEL 514).
10-Mar-14	QGC/BG	Drillsearch	ATP 940P	A$130m	Revision of initial terms of July 2011 agreement to consolidate three-stage programme into one stage, and expanded number of wells from six to 10. QGC/BG still carries A$90m of first A$100m expenditure, with subsequent expenditures in proportion to JV interest share.
31-Mar-14	CTP	Magellan Petroleum Australia	Palm Valley and Dingo Fields	A$35m including A$20m cash and 39.5m CTP shares.	CTP acquires existing producing fields with compression, processing and transport infrastructure and six developed wells. Magellan has a GSA with PWC for sales up to 31PJ of gas over a 20-year period on a 100% take or pay basis, beginning in early 2015. CTP acquisition funded by A$20m loan facility from Macquarie Bank, with further A$30m for development expenditure including 50km gas pipeline to Alice Springs.
28-May-14	Drillsearch	Ambassador Oil and Gas	PEL 570	A$41m	DLS to acquire AQO via scrip and cash, to assume AQO's 47.5% interest in PEL 570 in the northern Cooper Basin. PEL 570 is adjacent to DLS's existing PEL 101 and PEL 182 permits, and DLS has already undertaken the Coolibah 3D seismic across the area including through PEL 570. There are four wet gas discoveries in PEL 101 and PEL 182. New Standard Energy is a 52.5% interest holder in PEL 570. Offer remains open at time of writing.
28-Jul-14	Beach Energy	Drillsearch	ATP 924P	N/A	BPT to earn 45% interest in ATP 924P in the Inland Cook region of the Cooper Basin, by paying for recently completed 3D seismic programme, drilling two wells (second well on option) and paying DLS for 45% of past expenses.
24-Apr-14	Landbridge	WestSide	Corporate	A$178m	Off-market cash takeover, increased from A$0.36/share to A$0.40/share on 24 April 2014. Landbridge has achieved >90% of WestSide ownership and has proceeded to compulsory acquisition of remaining shares and assumption of WestSide Board positions.
20-Jun-14	Magnum Hunter	Ambassador	PEL 570/corporate	A$53m	One share in Magnum Hunter per 23.6 Ambassador shares. Offer remains open at time of writing.

Source: Company announcements

In terms of deal structure, the recent deal flow in Exhibit 9 shows a continuation of themes observed at the last report. Where farm-ins take place, they continue to be very much work programme focused, rather than driven by large upfront cash payments. The deals are also staged, which allows for opt-in or opt-out as more is learnt from the unfolding work programme. To date, the IOC farm-ins remains committed to the work programmes.

The QGC/Drillsearch JV has commenced vertical drilling of shale gas targets in ATP 940P in the Nappamerri Trough in the Cooper Basin. In March 2014, the JV agreed to consolidate its three-stage programme into one stage, and to expand its well count from six to 10. In July 2014, Santos elected to proceed to Stage 2 of its South Amadeus Basin JV with Central. This followed Stage 1 of 2D seismic acquisition and drilling the Mt Kitty gas discovery well.

There has also been plenty of manoeuvring on the ground as the smaller players jockey for position, buy up adjacent acreage covered by their previous seismic activities, and grow their overall acreage footprint. There was even a false start, with an attempt by Senex to acquire AWE for scrip in December 2013, which was leaked to the media before the market, and before both parties had discussed the proposition in detail. AWE, with its offshore ambitions preserved, bolted and a red-faced Senex was left dealing with the temporary share price fallout. At the very least, this episode shows there is some appetite for consolidation at the mid-cap level. With plenty of cooperation between Drillsearch, Beach and Senex on the ground, and asset interests from Santos and Origin (as well as Chevron and QGC), it is a space worth watching.

In May 2014 Drillsearch offered to buy out Ambassador Oil and Gas via scrip, with a cash sweetener later added to the offer. The most recent offer by Drillsearch is at a 21% premium to a counter offer by Magnum Hunter. Ambassador holds a 47.5% non-operated interest in PEL 570 in the Cooper Basin. PEL 570 lies in the northern Cooper Basin "wet gas fairway" but most focus is on the sizeable unconventional potential of the tight sands, shale and coal formations of the Patchawarra Trough. Ambassador also holds minor exploration acreage in Colorado, US. The deal has plenty of strategic rationale, with Drillsearch holding the adjacent PEL 101 and PEL 182 permits, which contain existing wet gas discoveries. Drillsearch completed the Coolibah 3D seismic survey across all three permits in 2013. **The deal also brings together New Standard Energy and Drillsearch**, as New Standard holds the remaining 52.5% share in PEL 570, in alliance with New Standard's own 17% shareholder Magnum Hunter Resources. At time of writing, the Ambassador board had recommended the Drillsearch offer and Drillsearch is progressively making its way up the Ambassador register. At time of writing the Drillsearch offer was to close on 27 August 2014 and the Magnum Hunter bid closes on 5 September 2014,

The recent high-profile takeover of WestSide Corporation by Chinese Landbridge shows that flames are still burning in the Queensland CSG scene. WestSide achieved a coup in March 2014 to lock in a 20-year gas sales agreement to the GLNG project from 2015 up to 65TJ/day, at oil-linked prices from 2016, from its Meridian Gas Field where it has booked 2P reserves of 680PJ (gross, WestSide 51% share 347PJ).

New Standard and **Lakes Oil** have both sought to reposition themselves on the edges of the Cooper Basin, to shift focus away from their higher-risk frontier acreage or, in the case of Lakes Oil, where drilling activity is presently prohibited. Both have recently purchased acreage.

Elsewhere in the Cooper Basin, Beach Energy and Drillsearch continued their Western Flank oil and wet gas partnership with a JV in ATP 924 in the Inland Cook region. Drillsearch has also brought Santos more tightly into the fold, with Santos as the operator of the recently re-badged PEL 632, in JV with Drillsearch, the permit formerly known as PEL 106A. PEL 106B, with most of the present wet gas production, is now known as PEL 106.

Origin farmed into Senex's unconventional permits in late February 2014. Under the deal, Origin will free-carry Senex through the first A$185m of an A$252m, two-stage work programme across two

Areas (A&B). Origin can earn up to 50% in Area A, and 40% in Area B. Area A includes 36% of total areas of PEL 516 and PEL 115 (Senex 100%). Area A includes the tight sands of the Allunga, Skipton and Nappamerri Troughs. Area B includes 47% of the total area of PEL 514, deep formations only (Senex 80%). This area includes the Patchawarra Trough of the northern SA Cooper Basin.

