

## RESERVES AND RESOURCE

### AGL Energy

**27 FEB:** AGL Energy announced a small increase in reserves at the Moranbah Gas Project (MGP) over the six months to 31 December 2012. Gross 2P reserves at the field increased by 67 PJ to 1,211 PJ and 3P reserves increased by 140 PJ to 2,662 PJ. The reserve changes incorporated a decrease in reserves at the core MGP due to changes in forecast capital investment, with this decrease offset by an increase in reserves in acreage surrounding the field. AGL owns 50% of the MGP with the Arrow Energy JV of Shell and PetroChina operating the field and owning the remaining interest. Reserves at AGL's New South Wales CSG fields were virtually unchanged in the period. The company's total 2P CSG reserves are 2,170 PJ and 3P reserves are 3,961 PJ.

### Blue Energy

**26 FEB:** Blue Energy announced that it had established its first 2P reserves, located within the Sapphire Block of ATP 814P in the Bowen Basin. The 2P reserve estimate of 50 PJ was accompanied by a 3P reserve increase from 75 PJ to 180 PJ and was independently assessed by Netherland, Sewell and Associates. Blue has been testing the production capacity of the Fort Cooper Coal Measures within the block for the past year with the Sapphire 4 pilot well however gas flow rates have remained low. The Sapphire Block is located immediately to the east of Arrow Energy's Moranbah Gas Project; Arrow has provided Blue with data related to the MGP. The Sapphire Block remains the only field where Blue has established gas reserves; the company owns 100% of ATP 814P.

### Senex Energy

**25 FEB:** Senex Energy announced an increase in reserves at its Surat Basin CSG fields in Queensland. The company operates the Don Juan Field with a 45% interest and owns 30% of ATP 574P and 20% PL 171, with both fields operated and majority owned by QGC. The reserves increase came from ATP 574P and PL 171, where QGC completed an eleven well appraisal program during 2012. Senex's net 2P reserves across all its Surat assets increased by 13% to 157 PJ with 3P reserves increasing by 14% to 358 PJ, 2C contingent resources were also up, by 17% to 241 PJ.

### Santos

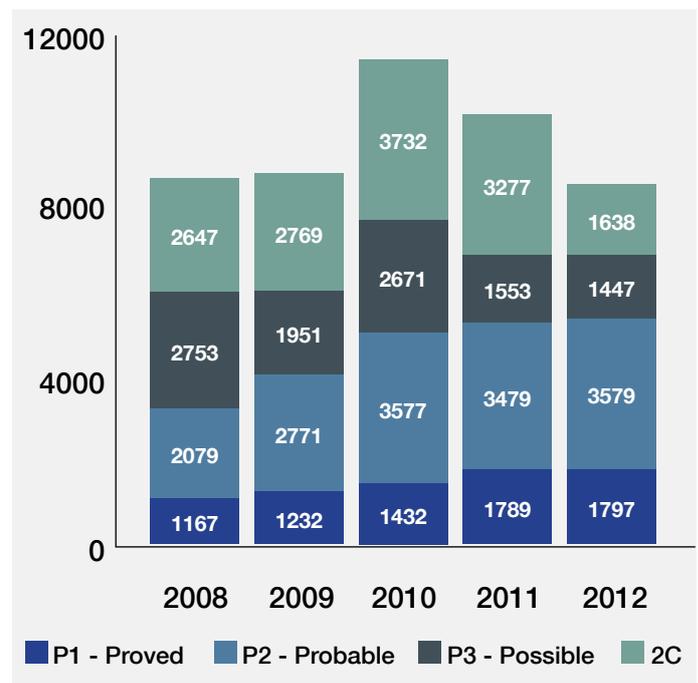
**22 FEB:** Santos reported that it had increased Cooper Basin sales gas reserves during 2012. The company increased its share of 2P reserves by 149 PJ, net of production, to a total of 1,213 PJ. The increased reserves were the result of infill drilling, technical studies and production performance. Santos

is the operator of the SACBJV (Santos 66.6%, Beach Energy 20.2% and Origin Energy 13.2%) and the SWQJV (Santos 60.0%, Beach 23.2% and Origin 16.7%).

Santos also reported that GLNG 2P reserves had increased by 108 PJ to 5,376 PJ at the end of 2012. 1P and 3P reserves were virtually unchanged at 1,797 PJ and 6,823 PJ. During the year Santos focussed on building production rather than reserves, this, and a technical reassessment, were the drivers of the reserves performance. The technical reassessment and a revision of the SPE-PRMS reserve and resource estimation system resulted in a large drop in GLNG 2C resources. They decreased by 50% over the year, down to 1,638 PJ.

Santos advised that the total amount of 2P gas available to GLNG increased during the year to 6,721 PJ. This figure is comprised of GLNG's 2P reserves of 5,376 PJ, a Santos Cooper Basin supply contract of 750 PJ, an Origin supply contract of 365 PJ and Santos' 230 PJ share of the reserves at APLNG's Combabula CSG Field (the company has a 5.91% interest in the field). Santos plans to ramp-up the first GLNG train within three to six months of its first LNG production, scheduled in 2015. The company may then take two to three years to ramp up production from the second train of the project, after first LNG in 2016. The contracts for LNG offtake for the project do not require it to produce at its full planned capacity of 7.8 MTPA until 2019.

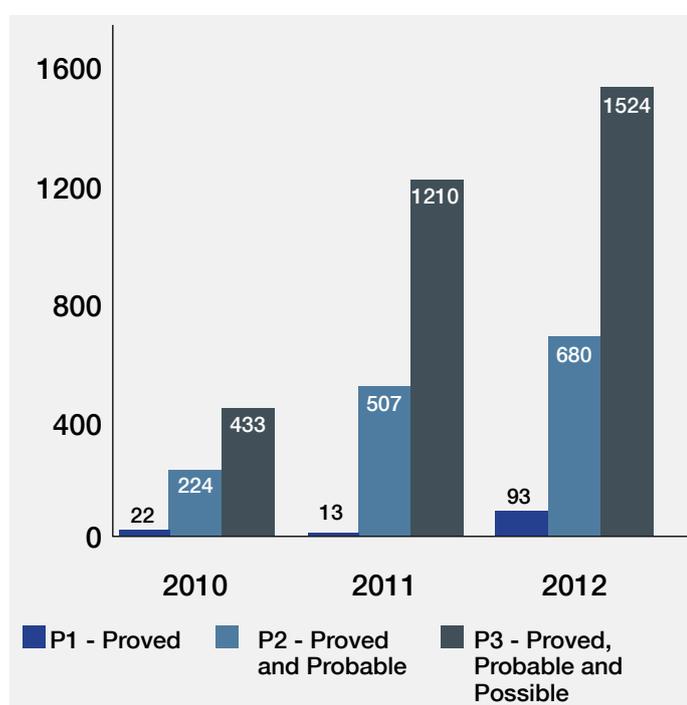
### GLNG Reserves and Resources at end of year in PJ:



## WestSide Corporation

**12 FEB:** WestSide Corporation announced a substantial increase of reserves at its Meridian SeamGas Field in the Bowen Basin. Gross 1P reserves at the field increased from 13 PJ to 93 PJ, 2P reserves increased by 34% to 680 PJ and 3P reserves at the field were up by 314 PJ to 1,524 PJ. The reserves were independently assessed by MHA Petroleum Consultants. The increased reserves at Meridian are the result of WestSide's investment in improving production performance at the field. The company has drilled new production wells as well as working over existing wells. WestSide operates Meridian and holds a 51% stake in the field; its JV partner is Mitsui. The company has achieved consistent reserve increases since it acquired Meridian in 2010.

