



**Breakaway
Research**

April 2021

Oil & Gas Team

Stuart Baker, Research Manager

www.breakawayresearch.com

Company Information

ASX Code	BLU
Share Price (EOT 16/4/21)	\$0.087
Ord Shares (M)	1328.9
Market Cap (fully diluted)	A\$116M
Cash (31/12/2020)	A\$3.25m
Debt	A\$0.0m
Enterprise Value	A\$113M

Directors

Exec. Chairman	John Ellice-Flint
Managing Director	John Phillips
Non-Exec. Director	Rodney Cameron
Non-Exec. Director	Mark Hayward

Significant Shareholders

Jeach Pty Ltd	9.5%
Greig & Harrison Pty Ltd	9.0%

Source: Company

Company Details

Address	10/26 Wharf St, Brisbane, Qld, 4000
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Price Chart to April 2021



Source: ASX

Blue Energy Ltd (BLU)

A Major Gas Producer in the Making

Recommendation: **BUY**

Key Points

- **Blue Energy (BLU) has advanced monetizing its substantial gas assets at a time of rising Governmental support and recognition of the critical importance of gas. BLU has vast acreage and very large gas resources in all of the areas coming into Governmental focus, in Qld and the NT. Agreements with “blue chip” customers for the supply of 505 PJ in total, and MoU’s with pipeline companies for infrastructure access position BLU as development-ready.**
- **Key exploration and acreage assets are:**
 - **Gas reserves of 71 PJ 2P, and 298 PJ 3P, and resources of 1166 PJ 2C and 4179 PJ 3C, in Qld’s Bowen, Surat and Galilee Basins.**
 - **Interests in 112,000 km2 of prospective acreage in the NT’s Wiso Basin, with broadly similar geology to the widely promoted Beetaloo & McArthur Basins.**
- **It is “development” ready in Qld’s Bowen Basin:**
 - **BLU conducted significant exploration programs in Qld between 2008 and 2014, with numerous wells drilled and \$110M invested, and delivered a series of reserve and resource upgrades.**
 - **Commercialization of the Bowen Basin, which hosts the majority of Blu’s reserves and resources is advancing. Non-binding agreement’s with gas customers in Townsville and southern Qld total 505PJ. At current contract gas prices, this volume represents a revenue opportunity of ~\$4B.**
 - **Queensland Government support for a new pipeline to connect the southern market to the Bowen Basin, and agreements with the APA Group to bring gas south, and owners of the Northern Gas pipeline to send gas north to Townsville, effect gas delivery to the critical markets.**
- **The share price does not capture the value from commercial activities. There are E&P peers trading on higher market valuations which are at an exploration phase or have no gas sale agreements. Our best estimate of fair value is 34.4c, based on peer group resource valuations, and the gas volumes subject to sale agreements. However only 15% of BLU’s Bowen Basin gas resource is contracted, leaving substantial upside if the Bowen Basin opens up and Blue can monetize the remaining 85%.**

BLU is shaping into a major supplier of gas to the east coast market. The quantum of gas that is contracted and the revenue it could generate dwarf the current market value. Our best estimate of fair value is 34.4c and our rating is buy.



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Bowen Basin development will turn Blue into a major producer.

Blue Energy (“Blue”) has been active in the Queensland coal seam gas (CSG) regions since 2008, and is one of the CSG industries’ few pioneers that has remained independent during a decade of “internationalisation” that has fundamentally transformed the gas industry in eastern Australia. Blue Energy’s Executive Chairman, was previously Managing Director at Santos, and in 2007 oversaw that company’s launch of Gladstone LNG, the first export LNG project in the world to utilise coal seam gas. This catalysed a Qld LNG boom, and a decade of structural change in the domestic gas industry, evolving away from an over-supplied, low-price market to one where prices are linked to international oil and LNG prices. A wave of consolidation has resulted in large volumes of reserves and resources in the ownership of global multi-nationals focused on LNG exports. Under the radar of the mega-export projects, Blue undertook significant drilling activity, acquired prospective acreage, and has established a very large resource base.