In Area A (PEL 516 and PEL 115), the work programme will consist of a 300km 2D seismic survey and the drilling of up to eight exploration and appraisal wells, with fracture stimulation and flow testing. Senex expects the first well drilled in early CY15. The Area B work programme will involve a 250km^2 3D seismic survey and the drilling of up to seven exploration and appraisal wells, with fracture stimulation and flow testing. An additional, optional work programme of up to A$67m (gross) can be undertaken on equity % participation basis, on agreement by the JV.

In December 2013 Armour Energy attempted to enter the Gippsland Basin via a two-stage farm-in to Lakes Oil's PRL2 permit. The first 15% interest is contingent on Armour undertaking an A$10m work programme, which cannot take place with the current moratorium on onshore drilling activity in Victoria. Lakes Oil has previously booked 2C resources of 329bcf in PRL2. Armour Energy holds 19.9% of Lakes' issued share capital, and Armour CEO Robbert de Weijer has been appointed as an alternate director of Lakes Oil, suggesting a close working relationship between the two companies and potential for consolidation. The latter would make sense for Lakes, given its present impasse in Victoria.

Looking forward, Armour and Buru are both seeking to farm down their sizeable acreage in the north-east and south-west of the continent, respectively. Other smaller players on the fringes of the Cooper Basin such as Icon and Cooper could see continued interest in their assets as the work programmes unfold.

The marketing push

The end game is all about commercialisation. Even if companies are at early stages in their development, that has not stopped them from engaging with end users to cooperate on long-term, but typically small gas sales agreements. This provides some incentive for continued activity in the near term, and financing options, which could ultimately lead to the big prize. The activity also shows that players on both sides of the demand-supply equation are keen to shore up security of supply or off take, notwithstanding that production may be years ahead.

Exhibit 10 summarises recent deals and arrangements struck with energy end users.

Exhibit 10: Recent marketing deals

Announced	Company	Counterparty	Deal outline
19/02/2014	Central Petroleum	Power and Water Corporation (NT)	Central purchased the Palm Valley and Dingo fields from Magellan Petroleum. Magellan had a pre-existing GSA with NT PWC to sell 31PJ from the Dingo Gas Field, on a 100% take-or-pay basis over a 20-year supply period, initially expected from early 2015.
27/02/2014	Strike Energy	Austral Bricks	Agreement to sell up to 12.5PJ of gas to Austral Bricks.
3/03/2014	Senex Energy	SACB JV	Senex to supply Santos-operated SA Cooper Basin JV with raw gas from the Hornet gas field, up to 10mmscf/day for two years, during the extended production testing of the field. Pricing differentiates gas, condensate and LPG streams.
25/03/2014	Strike Energy	Orica	Agreement to sell up to 250PJ of gas to Orica.
23/06/2014	Strike Energy	Orora	Gas supply option agreement for 45PJ of gas from PEL 96 over a 10-year period from 2017.
30/06/2014	Icon Energy	Shantou SinoEnergy	Extension of timing for conditions precedent until 30 June 2015. Conditions precedent include the certification of 2tcf of 2P reserves, and all necessary approvals for seller and buyer production/receiving facilities. The agreement covers 2mtpa of LNG supply over 20 years.
4/07/2014	Lakes Oil	Simplot	Letter of intent (LOI) signed for gas supply to Simplot from Lakes' Wombat Field in the Onshore Otway Basin.
17/07/2014	Armour Energy	MMG	MoU to evaluate potential to supply 7-9PJ/annum to MMG's Century Mine in Queensland with potential "third-party" additions, via non-binding MoU. The mine is located on Armour's 100% owned ATP 1007 permit in NW Queensland.
24/07/2014	Lakes Oil	Dow Chemical	LOI signed for gas supply to Dow Chemical from Lakes' Wombat Field in the Onshore Otway Basin.
27/03/2014	WestSide Corp	GLNG	Binding gas sales agreement for up to 65TJ/day to GLNG from 2015 for 20 years, with oil-linked pricing from 2016.

Source: Company announcements

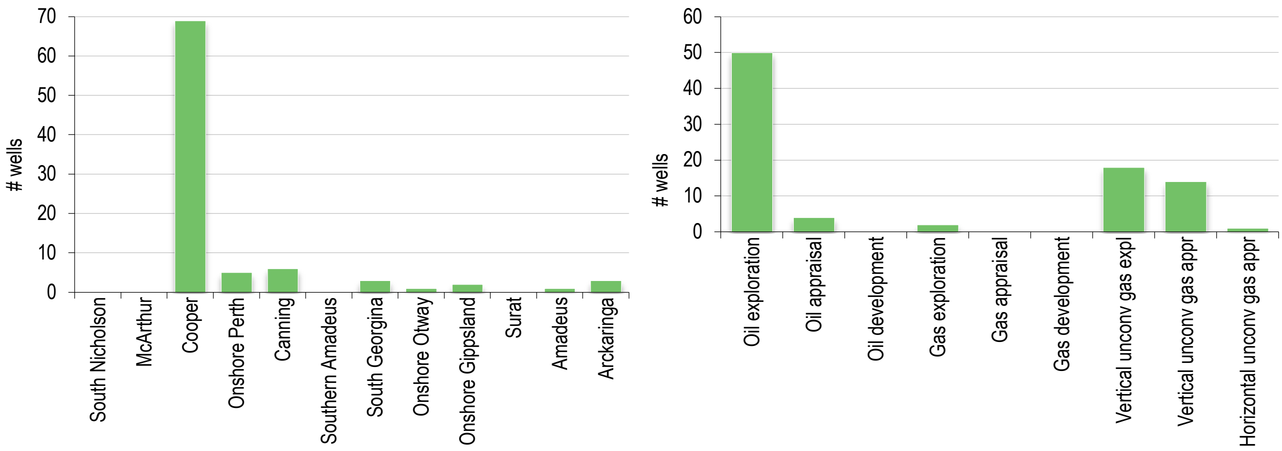
In July 2014, Armour Energy announced it will undertake a scoping study to supply up to 7-9PJ/year of gas to the MMG Century Lawn Hill zinc mine, which is located on AJQ's ATP 1107 permit.

Looking forward: Operational catalysts

We think that following periods of investor exuberance surrounding the early stages of the onshore Australian unconventional industry, and associated deal flow, the next set of investment catalysts will be operational achievements. Flow rates, estimated ultimate recoveries (EURs), resources, reserves and final investment decisions (FIDs) will become more important features in the investment environment. As such, we plot out a summary of the key operational activity expected in the next 12 months.