### Meridian SeamGas gross reserves during WestSide ownership in PJ:



## DEVELOPMENT

### AGL Energy

**12 FEB:** AGL Energy advised that it had received approval from the Federal Government for the development of the first stage of the Gloucester Gas Project. The approval was given under the aegis of the *Environment Protection and Biodiversity Conservation Act 1999* and was delivered with 36 conditions. AGL has already received approval for the Gloucester Project from the New South Wales Planning and Assessment Commission and has lodged production lease and pipeline licence applications with the state. The first stage of the Gloucester field development will include up to 110 production wells, a gas processing plant with a capacity of 30 PJ/year (80 TJ/day), a water treatment plant, an up to 15 MW gas-fired power plant and a 95 km pipeline connection to the Sydney to Newcastle gas pipeline at Hexham. AGL plans to make an FID for the project in the middle of 2014;

this would allow gas production to commence in the fourth quarter of 2016, with the project producing 20 – 30 PJ/year. The company's exploration permit for the project covers all of the relatively small Gloucester Basin; it has established 2P reserves of 669 PJ and 3P reserves of 832 PJ at the field.

Earlier, on the 8th of February, AGL reported that it had suspended its application for approval of the expansion of the Camden Gas Project. The company had been seeking approval from the NSW Department of Planning and Infrastructure for the Sydney Basin development; it has now suspended this process to consider community concern about the project. The company requested that a public hearing by the NSW Planning and Assessment Commission scheduled for the 25th of February also be postponed. Soon after AGL suspended the application process for its Camden expansion the New South Wales government announced a number of policy changes to CSG regulation in the state. This is covered in more detail later in this newsletter.

AGL proposed to expand production at Camden by drilling up to 66 new production wells, including horizontal wells, and sought approval to fracture stimulate wells where required. The company planned to drill the wells from six pads with gas to be processed by the existing Rosalind Park Gas Plant. A number of community groups have mounted campaigns to prevent AGL undertaking the expansion.

## LNG

### APLNG

**21 FEB:** Origin Energy reported that the estimated total cost of developing the APLNG Project had risen 7% to \$24.7b. The main causes of the increase were in the upstream part of the project, and included increased costs related to drilling and gas gathering, water management due to changed government policy and increased costs at other LNG projects in which APLNG has an interest. Contingency allowances for the project were also increased. Origin advised that the first train of the project is on schedule to produce its first LNG in the middle of 2015 and that first LNG for the second train is now expected three months earlier than previously planned, at the end of 2015. Origin and ConocoPhillips each own 37.5% of APLNG, they are currently seeking to reduce their stakes to 30%; Sinopec owns the remaining 25% interest. Origin estimated that at the end of 2012 the upstream part of the project was 29% complete and the downstream part was 31% complete.

### BG Group

**5 FEB:** BG Group reported that construction of the QCLNG project was on schedule and that it expected to complete the project on time and on budget. The company plans to introduce the first gas into the Curtis Island liquefaction plant at the end of 2013 to allow commissioning to commence, and LNG sales to start in the second half of 2014. BG's QGC subsidiary drilled 148 wells in the final quarter of 2012 as part of the QCLNG project, including a record 55 wells in December. A total of 1,160 wells have now been drilled for QCLNG with a further 600 to be drilled this year. QGC added

another drilling rig to its fleet in December taking it to 11 rigs. BG also reported that two new field compressor stations were operating, six were under construction and the Ruby central gas processing plant was 25% complete and on schedule for completion in the fourth quarter of this year.

BG also reported progress with QCLNG pipelines. Welding of the project's gas collection header has been completed and 75% of the pipeline is in the ground. The export pipeline linking the gas collection header to the Narrows at Gladstone Harbour is 74% welded with 45% in the ground. By the 25th of February the pipeline crossing the Narrows had been pulled into place, along with the APLNG pipeline with which it is co-located in a single trench, with the trench now to be filled.

On Curtis Island 24 of the total 80 LNG plant modules have been delivered from Thailand with another 25 in transit. Construction of the two LNG tanks is continuing with the roof of the first tank raised in early February.

BG reported that cost pressures on the QCLNG development have eased since it revised the project's budget upwards to US\$20.4b (\$19.9b) in May 2012 and that it expected to meet that budget. The company's CEO Chris Finlayson said that the slowdown in activity in the Australian mining industry has significantly reduced cost pressures on the project. At the end of 2012 more than 50% of the project work by value had been completed and 94% of the budget was covered by contracts and agreements.

## EXPLORATION AND APPRAISAL

### Metgasco

**22 FEB:** Metgasco advised that it had completed drilling the Bowerbird-4 core well in the Clarence-Moreton Basin. The well was drilled in wholly-owned PEL 13 and reached a total depth of 495 m. Metgasco took some 34 core samples from the Walloon Coal Measures intersected by the well. The company has now completed the second of two exploration wells in its current campaign; it also plans to drill three lateral/pilot wells in the Clarence-Moreton this year.

### Comet Ridge

**15 FEB:** Comet Ridge announced that the first of four step-out wells at the Mahalo Project in the Bowen Basin had been completed. Field operator Santos drilled Scrubber Gully-2 to a total depth of 523 m with 7.2 m of net coal intersected. The aim of the exploration campaign is to build reserves at Mahalo. Comet Ridge has a 35% interest in the field; Santos and Origin Energy each have a 30% stake and Stanwell Corporation holds the remaining 5%.

### Dart Energy

**5 FEB:** Dart Energy reported that it would acquire an exploration licence in the New South Wales section of the Clarence-Moreton Basin from Arrow Energy; paying its former parent company a modest cash fee. Arrow has drilled 15 wells within PEL 445, with results showing the presence of

significant gas resources. The tenement is located immediately to the north of Metgasco's PELs 13 and 16, where it has established 428 PJ of 2P gas reserves and 2,542 PJ of 3P reserves. Dart's purchase of PEL 445 is conditional on approval by the NSW government.