By 2014, Blue was approaching a development phase, but subsequent collapse(s) in energy prices, and industry-wide capital rationing has delayed timely development and extinguished M&A and asset deal activity. The consequences of this gas mega-boom followed by a bust, are finally being recognised by policy makers. Gas shortages are forecast in eastern Australia from 2023, and prices will parallel international benchmarks, or what-ever is required to stimulate new investment in upstream supply and /or LNG imports.

Strategically, Blue is in a very strong position to monetise its very large reserve and resource. There are very few E&P companies with uncontracted gas in convenient locations. Recent gas sale agreements with “blue chip” customers and infrastructure operators are major steps toward commerciality and significantly de-risk development of the Bowen Basin, and the 505PJ agreed to date is still only ~15% of Blue’s Bowen Basin Resource. Huge upside remains as future development creates the platform for monetizing the remaining 85% of Blue’s Bowen Basin gas.

These gas agreements offer a revenue opportunity of ~\$4B over 10 years, or \$400M p.a. at estimated current prices for long term gas supply.

The importance of Government support

The Federal Government in its October 2020 budget, allocated funds to aid frontier gas development and specifically cited the opening of gas-rich frontiers in the **Bowen, Galilee and Beetaloo basins**, as integral to a “gas-driven, industry-led recovery”. Natural gas is finally being acknowledged as an important input to the economy for its use in industrial applications, for residential purposes and for a critical role in power generation to mitigate the unreliability of renewable energy sources. Separately, in September 2020 the Qld State Government pledged \$5M for studies into a pipe-line into the northern Bowen region while in the NT ~\$220M has been allocated to assist in opening up of the Beetaloo Basin.



The common thread is that finally, the opening up of gas from remote regions, as a critical solution to long-term reliable supply in eastern Australia has broad political support.

Asset overview

Blue’s assets are its acreage in the NT Wiso Basin, the Bowen and Surat Basins in southern Qld, and the Galilee Basin in central Qld. The acreage has reserves and resources, which have option value if undeveloped, and greater value if converted to binding gas sale agreements. Non-binding gas sale agreements to date for a total of 505PJ are a major step in that direction, but from a value upside, still leaves Blu with ~85% of its resources of >3200 PJ in the Bowen Basin ATP814 available for further contracting. Refer to figure 1.

Reserves and Resources

Blue’s reserves and resources are documented in Figure 1.

Permit	Block	1C	2P	2C	3P	3C
ATP854P		22		47		101
ATP813P				61		830
ATP814P	Sapphire	66	59	108	216	186
ATP814P	Central	50	12	99	75	306
ATP814P	Monslatt			619	0	2054
ATP814P	Lancewood	5		23	1	435
ATP814P	Hillalong			182		237
ATP814P	South	15		27	6	30
Total		158	71	1166	298	4179

Figure 1. Reserves and resources. Source: Blue Energy December quarter 2020 report.

Reserves and resources have been upgraded on numerous occasions spanning 8 years since the maiden Monslatt 3C booking in 2011 which followed three years of drilling. The history of reserves growth is important to document, as it demonstrates the results of several years of work and is not the result of a once-off drilling event related to a single well result. Reserves and Resources have been audited by independent reservoir assessors Netherland Sewell (NSAI). NSAI have been engaged by other operators in the Qld CSG fields and are recognised as having industry-leading experience in CSG reserves assessment.

The chronology of reserve upgrades, as per ASX releases on these dates:

- 21/7/2011: Maiden Reserves for ATP814P
- 13/12/2011: Monslatt Resource Upgrade
- 25/1//2012: ATP814P Reserves Upgrade
- 26/2/2013: CSG reserves boost for ATP814P
- 19/3/2013: Major Qld Gas Reserves Boost for ATP814 and ATP854
- 8/12/2015: Significant Increase in Gas Reserve for key Bowen Basin permit
- 28/2/2019: New Gas Resource upgrade- ATP814P- Hillalong Block

Growth in 2C and 3C resources over time is graphed in figure 2. Over 10 years, this is an impressive track record in growing reserves and resources.