Exhibit 11 and Exhibit 12 show planned wells and seismic over the next 12 months (and some beyond), where they have been disclosed. As shown in the exhibit, the Cooper Basin JVs are moving into their work phases to ultimately test the Cooper shale gas potential. In the Canning Basin, the **Buru/Mitsubishi** JV is embarking on a programme to test the tight wet gas potential of the Laurel Formation, its big-ticket unconventional resource target.

Exhibit 11: Wells planned by onshore basin (left) and by type (right), where disclosed



Source: Company reports

The Beach/Chevron/Icon JV will kick off with the fracking and flow testing of four wells in ATP 855, commencing in September 2014. The flow performance and decline rates will be key diagnostics on the production potential of these wells. Encouragingly for Icon, the junior JV partner, these wells could be plugged into the Cooper Basin pipeline and processing network, as per Moomba-191, via Beach's participation in the SACB JV. EURs, resources and reserves and development plans, and possibly even pilot production, should come out of this process, should it be successful.

For Drillsearch, the Star Wars themed adventure in ATP 940P continues, with the Charal-1, Anakin-1 unconventional vertical wells drilled, cased and suspended and the rig moving to the Padme-1 well and the proposed Amidala-1 well.

In the South Georgina Basin, PetroFrontier and Statoil are set to fracture stimulate and flow test two of the most prospective wells from their recent multi-well unconventional gas exploration programme.

NWE/AWE are looking to drill a horizontal shale/tight gas well, Arrowsmith-3 in FY15, armed with production logging data from each of the main target formations in Arrowsmith-2 and soon to be completed 3D seismic across EP 430.

For Senex, its Origin farm-in brings A$185m of activity free carry on its unconventional permits, allowing the type of scale required to test the commerciality of vast unconventional acreage. The JV is undertaking seismic surveys in 2014, and drilling of "at least" 15 wells is set to commence in early calendar year 2015.

Lakes Oil and **Armour** plan wells in the onshore Otway and Gippsland Basins, although it is unsure when these will progress given the current ban on onshore drilling in that state.

Exhibit 12: Planned onshore seismic surveys (where disclosed)

Company	Location	Permit	Name	Type	Timing	Length	Comments
AWE	Onshore Perth Basin	EP413	N/A	3D	Q414	N/A	To identify location and target zone of Arrowsmith-3 horizontal well
Buru	Fitzroy Blocks, Canning Basin	EP 458	N/A	2D	H214	N/A	Continued seismic on Ungani trend, targeting oil targets for drilling
Buru	Coastal permits, Canning Basin	EP 471	Commodore West	2D	H214	123km	
Buru	Coastal permits, Canning Basin	EP 458	Mt Fenton	2D	H214	N/A	
Buru	Yulleroo/Ungani	Various	Jackaroo	3D	H214	N/A	
Empire	Onshore Perth Basin	EP426/368	North Eregulla	3D	Early 2015	N/A	
New Standard/ Ambassador	Cooper	PEL 570	N/A	N/A	2015 or 2016	N/A	New Standard farm-in commitment

Source: Company announcements

Investor themes

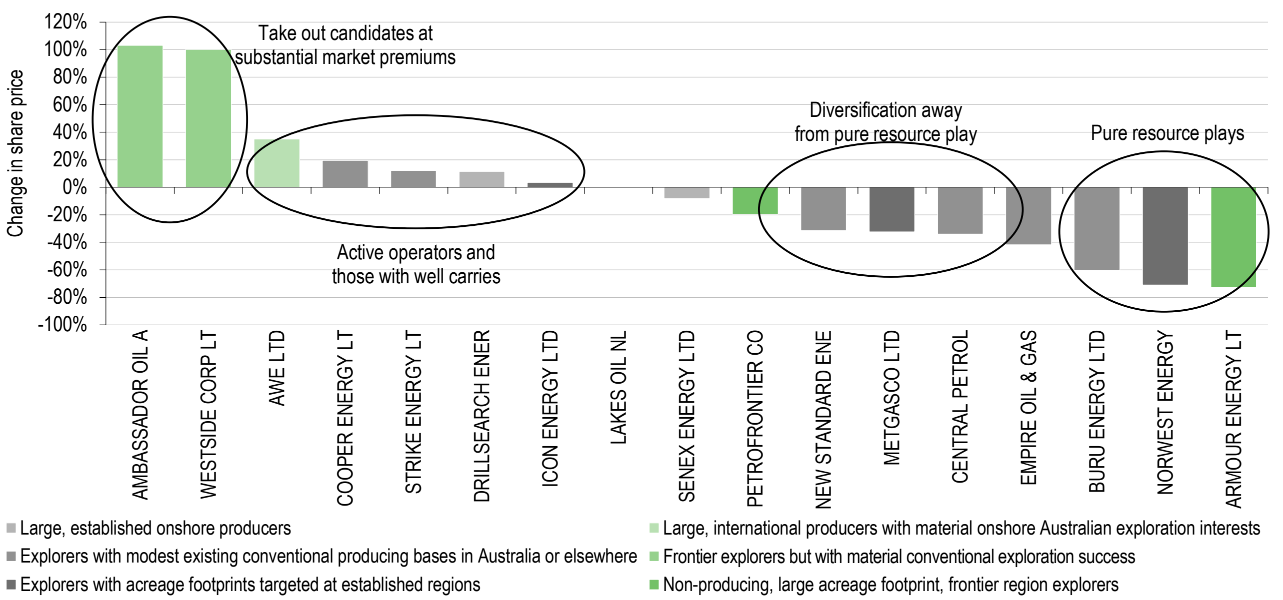
In our August 2013 report we set out our views on valuing and investing in the smaller end of the Australian onshore sector. A key finding was that the market was heavily discounting valuations compared with industry, analysts and indeed our own assessed valuations. We will not revisit the full valuation treatise here, but provide some commentary on continuing or emerging themes since our last report. Please refer to the original report for a more detailed treatment of valuation.

In summary, equity markets' valuation discount to industry and analyst valuations has generally widened in the last 12 months. However, the WestSide and Ambassador transactions show how the equity market can substantially misprice E&P companies, and this is not realised until the companies are taken over or there is some other M&A catalyst. This phenomenon saw heavy equity market discounting of Aurora Oil and Gas and ROC Oil prior to them being taken over by overseas players at substantial premiums, unrealised by equity markets until the offers were on the table (and indeed sometimes discounted even after that, leading to multiple low-risk investment opportunities for those on the ball). If the Australian onshore unconventional sector can prove its worth in the next one to two years, many equities will come from a position of heavily discounted value, some almost to zero, for their unconventional acreage.