## GAS PRICES

### AGL Energy

**27 FEB:** AGL Energy MD Michael Fraser said that gas producers supplying the company under long-term contracts were trying to increase gas prices. He said his company was spending millions of dollars within formal arbitration processes to try and counter these efforts. Large gas supply contracts that AGL has with the SACBJV and BHP Billiton/Esso will expire at the end of 2016 and 2017 respectively. The company will need to secure new gas supplies in an environment of higher Eastern Australian gas prices.

### NSW tightens the noose on CSG

On the 19th of February the New South Wales Government unveiled a number of new policies designed to toughen regulation of the state's CSG industry. The announcement was made by Premier Barry O'Farrell and Deputy Premier Andrew Stoner; they advertised the changes as strengthening what was already the toughest CSG regulatory regime in Australia.

The policy changes announced included:

- Exclusion of all CSG activity within two kilometres of residential zones, as well as land allocated for future residential use;
- The NSW EPA is to become the lead agency for regulation and compliance of the health and environmental impacts of CSG within the state;
- Establishment in the Department of Trade and Investment of an Office of CSG Regulation for enforcement of other CSG regulation;
- Exclusion zones preventing all CSG activity around what the government has termed Critical Industry Clusters, wine making and horse breeding activities; and,
- The requirement that all CSG tenements and licences must have an Environment Protection Licence.

Additionally, the NSW Chief Scientist and Engineer will review all CSG activities in the state, with the aim of identifying any lapses in risk management relating to health, environment and water. The new exclusion zones announced by the government will apply to all CSG activities not yet authorised under the state's petroleum legislation. Existing activities that have been authorised will be unaffected.

The new CSG regulations came as something of a surprise as the government had touted its Strategic Regional Land Use Policy, announced in September last year, as a solution to land use conflicts between CSG and mining and agriculture. That policy introduced an additional gateway approval process for CSG and mining activities on or within two kilometres of land identified by the government as strategic agricultural land, before projects are then subject to the normal development

assessment process. The gateway assessment is to be administered by independent experts who will also consider the advice of the Federal Government's Independent Expert Scientific Committee on CSG and Coal Mining. The policy also identified land used for wine making and horse breeding as strategic agricultural land.

The government's new, more restrictive CSG specific policies will apply to all projects in the state that have yet to receive development approval. AGL Energy will be one of the companies most affected, with residential and critical industry areas within its three NSW fields. The company suspended its development application for expansion of the Camden Gas Project due to community opposition earlier this month; under the new policies much of that project is likely to be within exclusion zones preventing all CSG activity. AGL advised that the 142 PJ of 2P reserves it has established at its Hunter Gas Project would also be unable to be developed under the new policy. The first stage of the company's Gloucester Project has just been approved and would therefore be unaffected but any expansion would be subject to the new restrictions.

Santos has yet to seek approval for the development of its Narrabri CSG Project. As the field is centred in the Pillaga State Forest the new rules should not stop development of the field. Metgasco is likely to experience difficulties developing its Clarence-Moreton Basin acreage as there are a number of towns within the area.

The CSG companies are seeking to meet with the NSW government for further clarification on the new policies. Metgasco reported that it had been told the changes are subject to a month long consultation process before they are finalised. Even if there are changes to the policies to make them less restrictive for CSG activities it is looking less and less likely that NSW will see many large-scale developments of its CSG resources.

## CORPORATE ACTIVITY

### Beach Energy

**25 FEB:** Beach Energy announced that Chevron would farm-in to its two Nappamerri Trough tenements in an up to US\$349m (\$340.9m) two-stage agreement. The oil major will have the right to earn up to 60% of Beach's 100% interest in PEL 218 in the South Australian section of the Nappamerri and 60% of its 60% interest in ATP 855P immediately to the east in the Queensland section of the trough. PEL 218 has a total area of some 1,600 km<sup>2</sup> or 395,000 acres while ATP 855P is slightly larger at 1,670 km<sup>2</sup> or 414,000 acres. Chevron's farm-in will fund an exploration program followed by pilot production work.

If Chevron elects to proceed with both stages of the farm-in, for both of the tenements, it will pay Beach a total of US\$172m as well as carrying Beach for US\$142m of exploration and appraisal in PEL 218. If, after the two stages of the farm-in are completed, Chevron commits to further development of PEL 218 the company will pay Beach a further US\$35m bonus and the Australian company will allow Chevron to become operator of both tenements, if it

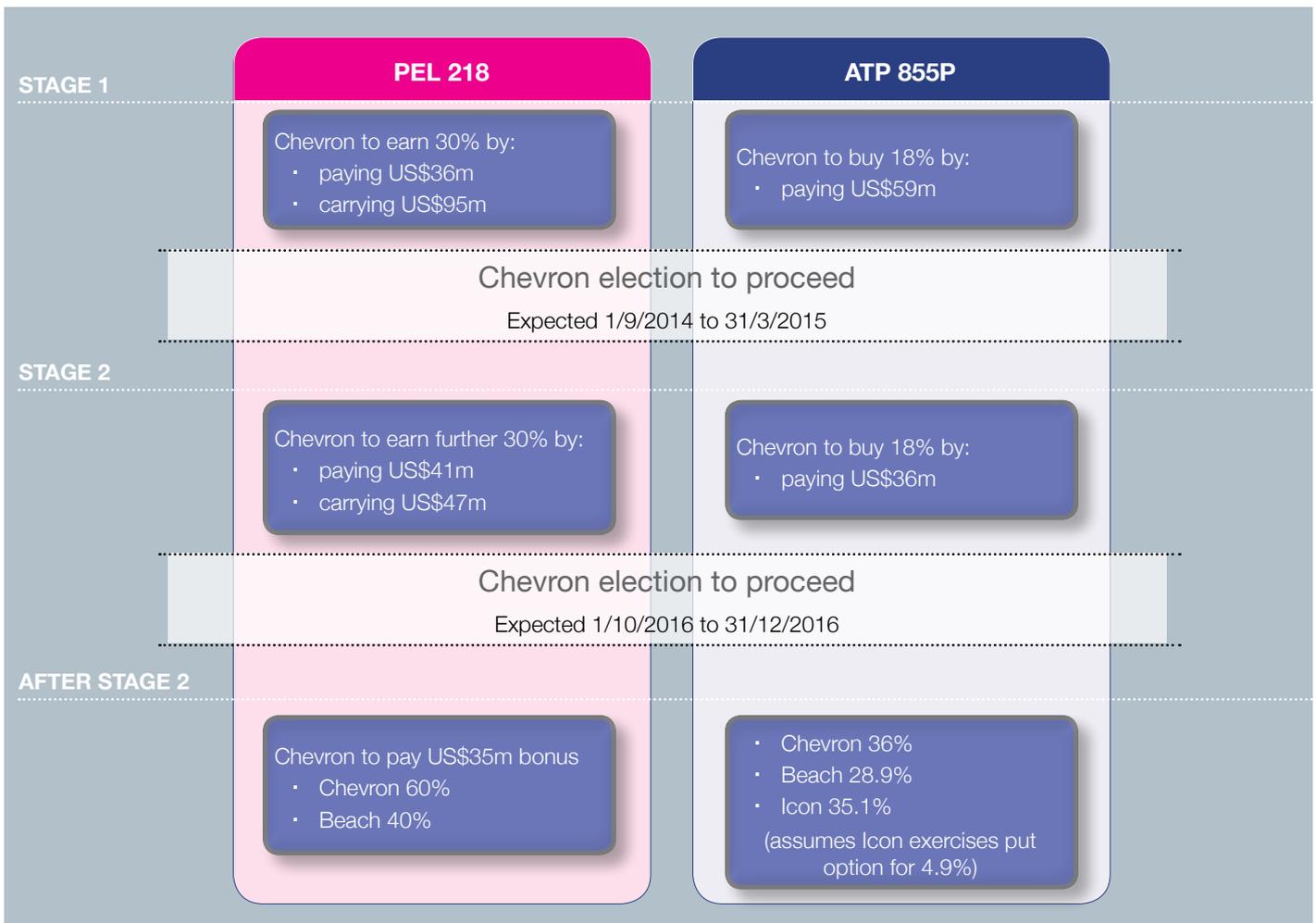
so chooses. If Chevron does not proceed with the farm-in after the first stage its ownership stake will revert to Beach at no cost; if it chooses not to proceed after the second stage Beach may choose to receive a re-assignment of Chevron's interest.