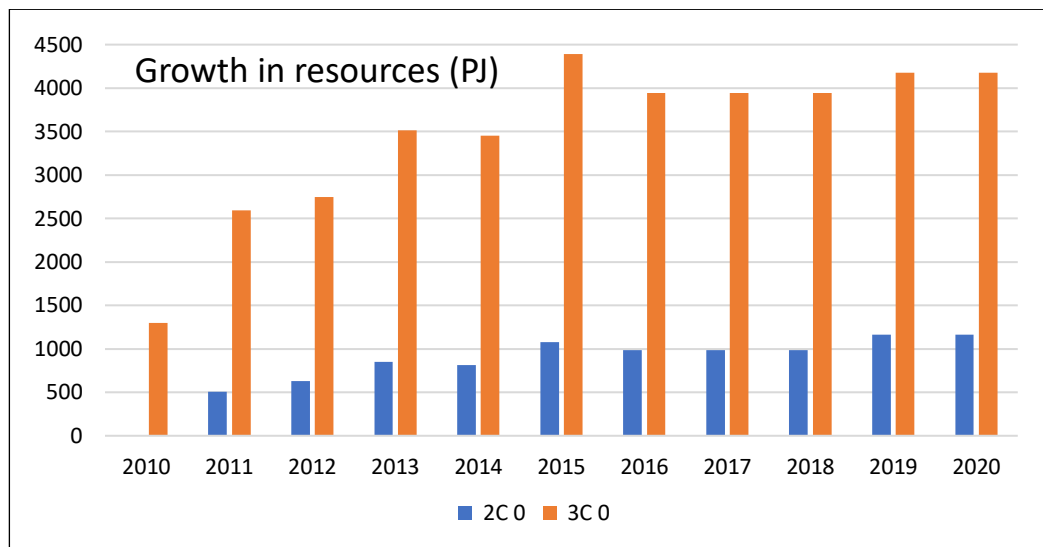


Figure 2. From Blue Energy annual reports from 2011 to 2020.

The reserve and resource estimates are anchored in data from (1) 15 wells drilled up to 2014, accompanied by core data and flow test data and (2) data sharing agreements with offset acreage owners, in particular Arrow Energy (*) in acreage to the west of the Sapphire block, where Arrow production wells are ~1 km from Blue’s permit boundary. (* Arrow Energy is 50/50 owned by Shell and Petrochina)

Bowen Basin: Ready for commercial development

Blue Energy’s vast and diverse acreage portfolio gives it huge option value and the ability to meaningfully participate along with other companies in opening new frontiers, however the Bowen Basin assets are the most advanced in terms of moving into a development phase. The drilling has been done, and the reserves are proved, and geology de-risked from over 150 Arrow production wells, and 400+ exploration core holes and pilots drilled by Arrow and Blue to date.

Blue’s 100% owned ATP814P permit has a certified 2C Contingent gas resource of 1119 PJ, and 3C of 3248 PJ of recoverable gas, in addition to 71 PJ of 2P and 298 PJ of 3P reserves.

The North Bowen Basin has in total, over 15,000PJ of gas resources across all the participants. This is recognised by the Federal Government, and building a large multi-user gas pipeline to the region would solve the expected eastern Australia gas shortfall once and for all.

Blue is progressing its own commercial activities publicly, and the current focus is on putting in place sales agreements with customers, and infrastructure owners. Important recent milestones are:

- Refresh of an agreement in early 2020, with APA group to investigate building, owning and operating a gas pipe-line to connect Blue’s Sapphire / Monslatt CSG fields, to tie-in to APA’s network running into Gladstone. The MoU includes the option for APA to build, own and operate specific gas processing facilities in the field.
- An MoU with Townsville gas consumer Queensland Pacific Metals for the supply of 7PJ of gas p.a. for 15 years for a proposed battery metal refinery in Townsville, to be sourced from Blue’s Bowen Basin ATP814P (Sapphire Block). Total contract volume is up to 105 PJ.
- An MoU with the Northern Queensland Gas Pipeline (NQGP) to transport gas from ATP814P to Townsville.