Equity markets remain sceptical of unconventional upside

As shown in Exhibit 13, equity prices for the small to medium-sized onshore players have mostly fallen during the last 12 months. We provide an overlay of our assessed development maturity (see Exhibit 6) across share price performance. Outliers on the positive end are those currently under takeover offer, WestSide and Ambassador. This reflects the industry valuation premium to market valuation, which is typically only realised by equity markets on anticipation of a takeover or asset deal, or confirmation that they are actually taking place. The vast acreage owners, which are taking early steps to prove up the commercial prospectivity of their assets, occupy the negative outlier space. This is slow and steady work and has failed to captivate investors. Not surprisingly, investors retain relative favour with companies that have established production assets (here and overseas), but also have exposure to the resource and acreage plays; these names, such as AWE, Drillsearch and Senex, occupy the middle region of Exhibit 13.

Exhibit 13: 12 month equity price performance

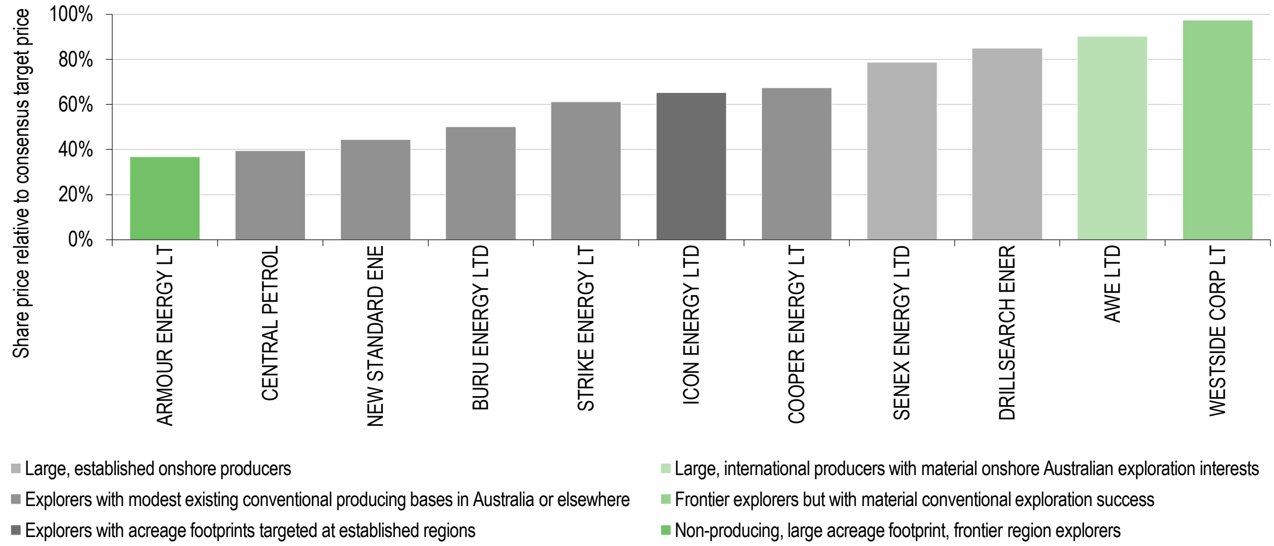


Source: Thomson One

In the case of AWE, its relatively strong performance in the group reflects its mature production base and its activity overseas, which includes the development of sizeable oil reserves of the Ande Ande Lumut (AAL) field in partnership with Santos, offshore Indonesia, and growing production from the Eagle Ford, Texas. AWE's onshore, unconventional assets remain a small part of its portfolio, for now at least, and we believe AWE's onshore Australian activity has little to do with its 12-month share price performance.

For other cases, where there have been drilling results that have not met investor expectations, for example Buru's Ungani 3 or NWE's Arrowsmith-2 well, the equity price has been heavily penalised. In the case of Metgasco, the state government has halted its drilling activity in NE NSW, with predictable effects on its share price. In the case of Empire Oil and Gas, management turnover, legal stoushes with previous directors, commissioning issues with the Red Gully facility leading to downtime and emerging balance sheet issues have underwhelmed investors.

Exhibit 14: Market EV versus analyst consensus price targets (where coverage exists)

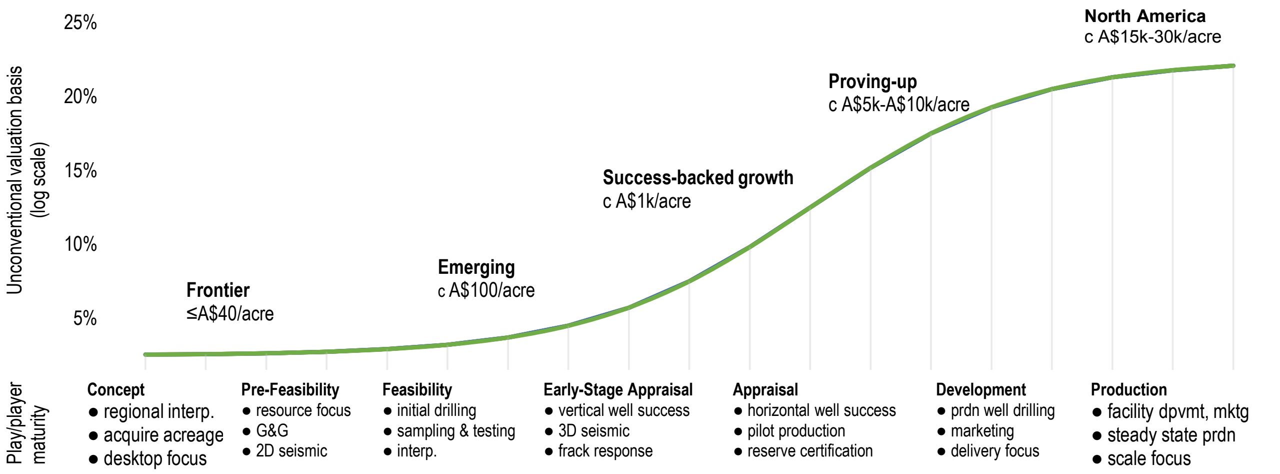


Source: Thomson One

Turning to analyst estimates, we see that, perhaps not surprisingly, the market continues to price in steep discounts to consensus valuations (Exhibit 14). The average investor discount is 40%, with a range spanning between 20% and 80%. Again as one would expect, the discounts are most marked for pure resource plays, while those with active programmes and significant production are better understood and rewarded by the markets.

This discount range is also largely consistent with our 'S' curve categorisation of relative play maturity and associated approximate acreage valuation matrices.