Icon Energy, Beach's JV partner in ATP 855P with a 40% stake in the tenement, has agreed to waive all its pre-emptive rights at each stage of the Chevron farm-in agreement. As an adjunct to the farm-in, Beach has granted Icon a put option to sell it 4.9% of the Queensland tenement for US\$18m, exercisable until the middle of this year.

The Stage 1 exploration and appraisal program for PEL 218 under the farm-in agreement has already commenced, and covers wells drilled after Beach's initial two wells in the tenement, Encounter-1 and Holdfast-1. Beach's exploration of the Nappamerri Trough to date has established the prospectivity of the Roseneath-Epsilon-Murteree Shale Formations as well as a basin-centred gas accumulation in the sands of the Patchawarra Formation. The company established a 1.3 tcf 2C contingent resource in PEL 218 following the drilling and testing of Encounter-1 and Holdfast-1 and has recorded initial gas flows above 2 MMscfd from four wells after fracture stimulation, including one well in ATP 855P. Beach has drilled six wells to date in PEL 218 and is currently drilling its first horizontal well in the tenement. In ATP 855P Beach has drilled one well, currently being flow-tested after it was fraced in January.

Chevron's farm-in to the Nappamerri Trough shows continuing interest in early stage Australian shale gas plays by international majors. It follows farm-ins by Total and Statoil last year and by ConocoPhillips in 2011. The deal between Beach and Chevron is subject to FIRB and South Australian and Queensland government approvals.

# Chevron Nappamerri Trough Farm-in



## Cooper Energy

**25 FEB:** Cooper Energy announced that John Conde had succeeded Laurie Shervington as Chairman of the company, effective immediately. Among other roles Mr Conde is a former Chairman of Whitehaven Coal and non-executive director of BHP Billiton and the current Chairman of BUPA Australia and Deputy Chairman of Whitehaven Coal. Mr Shervington served as Chairman of Cooper for more than eight years and will remain on the company's Board as a non-executive director until he retires later this year.

## ConocoPhillips

**20 FEB:** ConocoPhillips announced that it had sold a 29% interest in the Goldwyer Shale Project in the Canning Basin to PetroChina. The Chinese company will also acquire a 20% interest in the Poseidon field in the Browse Basin from ConocoPhillips and the two companies will jointly study the unconventional potential of the Sichuan Basin in China. ConocoPhillips is earning a 75% interest in the Goldwyer Project from New Standard Energy by funding US\$110m of exploration and appraisal in a four stage farm-in of 45,000 km<sup>2</sup> (11m acre) play. New Standard reported that PetroChina's investment values the project at a total of US\$100m (\$97.7m).

## PIPELINES

### Northern Territory

**13 FEB:** The Northern Territory Chief Minister Terry Mills announced that government owned Power and Water Corporation would supply Rio Tinto's Nhulunbuy alumina refinery with gas for ten years from 2016. The deal ensures that Rio will not close the refinery as threatened and will instead convert it to run on gas rather than heavy fuel oil. The gas will be supplied from Eni's Blacktip field in the offshore Bonaparte Basin with a new 600 km gas pipeline to be constructed from near Katherine to Nhulunbuy. The new pipeline will link to the Amadeus Gas Pipeline and will pass through the McArthur Basin including tenements held by Santos and Empire Energy. The companies consider the acreage prospective for shale gas and oil in the Velkerri Formation and the Barney Creek Shales.

The deal to supply gas to Nhulunbuy will require an estimated infrastructure investment of some \$1.2b. This includes \$500m for upgrading existing infrastructure, the estimated \$200m cost of converting the refinery and \$500m to construct the new pipeline. Rio Tinto is to request financing support for the pipeline from the Federal government.

## EXPLORATION AND APPRAISAL

### Beach Energy

**28 FEB:** Beach Energy advised that the Halifax-1 well in ATP 855P in the Queensland Nappamerri Trough was flowing back gas at a rate of 3.2 MMscfd, following fracture stimulation of the well. The well is being constrained with a 40/64" choke with Beach planning to open the choke on the well further as the ratio of stimulation fluid to gas declines. The company first brought the well on line on the 11th of February, two days later it was flowing 2.2 MMscfd on a 24/64" choke. Halifax-1 was drilled to a total depth of 4,267 m before being fraced across 14 stages in the Patchawarra, REM shale, Daralingie and Toolachee Formations. The well was drilled as part of Beach's farm-in to earn a 60% stake in ATP 855P from Icon Energy. The farm-in has now been completed and Beach has announced a farm-in by Chevron to its interest in the tenement.