- An MoU with Stanmore Coal, to capture and process mine gas from its proposed Isaac Plains coal mine, nearby and west of ATP814 in the Bowen Basin. The volume is not disclosed and is unlikely to be large, and will be aggregated into Blue’s own ATP814 production.
- Heads of Agreement (HoA) with Energy Australia for 10 PJ p.a. for 10 years, for a total of 100PJ, to be delivered to the Wallumbillah gas hub. This will require construction of a 450 km pipeline to connect to Blue’s Bowen Basin gas fields. Significantly, Energy Australia is eastern Australia’s third largest energy retailer, after Origin Energy and AGL.
- HoA with Origin Energy for supply of up to 300 PJ over 10 years from 2024, with gas from the Bowen Basin to be delivered to Wallumbilla. Origin Energy is the largest supplier of gas to retail and wholesale customers in eastern Australia, as well as being a highly experienced owner and operator of CSG assets in Qld.

Each of these commercial initiatives is outlined in more detail elsewhere in this report.

Drilling history & geology

Blue is more advanced than many peers that are currently spending money for drilling and exploring. Blue did that several years ago, establishing a depth of knowledge in terms of the geology, and achieving reserve and resource bookings. Blue’s key asset in the Bowen Basin is its ATP814 acreage, which is split into 4 blocks, the “Sapphire”, “Central”, “Monslatt” and “Lancewood” blocks. Refer to figure 3.

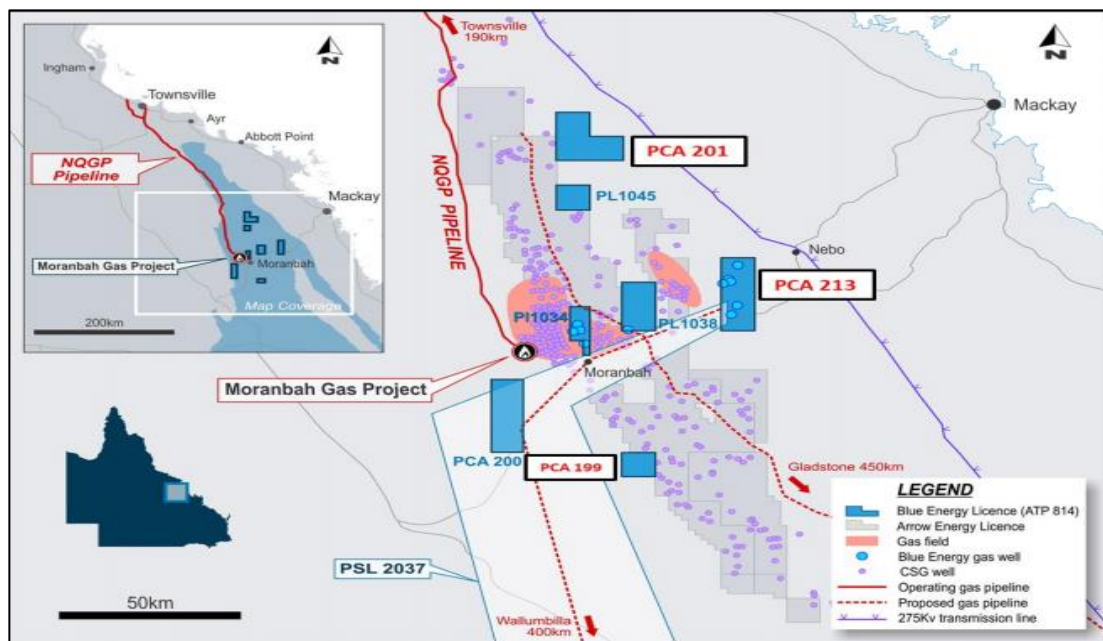


Figure 3: Blue Energy December 2020 quarterly report

The acreage is prospective for coal seam gas, in Permian age coals at depths between 600 and 800m. Arrow Energy’s Moranbah gas field which abuts ATP814’s western boundary, has been extensively drilled and developed and the geology extends into BLU’s acreage. The Arrow operated Moranbah gas field has exclusively supplied Townsville since 2005. Between Blu and Arrow, over 400 core and pilot wells, and 150 production wells have been drilled in the basin.