Exhibit 15: Value creation 'S' curve

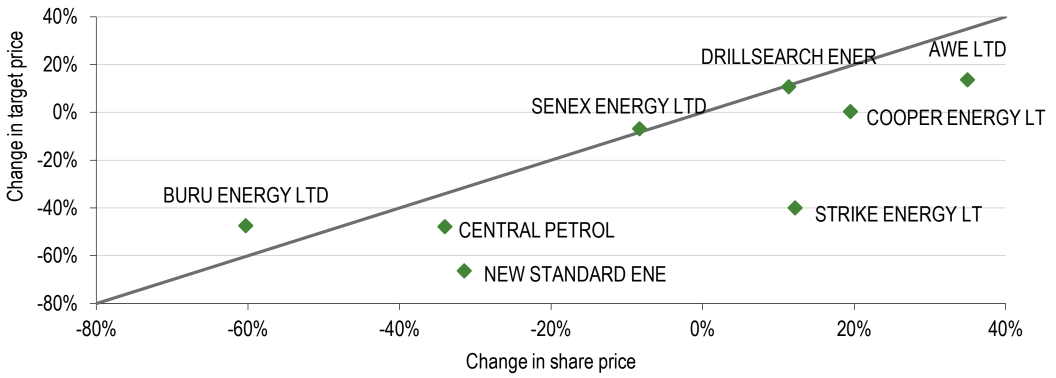


Source: Edison Investment Research

Some companies have moved up the development curve, mainly by adding production assets through acquisition or discovery. Central Petroleum, New Standard, Empire and Buru fall into this category. However, this has not been reflected in the relative equity price performance of the last 12 months. Investor expectations are high, and incremental progress has not been rewarded.

This leads us into our final piece of analysis for this report, namely to see how the market has reacted to newsflow and activities over the last 12 months. As a proxy for this, in the absence of individual fundamental valuations, we look at the movement in target prices (where available) for our coverage universe and assess the market reaction for each of these stocks individually as shown in Exhibit 16.

Exhibit 16: Consensus price targets and share price movements



Source: Thomson One, Bloomberg

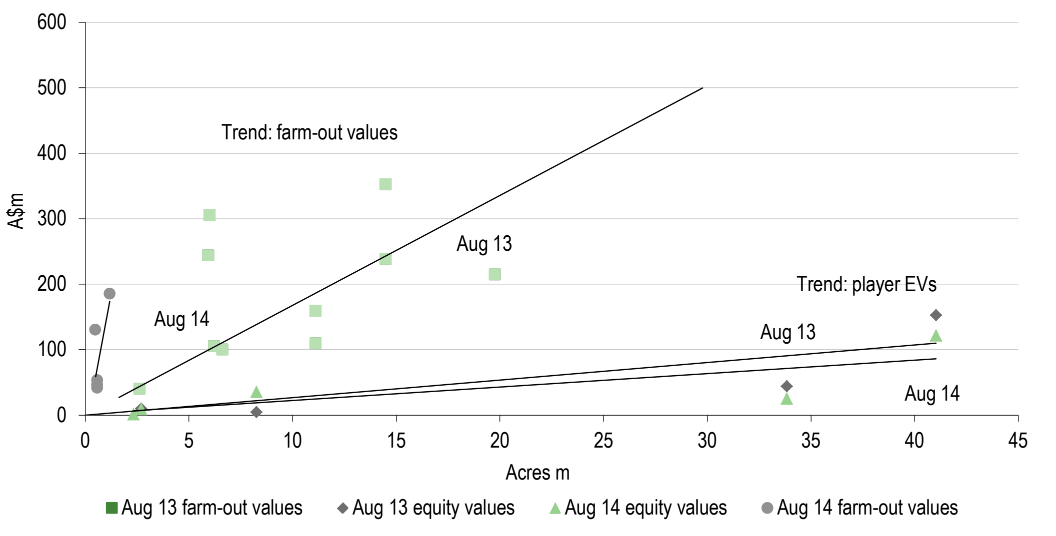
The trend is clearly one of greater volatility in stock prices relative to analyst price targets. Again, it is clear within that trend that the market is presently less inclined to take a punt on acreage plays unless there is expectation or confirmation of a takeover or asset deal. Activity that does not meet expectations, or is perhaps misunderstood by the market, such as the case of Buru's Ungani-3 flow rates, is heavily penalised in the equity price response. Conversely, we also note that some that have consolidated positions in North America have benefited from stronger market reaction than might be expected, eg New Standard and Strike. The market appears to be awarding these particular players more favourably, indicating greater confidence that resources can be monetised. This was a key feature of our previous report, and why we resoundingly concluded that Australia does not equal North America (or at least not yet).

Furthermore, at times market valuations have indeed exceeded analyst valuations, but this has typically accompanied times of heightened newsflow, rumours of deals or takeovers, or when the sector has simply been in favour with investors. More generally, as risk tolerance across the market varies, so will investors' value attribution to high-risk, early stage acreage plays. Those companies undertaking the bulk of activity, across conventional and unconventional plays, have displayed the least volatility in share prices. With the exception of the companies under offer, they have also outperformed in the peer group.

Industry continues to better understand the potential

Asset and corporate deals provide a clear view on industry valuations. Luckily, over the past two to three years there have been plenty of farm-ins and acquisitions from which to draw data (Exhibit 17). When compared with equity market valuations, the same trend is apparent as observed in our August 2013 report. The equity markets are willing to pay far less for acreage than industry participants, and this gap has widened, not narrowed, in the last 12 months. The most recent deals have been typically one or two permit farm-ins or corporate deals in partially explored acreage, near to infrastructure and markets, in the Cooper Basin. These smaller acreage deals, for example Drillsearch-Magnum-Hunter-Ambassador, have attracted a premium over some of the larger, basin-wide farm-ins of the previous period, such as Statoil-PetroFrontier and the partial sell down of ConocoPhillips' Canning Basin interests to PetroChina. By contrast, the equity markets are placing an even smaller value on acreage than before.

Exhibit 17: Industry farm-out values versus equity market values



Source: Thomson One, company announcements, Edison Investment Research

For the sector, it appears investor fatigue is setting in as some work programmes are pushed out, drilling results can fail to excite, and also as the realities of early stage, frontier or unconventional oil and gas more generally become apparent to investors. This is exemplified in the case of Norwest, where incremental progress on understanding the zones of the Arrowsmith-2 well through flow testing and well logging, albeit with some delays due to equipment, weather and technical issues, has been accompanied by a sharp decline in the share price.

What's next?