### Key Petroleum

**25 FEB:** Key Petroleum announced that it had completed drilling the Cyrene-1 well in the Canning Basin, with the well reaching a total depth of 1,070 m. The primary target of Cyrene-1 was conventional oil within the Willara Formation but it also drilled through a 137 m interval of the Goldwyer Formation, with core samples taken. No oil was recovered from the Willara however oil and gas shows were observed when drilling through the Goldwyer. Key interpreted the oil shows and chromatograph readings to show that the Goldwyer was in the oil generating window at Cyrene-1. The well was drilled in EP 438 where Buru Energy and Mitsubishi each hold 37.5% stakes, Key holds 20% and Indigo Oil has a 5% interest.

### Santos

**22 FEB:** Santos reported that the Gaschnitz-1 well drilled in the Nappamerri Trough had confirmed the presence of a basin-centred gas accumulation (BCGA). The entire Permian section of more than 1,000 m was gas bearing in the well and the company is now planning to fracture stimulate and flow test it as well as drill two follow up wells. Santos drilled the Gaschnitz-1 at the western end of the Nappamerri Trough in PPL 101, part of the SACBJV acreage. Further to the east in the Nappamerri Beach Energy has also confirmed the presence of a BCGA play.

Santos also advised that production from Australia's first commercially producing shale gas well is continuing. At the end of January Moomba-191 was producing at 2.3 Mmscfd with Santos planning to drill a horizontal well targeting the REM shales in the middle of this year. The company also

booked the first Australian shale gas 2P reserves after the success of the well.

### Senex Energy

**21 FEB:** Senex Energy advised that it had completed drilling the Paning-2 well in the Patchawarra Trough in the northern Cooper Basin. Paning-2 was drilled to a total depth of 3,144 m and intersected 47 m of gas bearing tight sands in the Lower Poolawanna, Epsilon and Patchawarra Formations and 70 m of deep coal seams in the Toolachee, Epsilon and Patchawarra Formations. The company was pleased with the results of the well and plans further testing of the unconventional potential of its northern Cooper acreage, previously it has been focussed its acreage in the southern part of the basin. Paning-2 was drilled in Senex's wholly-owned PEL 90 with the well to be fracture stimulated and flow tested in a five well program started by the company earlier in February.

The main target of the fracing program is the tight gas sands of the Patchawarra Formation with the REM shales and deep coals in the Toolachee and Patchawarra Formation also to be tested. Senex aims to gather further information on the fracturing properties of the formations from the program and also expects to establish material contingent resources. Four of the wells to be fraced are in the southern Cooper including the first, Skipton-1, with one Murteree shale zone and seven Patchawarra zones to be fraced in the well.

### Cooper Energy

**19 FEB:** Cooper Energy advised that JV partner Beach Energy had spudded the Sawpit-2 exploration well in PEL 495 in the South Australia Otway Basin. As well as testing an oil target in the Crayfish group the well will investigate the unconventional potential of the Otway, with core to be taken from the Sawpit and Casterton Formations. Beach is funding 70% of the cost of the well as part of a farm-in to earn a 35% interest in PEL 495.

### Norwest Energy

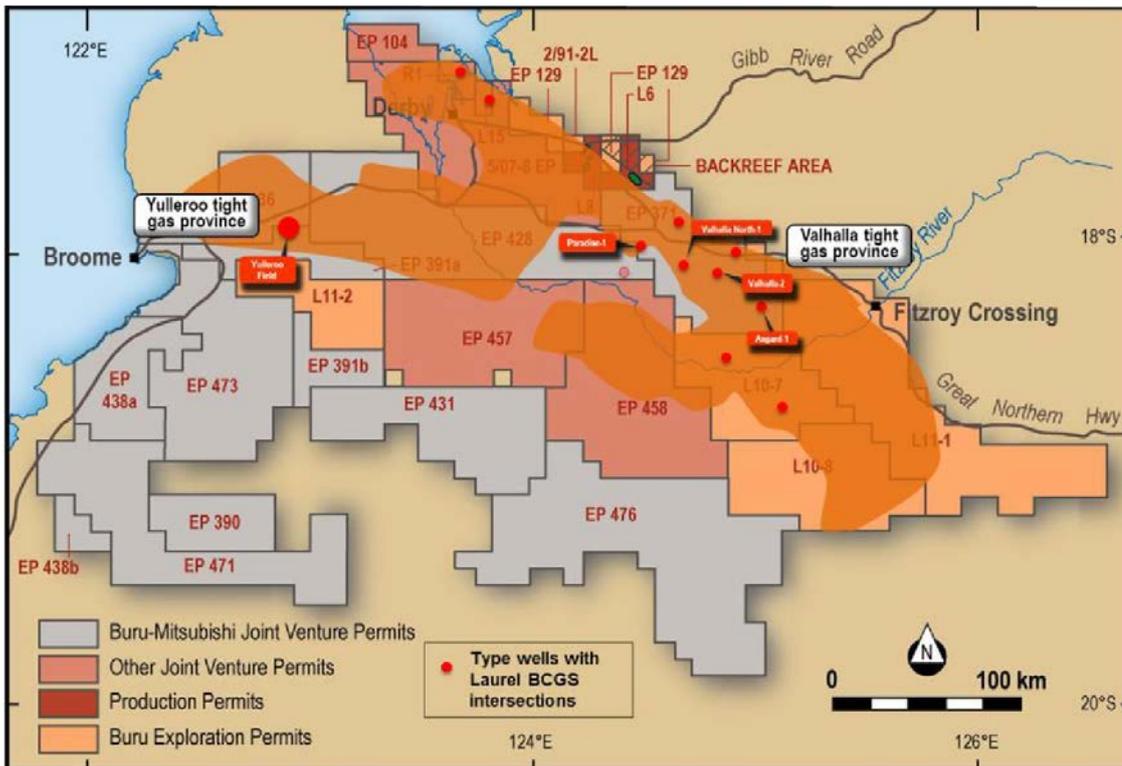
**19 FEB:** Norwest Energy reported that the Carynginia Formation in the Arrowsmith-2 well had flowed gas at a rate of up to 0.35 MMscf/day during flow testing. The company started flowing back from the formation on the 15th of February and advised that a significant amount of fracc fluid remains in it. Norwest is conducting an extended testing program on four intervals that were fracture stimulated in Arrowsmith-2 last year; having finished testing the Kockatea Shale the company expects to take four months to complete testing on the Carynginia, the Irwin River Coal Measures and the High Cliff Sandstone. Norwest (28%) operates EP 413 on behalf of AWE (44%) and Bharat PetroResources (28%).

## Buru Energy

**8 FEB:** Buru Energy reported the results of an independent assessment of the prospective resources within the Laurel Formation in its Canning Basin tenements. The assessment was undertaken by RISC, who concluded that the Laurel Formation in the area appears to be a basin centred gas accumulation (BCGA), extending beyond the Yulleroo and Valhalla gas fields discovered by Buru. RISC calculated that the total area of the Laurel BCGA is 17,373 km<sup>2</sup>

(4.3million acres), covering tenements wholly-owned by Buru as well as in JVs with Mitsubishi and others. The consultants estimated the P50 recoverable prospective resources net to Buru from overpressured reservoirs within the accumulation at 47 tcf of gas and 1.1 billion barrels of condensate. RISC also concurred with Buru's belief that the Laurel Formation hosts a combination of conventional reservoirs that will produce unaided and unconventional reservoirs requiring fracture stimulation before production. The data used by RISC to complete the study included results from 22 wells, 5 of which were drilled by Buru.

### Interpreted extent of the Laurel Formation BCGA (in orange):



Source: Buru Energy 8/2/2013

## New Standard Energy

8 Feb: New Standard Energy advised that it had cancelled its current drilling contract with Century Energy Services due to safety and performance concerns. The cancellation comes midway through a three well exploration program targeting the Goldwyer shales in the Canning Basin; the second well of the program, Gibb Maitland-1, is currently suspended after failed attempts to free a stuck drill pipe and bottom hole assembly. New Standard and JV partner ConocoPhillips intend to resume drilling at Gibb Maitland once a new drilling rig has been contracted.

## AWE

**6 FEB:** AWE reported that it had started a feasibility study for the development of the Senecio tight gas field in the northern Perth Basin. This follows flow testing of the Senecio-2 well last year when it flowed gas at a stabilised rate of 1.35 MMscfd after fracture stimulation of a 5 m interval of the Dongara/Wagina sandstone reservoir. AWE believes that development of the field using horizontal, fracture stimulated wells could be viable and is also investigating the possibility of using gas

production infrastructure at the neighbouring Dongara and Yxris fields as part of a field development.

AWE recently completed the acquisition of 291 km<sup>2</sup> of 3D seismic in the Perth Basin, including over the Senecio Field, which is currently being processed and will inform the field's development study. The company has booked a 2C contingent resource of 4.4 MMboe for its 50% share of Senecio, equivalent to a gross resource of 50 bcf of wet gas, and believes previous 2D seismic shows the field may contain a recoverable resource of more than 100 bcf. The flow test of Senecio-2 conducted during 2012 lasted more than 40-hours and produced a total of 4.65 MMscf of gas and 65 bbls of crude oil/condensate.

The company believes other tight gas discoveries in the north Perth Basin could also be commercialised, including Corybas in the same tenement as Senecio and the High Cliff sandstones, fraced and flow tested in the Arrowsmith-2 well in 2012. Arrowsmith operator Norwest Energy recently restarted testing operations at the well, including further testing of the High Cliff interval.

## Armour Energy

**5 FEB:** Armour Energy reported that it planned to commence an exploration drilling campaign in northern Queensland and the Northern Territory in late April this year. The company will start the campaign with one horizontal and two vertical wells in ATP 1087P in the south Nicholson Basin in Queensland. The wells will target shales within the Lawn Hill Formation with the horizontal well to be fracture stimulated in July before being flow tested. Four wells drilled by Comalco within the tenement in 1991 intersected 125 m thick sections of the Lawn Hill Formation with continuous gas shows. Armour estimates the formation contains a prospective recoverable gas resource of 22 tcf.

Armour also plans to drill three vertical exploration wells with both conventional and unconventional targets in the Batten Trough in the McArthur Basin in NT during 2013. The company's exploration campaign in the Batten Trough last year included a conventional gas discovery in the Coxco Dolomite Formation and a gas flow of 3.3 Mscf/day from the Coxco Dolomite and the Barney Creek Shale. That campaign was cut short over budget as a result of drilling and contract difficulties. Armour has structured its drilling contract for 2013 in a different manner to attempt to avoid a recurrence of these difficulties.