The next one to two years holds plenty of activity in store, particularly for the Cooper Basin – it is an 'event horizon' of sorts. The three major JVs (Chevron/Beach/Icon, QGC/Drillsearch and Origin Energy/Senex) are moving into the substantive parts of their work programmes. Much will be revealed about the commerciality of onshore shale gas, and if this proves to be a positive, investor interest will flow back into the sector and provide an opportunity for equity price buoyancy. Senex and Drillsearch will be at the forefront of the activity. Minor stakeholders such as Icon Energy and Cooper Energy are a steeply discounted entry to the potential opportunity. Activity is also picking up in the Northern Territory basins, with an increase in drilling and testing activity by PetroFrontier and Central Petroleum. Other potential catalysts include possible farm-downs for Armour, New Standard and Buru, which are actively seeking partners, which could provide further reinforcement of the industry premium on valuation.

Based on our assessment of forward work plans, it appears that the majority of the heavy lifting will continue to be done by the Cooper Basin players, Senex and Drillsearch (and Icon, Strike and Ambassador as JV partners), with an increase in activity expected in the South Georgina Basin from the likes of PetroFrontier and Central Petroleum. Given the market has recently favoured those that are driving the activity and newsflow, absent a specific deal catalyst, we would expect that trend to continue. The smaller, acreage players will remain as long-term positions, in our view, should the onshore unconventional industry demonstrate large-scale commerciality.

Appendix A: Well tracker – the last 12 months

Exhibit 18: Onshore wells: last 12 months

Date	Company	Well	Description	Basin	State	Permit	Results
28/08/2013	Armour	Egilabria-2 DW 1	Horizontal unconv gas appr	South Nicholson	QLD	ATP 1087	Fluid recovery, pressure build up. 2ft flare at surface.
6/12/2013	Armour	Lamont Pass 3	Oil exploration	McArthur	NT	EP 190	Multiple oil intersections and associated gas from ~250-1,200m depth, and particularly in the Barney Creek Shale over a ~500m interval. Oil and gas discovery reported, well logged, plugged and abandoned.
16/09/2013	Armour	Myrtle Basin 1	Vertical unconv gas expl	McArthur	NT	EP 176	Drilled to 861m, pending NT approval to deepen well and commence coring.
	Strike	Le Chiffre 1	Vertical unconv gas expl	Cooper	SA	PEL 96	Encountered gas saturated coal system. Fracture stimulated, currently flowing back drilling fluids.
	Strike	Klebb 1	Vertical unconv gas expl	Cooper	SA	PEL 96	Encountered over 145m of net coal with gas shows. Fracture stimulated, currently flowing back drilling fluids.
30/06/2014	AWE	Drover-1	Vertical unconv gas expl	Onshore Perth	WA	EP455	Cores cut across multiple intervals, gas readings observed in Caryngina and Kockatea Shales. Well suspended.
5/08/2014	AWE	Senecio-3	Vertical unconv gas appr	Onshore Perth	WA	L1/L2	Drilling commenced in early August 2014.
11/04/2014	AWE/ Norwest	Arrowsmith-2	Vertical unconv gas appr	Onshore Perth	WA	EP 413	Production/flow testing and production logging tool to determine productive zones. Results show Carynginia Formation (45%) and Irwin River Coal Measures (44%) account for the majority of gas flow.
14/01/2014	Buru	Ungani 3	Oil appraisal	Canning	WA	EP 391 (production application STP-PRA-0004)	Objective Ungani dolomite reservoir. Completed in March 2014 – encountered oil saturated Ungani Dolomite but flowed poorly, with low porosity dolomite the culprit.
15/04/2015	Central	Mt Kitty	Gas exploration	Southern Amadeus	NT	EP 125	Gas exploration well in southern Amadeus Basin NT, with Santos as operator. Gas flowed to surface at 0.5mmscf/day and then declined to ~0.1mmscf/day, on 1-1/4" choke. Preliminary analysis shows elevated helium content in the gas.
21/07/2014	Central	Whiteley 1	Vertical unconv gas expl	South Georgina	QLD	ATP 912	Drilling underway at time of writing
25/03/2014	Cooper Energy	Jolly-1	Vertical unconv gas expl	Onshore Otway	Vic	PEL 495	Testing unconventional oil and gas potential of shales in the Casterton Formation.
9/10/2013	Cooper/ Beach	Butlers-7	Oil exploration	Cooper	SA	PEL 92	Intersected 5m net pay in Namur Sandstone, cased and suspended as future tie-in to Butlers production facility.
22/10/2013	Cooper/ Beach	Butlers-8	Oil exploration	Cooper	SA	PEL 92	Intersected 6m net pay in Namur Sandstone, cased and suspended as future tie-in to Butlers production facility.
1/11/2013	Cooper/ Beach	Callawonga-9	Oil exploration	Cooper	SA	PPL 220	Intersected 4m of net pay across the McKinlay and Namur Sandstones. Cased and suspended as future tie-in to Callawonga production facility.
22/11/2013	Senex/ Cooper	Worrior-8	Oil development	Cooper	SA	PPL 207	Intersected oil pay from McKinlay, Namur and Patchawarra formations, and gas flows from the Patchawarra.
19/03/2014	Senex/ Cooper	Worrior-10	Oil appraisal	Cooper	SA	PPL 207	Intersected 4.5m net oil pay in Patchwarra Formation and 4.9m net pay in the Murta Formation, cased and suspended as future producer.
13/08/2014	Drillsearch	Balgowan-1	Oil exploration	Cooper	SA	PEL 91	
6/04/2014	Drillsearch	Hardwicke-1	Oil exploration	Cooper	SA	PEL 91	Plugged and abandoned.
28/03/2014	Drillsearch	Stunsail-1	Oil exploration	Cooper	SA	PEL 91	Cased and suspended as future oil producer.
June qtr	Drillsearch	Pennington-2	Oil appraisal	Cooper	SA	PEL 91	Cased and suspended as future oil producer, Drillsearch estimate 2P reserves of 0.67mmbbl.
June qtr	Drillsearch	Pennington North-1	Oil exploration	Cooper	SA	PEL 91	Encountered oil shows in Lower Birkhead Formation, cased and suspended.
14/02/2014	Drillsearch	Bauer-12	Oil appraisal	Cooper	SA	PEL 91	Cased and suspended as future oil producer, 2P reserves added.