# EASTERN AUSTRALIA CSG:

Reserves at 31 December 2011, production June Quarter 12 Averages

| Field                                                                | Ownership                                   | State | Basin            | Reserves (PJ) |              |               | Production Tenure<br>(TJ/day)            |
|----------------------------------------------------------------------|---------------------------------------------|-------|------------------|---------------|--------------|---------------|------------------------------------------|
|                                                                      |                                             |       |                  | 1P            | 2P           | 3P            |                                          |
| <b>AGL ENERGY</b>                                                    |                                             |       |                  |               |              |               |                                          |
| Camden Gas Project                                                   | AGL Energy* 100%                            | NSW   | Sydney           | 53            | 142          | 189           | 16 PPLs 1, 2, 4, 5;<br>PELs 2, 4, 5, 267 |
| Gloucester Basin Project                                             | AGL Energy* 100%                            | NSW   | Gloucester       | 15            | 669          | 832           | PEL 285                                  |
| Hunter Gas Project                                                   | AGL Energy* 100%                            | NSW   | Sydney           |               | 142          | 271           | PELs 4,267                               |
| <b>Total for AGL Energy including projects operated by others</b>    |                                             |       |                  | <b>236</b>    | <b>2,970</b> | <b>3,961</b>  | <b>32</b>                                |
| <b>ARROW ENERGY</b>                                                  |                                             |       |                  |               |              |               |                                          |
| 100% ownership of Arrow Energy LNG project                           |                                             |       |                  |               |              |               |                                          |
| <b>Total for Arrow Energy</b>                                        |                                             |       |                  | <b>617</b>    | <b>5,902</b> | <b>11,226</b> | <b>79</b>                                |
| <b>BG GROUP</b>                                                      |                                             |       |                  |               |              |               |                                          |
| 94% ownership of QCLNG project operator                              |                                             |       |                  |               |              |               |                                          |
| <b>Total for BG Group including projects operated by others</b>      |                                             |       |                  | <b>2,070</b>  | <b>7,600</b> |               | <b>150</b>                               |
| <b>BLUE ENERGY</b>                                                   |                                             |       |                  |               |              |               |                                          |
| Sapphire Field                                                       | Blue Energy* 100%                           | Qld   | Bowen            |               |              | 75            | ATP 814P                                 |
| <b>Total for Blue Energy</b>                                         |                                             |       |                  |               |              | <b>75</b>     |                                          |
| <b>METGASCO</b>                                                      |                                             |       |                  |               |              |               |                                          |
| Casino Gas Project                                                   | Metgasco 100%                               | NSW   | Clarence-Moreton | 3             | 428          | 2,542         | PEL 13, 16                               |
| <b>Total for Metgasco</b>                                            |                                             |       |                  | <b>3</b>      | <b>428</b>   | <b>2,542</b>  |                                          |
| <b>MOLOPO</b>                                                        |                                             |       |                  |               |              |               |                                          |
| Mungi/Harcourt                                                       | Molopo*72% Mitsui 28%                       | QLD   | Bowen            | 33            | 419          | 995           | 3 PL 94, ATP 56 4P                       |
| Lilyvale                                                             |                                             |       |                  |               |              |               |                                          |
| Timmy                                                                | Molopo*62.9% Mitsui 37.1%                   | QLD   | Bowen            | 0             | 67           | 175           | ATP 602P                                 |
| <b>Total for Molopo</b>                                              |                                             |       |                  | <b>24</b>     | <b>343</b>   | <b>824</b>    | <b>3</b>                                 |
| <b>ORIGIN ENERGY</b>                                                 |                                             |       |                  |               |              |               |                                          |
| 37.5% ownership of APLNG and project upstream operator               |                                             |       |                  |               |              |               |                                          |
| Ironbark Project                                                     | Origin 100%                                 |       |                  |               | 178          | 889           | ATP 788P                                 |
| <b>Total for Origin Energy including projects operated by others</b> |                                             |       |                  | <b>649</b>    | <b>5,089</b> | <b>6,886</b>  | <b>128</b>                               |
| <b>SANTOS</b>                                                        |                                             |       |                  |               |              |               |                                          |
| 30% ownership of GLNG and project operator                           |                                             |       |                  |               |              |               |                                          |
| Narrabri CSG Project                                                 | Santos* 80% TRUenergy 20%                   | NSW   | Gunnedah         | 115           | 1,520        | 2,797         | PEL 238                                  |
| <b>Total for Santos including projects operated by others</b>        |                                             |       |                  | <b>631</b>    | <b>2,829</b> | <b>4,285</b>  | <b>125</b>                               |
| <b>RED SKY ENERGY</b>                                                |                                             |       |                  |               |              |               |                                          |
| Clarence-Moreton                                                     | Red Sky *30% Clarence-Moreton Resources 70% | NSW   | Clarence-Moreton |               |              | 179           | PEL 457                                  |
| <b>Total for Red Sky Energy</b>                                      |                                             |       |                  |               |              | <b>54</b>     |                                          |
| <b>SENEX ENERGY</b>                                                  |                                             |       |                  |               |              |               |                                          |
| Don Juan CSG Project                                                 | Senex Energy* 45%, Arrow Energy 55%         | Qld   | Surat            |               | 101          | 197           | ATP 771P                                 |
| <b>Total for Senex Energy including projects operated by others</b>  |                                             |       |                  | <b>0</b>      | <b>157</b>   | <b>358</b>    |                                          |
| <b>WESTSIDE CORPORATION</b>                                          |                                             |       |                  |               |              |               |                                          |
| Meridan                                                              | Westside* 51% Mitsui 49%                    | QLD   | Bowen            | 93            | 680          | 1,524         | 8 PL 94, Coal Mining Leases              |
| Paranui                                                              | Westside* 25.5% Mitsui 24.5% BG 50%         | QLD   | Bowen            |               |              | 270           | ATP 769 W                                |
| Tibrook                                                              | Westside* 25.5% Mitsui 24.5% BG 50%         | QLD   | Bowen            |               |              | 152           | ATP 688P W                               |
| <b>Total for Westside</b>                                            |                                             |       |                  | <b>47</b>     | <b>347</b>   | <b>885</b>    | <b>4</b>                                 |

# QUEENSLAND CSG-TO-LNG PROJECTS:

| APLNG (AUSTRALIA PACIFIC LNG PROJECT)   |                                                                                     |       |       |                    |                                                                                                                                                                                                                                                       |       |                     |
|-----------------------------------------|-------------------------------------------------------------------------------------|-------|-------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------|
| <b>Ownership:</b>                       | Origin Energy 37.5% / ConocoPhillips 37.5% / Sinopec 25%                            |       |       | <b>Site:</b>       | Laird Point, Curtis Island                                                                                                                                                                                                                            |       |                     |
| <b>Operatorship:</b>                    | Upstream and pipelines: Origin / LNG: ConocoPhillips                                |       |       | <b>Customers:</b>  | Sinopec 7.6 MTPA for 20 years, Kansai 1.0 MTPA for 20 years                                                                                                                                                                                           |       |                     |
| <b>Status:</b>                          | FID Train 1: July 2011                                                              |       |       | <b>Reserves:</b>   | 2P: 13,073 PJ 3P: 15,993                                                                                                                                                                                                                              |       |                     |
|                                         | FID Train 2: July 2012                                                              |       |       |                    | PJ 2C: 3,825 PJ 3C: 9,829 PJ                                                                                                                                                                                                                          |       |                     |
| <b>Size:</b>                            | 2 x 4.5 MTPA LNG trains (four-train 18 MTPA ultimate potential)                     |       |       | <b>Production:</b> | 301 TJ/day (110 PJ/year)                                                                                                                                                                                                                              |       |                     |
| Major Fields                            | Ownership                                                                           | State | Basin | Reserves (PJ)      |                                                                                                                                                                                                                                                       |       | Production (TJ/day) |
|                                         |                                                                                     |       |       | 1P                 | 2P                                                                                                                                                                                                                                                    | 3P    |                     |
| Spring Gully                            | APLNG* 96.6% Santos 3.4%                                                            | Qld   | Bowen |                    |                                                                                                                                                                                                                                                       |       | 113                 |
| Peat                                    | APLNG* 100%                                                                         | Qld   | Bowen |                    |                                                                                                                                                                                                                                                       |       | 6                   |
| Talinga/Orana                           | APLNG* 100%                                                                         | Qld   | Surat |                    |                                                                                                                                                                                                                                                       |       | 94                  |
| ARROW ENERGY (ARROW ENERGY LNG PROJECT) |                                                                                     |       |       |                    |                                                                                                                                                                                                                                                       |       |                     |
| <b>Ownership:</b>                       | Shell 50% / PetroChina 50%                                                          |       |       | <b>Site:</b>       | Boatshed Point, Curtis Island                                                                                                                                                                                                                         |       |                     |
| <b>Operatorship:</b>                    | Arrow Energy                                                                        |       |       | <b>Customers:</b>  | None announced                                                                                                                                                                                                                                        |       |                     |
| <b>Status:</b>                          | EIS currently being undertaken                                                      |       |       | <b>Reserves:</b>   | 1P: 617 PJ 2P: 5,902 PJ 3P: 11,226 PJ                                                                                                                                                                                                                 |       |                     |
| <b>Size:</b>                            | 2 x 4 MTPA LNG trains (four-train 16 MTPA ultimate potential)                       |       |       | <b>Production:</b> | 79 TJ/day (28.8 PJ/year)                                                                                                                                                                                                                              |       |                     |
| Major Fields                            | Ownership                                                                           | State | Basin | Reserves (PJ)      |                                                                                                                                                                                                                                                       |       | Production (TJ/day) |
|                                         |                                                                                     |       |       | 1P                 | 2P                                                                                                                                                                                                                                                    | 3P    |                     |
| Moranbah Gas Project                    | Arrow Energy* 50% AGL Energy 50%                                                    | Qld   | Bowen | 336                | 2,288                                                                                                                                                                                                                                                 | 5,104 | 49                  |
| Blackwater                              | Arrow Energy* 100%                                                                  | Qld   | Bowen |                    | 148                                                                                                                                                                                                                                                   | 1,609 |                     |
| Comet                                   | Arrow Energy* 100%                                                                  | Qld   | Bowen |                    | 0                                                                                                                                                                                                                                                     | 871   |                     |
| Norwich Park                            | Arrow Energy* 100%                                                                  | Qld   | Bowen |                    | 35                                                                                                                                                                                                                                                    | 163   |                     |
| Surat Basin Fields                      | Arrow Energy* 50%-100%                                                              | Qld   | Surat | 472                | 4,648                                                                                                                                                                                                                                                 | 6,375 |                     |
| Tipton West JV                          | Arrow Energy* 100%                                                                  | Qld   | Surat |                    |                                                                                                                                                                                                                                                       |       | 29                  |
| Kogan North                             | Arrow Energy* CS Energy 50%                                                         | Qld   | Surat |                    |                                                                                                                                                                                                                                                       |       | 11                  |
| Daandine                                | Arrow Energy* 100%                                                                  | Qld   | Surat |                    |                                                                                                                                                                                                                                                       |       | 20                  |
| GLNG (GLADSTONE LNG PROJECT)            |                                                                                     |       |       |                    |                                                                                                                                                                                                                                                       |       |                     |
| <b>Ownership:</b>                       | Santos 30% / PETRONAS 27.5% / Total 27.5% / KOGAS 15%                               |       |       | <b>Site:</b>       | Hamilton Point West, Curtis Island                                                                                                                                                                                                                    |       |                     |
| <b>Operatorship:</b>                    | Santos                                                                              |       |       | <b>Customers:</b>  | PETRONAS and KOGAS both to take 3.5 MTPA for 20 years                                                                                                                                                                                                 |       |                     |
| <b>Status:</b>                          | FID taken January 2011, first LNG 2015                                              |       |       | <b>Reserves:</b>   | 1P: 1,797 PJ 2P: 5,376 PJ 2C: 1,638 PJ                                                                                                                                                                                                                |       |                     |
| <b>Size:</b>                            | 2 x 3.9 MTPA LNG trains (three-train 10 MTPA ultimate potential)                    |       |       | <b>Production:</b> | 125 TJ/day (45.6 PJ/year)                                                                                                                                                                                                                             |       |                     |
| Major Fields                            | Ownership                                                                           | State | Basin | Reserves (PJ)      |                                                                                                                                                                                                                                                       |       | Production (TJ/day) |
|                                         |                                                                                     |       |       | 1P                 | 2P                                                                                                                                                                                                                                                    | 3P    |                     |
| Fairview                                | GLNG* 76.07% APLNG 23.93%                                                           | Qld   | Bowen |                    |                                                                                                                                                                                                                                                       |       | 108                 |
| Scotia                                  | GLNG* 100%                                                                          | Qld   | Bowen |                    |                                                                                                                                                                                                                                                       |       | 27                  |
| Arcadia                                 | GLNG* 100%                                                                          | Qld   | Bowen |                    |                                                                                                                                                                                                                                                       |       |                     |
| Roma Shelf                              | GLNG* 100%                                                                          | Qld   | Surat |                    |                                                                                                                                                                                                                                                       |       |                     |
| QCLNG (QUEENSLAND CURTIS LNG PROJECT)   |                                                                                     |       |       |                    |                                                                                                                                                                                                                                                       |       |                     |
| <b>Ownership:</b>                       | BG Group 90% Train 1 and 97.5% Train 2 / CNOOC 10% Train 1 / Tokyo Gas 2.5% Train 2 |       |       | <b>Site:</b>       | North China Bay, Curtis Island                                                                                                                                                                                                                        |       |                     |
| <b>Operatorship:</b>                    | QGC (100%-owned subsidiary of BG Group)                                             |       |       | <b>Customers:</b>  | CNOOC 3.6 MTPA from Train 1 for 20 years, Tokyo Gas 1.2 MTPA from Train 2 for 20 years, Chubu Electric up to 20 cargoes over 20 years, BG portfolio supply: up to 1.7 MTPA to Quintero LNG in Chile to 2030, up to 3.0 MTPA to Singapore for 20 years |       |                     |
| <b>Status:</b>                          | FID taken October 2010, first LNG 2014, second train to start-up a year later       |       |       | <b>Reserves:</b>   | 1P: 3,030 PJ 2P: 10,350 PJ Discovered resources: 7,420 PJ                                                                                                                                                                                             |       |                     |
| <b>Size:</b>                            | 2 x 4.25 MTPA LNG trains (three-train 12.75 MTPA ultimate potential)                |       |       | <b>Production:</b> | 150 TJ/day (54.8 PJ/year)                                                                                                                                                                                                                             |       |                     |
| Major Fields                            | Ownership                                                                           | State | Basin | Reserves (PJ)      |                                                                                                                                                                                                                                                       |       | Production (TJ/day) |
|                                         |                                                                                     |       |       | 1P                 | 2P                                                                                                                                                                                                                                                    | 3P    |                     |
| QGC Central Walloons                    | BG* 59.4%-100%                                                                      | Qld   | Surat |                    |                                                                                                                                                                                                                                                       |       | 130                 |
| Berwyndale South                        | BG* 100%                                                                            | Qld   | Surat |                    |                                                                                                                                                                                                                                                       |       |                     |
| Kenya-Argyle                            | BG* 59.4% Origin 40.6%                                                              | Qld   | Surat |                    |                                                                                                                                                                                                                                                       |       | 82                  |
| Woleebee Creek                          | BG* 80% Toyota 15% CNOOC 4% Tokyo Gas 1%                                            | Qld   | Surat | 26                 | 275                                                                                                                                                                                                                                                   | 837   |                     |
| Lacerta                                 | BG* 100%                                                                            | Qld   | Surat | 44                 | 469                                                                                                                                                                                                                                                   | 1,097 |                     |
| Cameron                                 | BG* 100%                                                                            | Qld   | Surat |                    | 522                                                                                                                                                                                                                                                   | 1,279 |                     |
| Paradise Downs                          | BG* 80% VicPet 20%                                                                  | Qld   | Surat | 0                  | 38                                                                                                                                                                                                                                                    | 449   |                     |
| Lawton                                  | BG* 70% VicPet 30%                                                                  | Qld   | Surat | 0                  | 88                                                                                                                                                                                                                                                    | 234   |                     |