Date	Company	Well	Description	Basin	State	Permit	Results
March qtr	Drillsearch	Bauer-13	Oil appraisal	Cooper	SA	PEL 91	Cased and suspended as future oil producer.
March qtr	Drillsearch	Bales-1	Oil exploration	Cooper	SA	PEL 91	Plugged and abandoned.
Jan-14	Drillsearch	Chiton-3	Oil appraisal	Cooper	SA	PEL 91	Appraisal well targeting northern extent of Chiton oil field, cased and suspended as future McKinaly/Namur producer.
Apr-14	Drillsearch	Charal-1	Vertical unconv gas expl	Cooper	QLD	ATP 940P	Vertical wells, to be fracked and flow tested in FY15, targeting REM and Patchawarra Formations.
June/Sept quarter	Drillsearch	Anakin-1	Vertical unconv gas expl	Cooper	QLD	ATP 940P	
Underway	Drillsearch	Padme-1	Vertical unconv gas expl	Cooper	QLD	ATP 940P	
	Drillsearch	Tintaburra-8	Oil development	Cooper	SA	ATP 299	Wells cased and suspended as future Hutton Formation oil producers.
	Drillsearch	Toobunyah-10	Oil development	Cooper	SA	ATP 299	
	Drillsearch	Toobunyah-11	Oil development	Cooper	SA	ATP 299	
	Drillsearch	Ipundu-17	Oil development	Cooper	SA	ATP 299	Wells cased and suspended as future producers.
	Drillsearch	Ipundu-18	Oil development	Cooper	SA	ATP 299	
	Drillsearch	Smegsy-1	Gas development	Cooper	SA	PEL 632	Re-entry to Smegsy-1 well to reassess geology of Smegsy-Moruya Field.
6/08/2013	Senex	Burruna-2	Oil exploration	Cooper	SA	PEL 115	Net pay of 5.3m with a maximum flow rate of 3.6mb/d during testing.
24/08/2013	Senex	Acrasia-7	Oil development	Cooper	SA	PPL203	Net pay of 6.3m.
28/08/2013	Senex	Ventura-2	Oil development	Cooper	SA	PPL 214	Net pay of 13.4m.
14/09/2013	Senex	Kobari-2	Oil exploration	Cooper	SA	PEL 516	Oil shows over 22m.
30/09/2013	Senex	Pirie-1	Oil exploration	Cooper	SA	PEL 105	Moderate oil shows in the Birkhead Formation.
1/10/2013	Senex	Dunlop-1	Oil exploration	Cooper	SA	PEL 113	Net pay of 3m, flow of 1.2 kb/d during DST.
5/10/2013	Senex	Moothandella-4	Oil appraisal	Cooper	QLD	ATP 794P	Gross oil intersection of 10m.
6/10/2013	Senex	Sprigg-1	Oil exploration	Cooper	SA	PEL 514	Interpreted net pay of 6.3m.
22/10/2013	Senex	Pirraminta-2	Oil exploration	Cooper	SA	PEL 115	Cased and suspended as future water well.
8/11/2013	Senex	Burruna-3	Oil appraisal	Cooper	SA	PEL 115	Interpreted net pay of ~3m.
14/11/2013	Senex	Acrasia-6	Oil appraisal	Cooper	SA	PPL 203	15m possible net pay.
24/11/2013	Senex	Vintage Crop-3	Oil appraisal	Cooper	SA	PPL241	~6.8m net pay.
27/12/2013	Senex	Growler-13	Oil exploration	Cooper	SA	PPL 242	
30/12/2013	Senex	Acrasia-8	Oil development	Cooper	SA	PPL 203	
4/01/2014	Senex	Mirage-5	Oil appraisal	Cooper	SA	PPL 213	
9/01/2014	Senex	Spitfire-4	Oil appraisal	Cooper	SA	PEL 104	13.8m of net pay.
17/01/2014	Senex	Growler-12	Oil appraisal	Cooper	SA	PRL 15	
13/08/2013	Senex	Paradise Downs-10	Gas appraisal	Surat	QLD	PL 171	Cased and suspended.
13/10/2013	Senex	Kato-3	Gas exploration	Surat	QLD	ATP 593P	Plugged and abandoned.
27/10/2013	Senex	Kato-4	Gas exploration	Surat	QLD	ATP 593P	Plugged and abandoned.
22/11/2013	Senex	Indy-3	Gas exploration	Surat	QLD	ATP 771P	Plugged and abandoned.
9/12/2013	Senex	Indy-4	Gas exploration	Surat	QLD	ATP 771P	Plugged and abandoned.
31/01/2014	Senex	Snatcher-11	Oil appraisal	Cooper	SA	PPL 240	4.5m oil interval.
1/02/2014	Senex	Mirage-6	Oil appraisal	Cooper	SA	PPL 213	11.6m net pay in Murta formation.
21/02/2014	Senex	Vintage Crop-4	Oil appraisal	Cooper	SA	PEL 516	2.5m net pay in McKinlay, 8m net pay in the Murta formation.
27/02/2014	Senex/ Cooper	Worrior-10	Oil appraisal	Cooper	SA	PPL 207	4.5m of net pay in Patchawarra, 4.9m net pay in Murta.
23/03/2014	Senex	Vintage Crop-5	Oil appraisal	Cooper	SA	PEL 104	4.3m net pay in Murta, oil intersections in McKinlay.
23/03/2014	Senex	Spitfire-5	Oil development	Cooper	SA	PEL 104	7.2m of net pay in Birkhead.
24/03/2014	Senex	Spitfire-3	Oil appraisal	Cooper	SA	PEL 104	6.1m net pay in Birkhead.
4/04/2014	Senex	Spitfire-6	Oil development	Cooper	SA	PEL 104	8.9m net pay in Birkhead.
19/04/2014	Senex	Mustang-3	Oil appraisal	Cooper	SA	PPL 243	Plugged and abandoned.
2/05/2014	Senex	Mustang-2	Oil appraisal	Cooper	SA	PPL 243	6.4m net pay in Birkenhead.
26/05/2014	Senex	Tornado-1	Oil exploration	Cooper	SA	PEL 104	
4/08/2014	Senex	Sabre-1	Oil exploration	Cooper	SA	PEL 111	Plugged and abandoned.
4/08/2014	Senex	Warthog-1	Oil exploration	Cooper	SA	PEL 111	In progress.
4/08/2014	Senex	Squire-1	Oil exploration	Cooper	SA	PRL 59	In progress.
21/01/2014	Icon/ Beach	Redland-1	Vertical unconv gas expl	Cooper	QLD	ATP 855	Wells to be fracked and flow tested in 2014 and 2015. All wells encountered gas readings in the Toolalchee, Daralingie, REM and Patchawarra shale and tight gas formations.
9/12/2013	Icon/ Beach	Geoffrey-1	Vertical unconv gas expl	Cooper	QLD	ATP 855	
25/03/2014	Icon/ Beach	Etty-1	Vertical unconv gas expl	Cooper	QLD	ATP 855	

Date	Company	Well	Description	Basin	State	Permit	Results
	PetroFrontier	OzAlpha-1	Vertical unconv gas expl	South Georgina	NT	EP 128	
7/05/2014	PetroFrontier	OzBeta-1	Vertical unconv gas expl	South Georgina	NT	EP 128	
30/05/2014	PetroFrontier	OzGamma-1	Vertical unconv gas expl	South Georgina	NT	EP 128	
22/06/2014	PetroFrontier	OzDelta-1	Vertical unconv gas expl	South Georgina	NT	EP 128	
22/07/2014	PetroFrontier	OzEpsilon-1	Vertical unconv gas expl	South Georgina	NT	EP 128	Plugged and abandoned.
June quarter	WestSide	Various	Gas development	Bowen	QLD	PL94	5 development wells at Meridian Field in Bowen Basin.

Source: Company announcements, Edison Investment Research

Appendix B: Well tracker – looking ahead

Exhibit 19: Planned onshore wells

Company	Well	Permit	Basin	Description	Planned start	Comments
Buru	Commodore-1	EP 471	Canning	Oil exploration	Q314	Targeting 5-30mmbbl oil reservoirs.
Buru	Olympus-1	EP 471	Canning	Oil exploration	Q314	Targeting 5-30mmbbl oil reservoirs.
Buru	Ungani North 1	EP 391	Canning	Oil appraisal	H214	Establish flow potential of Ungani Dolomite at well location.
Buru	Paradise 1	EP 428	Canning	Oil appraisal	H214	Flow testing to verify oil productivity.
Buru	Senagi prospect/ Ungani Trend	EP 458	Canning	Oil exploration	H214	
Buru	Blina target	EP 129	Canning	Oil exploration	H214	
Strike	Le Chiffre 1	PEL 96	Cooper	Vertical unconv gas appr	June quarter 14	Fracking, flow testing.
Strike	Klebb1	PEL 96	Cooper	Vertical unconv gas appr	June quarter 14	Fracking, flow testing.
AWE	Irwin Prospect	EP320	Onshore Perth	Vertical unconv gas appr	Sept quarter 2014	
AWE/Norwest	Arrowsmith-3	EP413	Onshore Perth	Horizontal unconv gas appr	Late '14/early '15	
Central Petroleum	Surprise East	L6	Amadeus	Oil exploration	1/03/2014, rescheduled to June quarter 2014	
Central Petroleum	Gaudi-1	ATP 909	South Georgina	Vertical unconv gas expl	Mid-September 2014	Part of a two-well unconventional gas exploration programme. Wells to be cored and sampled for gas desorption and reservoir properties.
IconEnergy	Geoffrey-1	ATP 855	Cooper	Vertical unconv gas appr	Early September 2014	Hydraulic fracture stimulation of four vertical exploration wells in ATP 855, Nappamerri Trough, Queensland Cooper Basin. Wells will be flow tested to understand decline rates, EUR and production potential. Icon expects the programme to commence in early September 2014 and to last a few months. JV includes Beach Energy (46.9%), Chevron (18%) and Icon (35.1%).
IconEnergy	Redland-1	ATP 855	Cooper	Vertical unconv gas appr		Fracking, flow testing.
IconEnergy	Hervey-1	ATP 855	Cooper	Vertical unconv gas appr		Fracking, flow testing.
IconEnergy	Etty-1	ATP 855	Cooper	Vertical unconv gas appr		Fraccing, flow testing.
Drillsearch	Banyan-1	PEL 103	Cooper	Oil exploration	Mid August 2014	
Drillsearch	Juniper-3	PRL 17	Cooper	Oil appraisal	Sep/Dec qtr 2014	Appraisal of Juniper discovery, 5.6km NE of Juniper 1.
Drillsearch	Flax-1	PRL 14	Cooper	Vertical unconv oil appr	Sep qtr 2014	Fracture stimulation of vertical tight oil well, with targets in Patchawarra Formation.
Drillsearch	Charal-1	ATP 940P	Cooper	Vertical unconv gas appr	Sep qtr 2014	Fracture stimulation and flow testing of vertical wells.
Drillsearch	Anakin-1	ATP 940P	Cooper	Vertical unconv gas appr	Sep qtr 2014	
Drillsearch	Padme-1	ATP 940P	Cooper	Vertical unconv gas appr	Sep qtr 2014	
Drillsearch	Amidala-1	ATP 940P	Cooper	Vertical unconv gas appr	Sep qtr 2014	
Drillsearch	18 wells planned	PEL 91	Cooper	Oil exploration	FY15	
Lakes Oil/Armour	Otway-1	PEP 169	Onshore Otway	Gas exploration	Unknown	Moratorium on onshore drilling in Victoria.
Lakes Oil/Armour	Wombat-3	PRL 2	Onshore Gippsland	Oil appraisal	Unknown	
Lakes Oil/Armour	Wombat-5	PRL 2	Onshore Gippsland	Gas exploration	Unknown	
Empire	Black Arrow-1	EP 432	Onshore Perth	Oil exploration	Late 2014 /early 2015	
Empire	Garabaldi	EP 454	Onshore Perth	Oil exploration	2015 or 2016	
Empire	Gingin	EP 389/Red Gully	Onshore Perth	Oil exploration	2015 or 2016	

Company	Well	Permit	Basin	Description	Planned start	Comments
New Standard/Ambassador	N/A	PEL 570	Cooper	Vertical unconv gas expl	2015 or 2016	New Standard farm-in commitment well.
PetroFrontier	OzAlpha-1	EP 128	South Georgina	Vertical unconv gas appr	Q3-Q414	Fracture stimulation and flow testing of vertical wells.
PetroFrontier	OzBeta-1	EP 128	South Georgina	Vertical unconv gas appr	Q3-Q414	
Senex/Origin	Various	PEL 637, 638, PRL 106	Cooper	Vertical unconv gas expl	2015 and 2016	Up to 15 wells in Senex-Origin Cooper Basin unconventional gas JV.
Senex	Estimated 20 wells	Various	Cooper	Oil exploration	2014 and 2015	Analyst estimate based on prior year drilling and company commentary.
Real Energy	Tamarama-1	ATP 927P	Cooper	Vertical unconv gas expl	Early Sep 2014	One firm well with option to drill up to two more (Flynnes-1 and Avalon-1) pending results of Tamarama-1.
Strike/Senex	Davenport 1	PEL 94	Cooper	Vertical unconv gas appr	August/Sept 2014	Flow testing of coal sections in Patchawarra formation.
Linc Energy	Estimated 3 wells	Various	Arckaringa	Oil exploration	2H14	Three oil exploration wells planned in Arckaringa Basin in 2H14

Source: Company announcements

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