Between 2008 and 2011, 15 wells were drilled in Blue’s acreage, including 4 at Sapphire, and 9 at Monslatt, for an investment of more than \$80M. Data from this activity, and data sharing arrangements with Arrow inform an extensive knowledge of the geology, with key parameters listed in figure 4. Collectively, this data makes the Bowen Basin world class. Key geological parameters are shown in Figure 4.



Bowen Basin coal data			
Parameter	Surat Basin	Galilee Basin	Bowen Basin
Age	Jurassic	Permian	Permian
Coal seam thickness	0.3-3.0 meters	0.5-4.0m	0.5-8.0+m
Gas content range	1.0-10m3/t	1.0-8m3/t	4.0-25m3/t
Gas Saturation	60-80%	30-70%	60-100%
Permeability	1-100 md	1-100 md	0.5-20 md
Water production	High	High	Low
Production	Yes	No	Yes

Figure 4: Source; Breakaway Research data base

In summary, the Bowen Basin is world class and “de-risked” compared to other large basins which are not yet in production or have proven reserves.

The revenue opportunity and longer term big-picture cashflow

The three non-binding agreements for the potential sale of up to 505PJ represent a substantial revenue opportunity. Pricing and other terms of delivery are not disclosed. However, if the latest data point for long term gas supply is correct, as guided by Beach Energy and Origin Energy for the Otway gas project, contract gas prices are in the range \$7.86-\$10.82/GJ. Even at the low end of this range, the revenue opportunity to be won over ~10 years from selling 505PJ of gas approximates A\$3.97B in total, or ~\$400M p.a.

To form a view of potential operating and development costs, Arrow’s Moranbah gas field would be a reasonable analogue, however we do not have access to Arrow’s financial results. However, financial results for Santos’ GLNG and APLNG’s Surat basin production are public and provide insight as to profitability from steady state, large scale production.

We document the data in Appendix 1. Key results for GLNG are a steady state upstream cash opex and stay-in-business capex of A\$3.60/GJ on average from 2017-2020. The figure for APLNG is A\$3.10/GJ. State royalties would add ~10% and in addition there are transportation charges which are project and location specific. All up, the total approximates ~\$4/GJ. These figures are for steady-state operations for large scale production and do not capture up-front development costs, which are also project and location specific.

The data are useful in guiding us to conclude that once in development, a large scale Bowen Basin gas field could deliver annual cashflow of at least \$4/GJ, assuming an \$8/GJ selling price.

Applying these figures to Blue’s non-binding gas sale agreements of 505PJ generates an indicative future cashflow opportunity of ~\$2B over ~10 years.

To be clear, this is not a valuation. There are numerous uncertainties and assumptions, but the general analysis is valid and indicates potential value for Blue Energy that is manifold the present equity market capitalisation

Other assets: longer term value creatin options

Blue has prospective acreage in other regions which are now being reassessed by equity investors due to co-lateral activity. And while the Bowen Basin acreage is leading Blue’s race to commercial results, valuation in the other acreage is gaining momentum due to industry and peer activity. We document Blue’s other assets in this section.

Surat Basin: ATP854

Blue's 100% owned ATP854, shown in Figure 5, is adjacent to GLNG and APLNG assets, and has 101 PJ of 3C resource. Blue's has applied for a "PCA (Potential Commercial Area) for the permit, which would allow for further work to be undertaken to grow the resource. Although not as large as the Bowen Basin resources, the location is strategic given nearby production and infrastructure.

Galilee Basin: coming more into focus

The Galilee basin in central Qld is a vast petroleum region, which once attracted "super-major" companies in the 1980's and 1990's for its very large resource potential, but sporadic drilling in such a large area did not deliver commercial outcomes or information to inform the regional geology. The region's remote location far from customers and lack of infrastructure and logistic support were significant challenges faced by the early explorers and this remains the case today.

The Galilee Basin is a lightly explored region and Blue is one of three ASX-listed companies that are dominant acreage holders in the basin, others being Galilee Energy and Comet Ridge. The latter two have been drilling and appraising in recent years. Refer to figure 5.

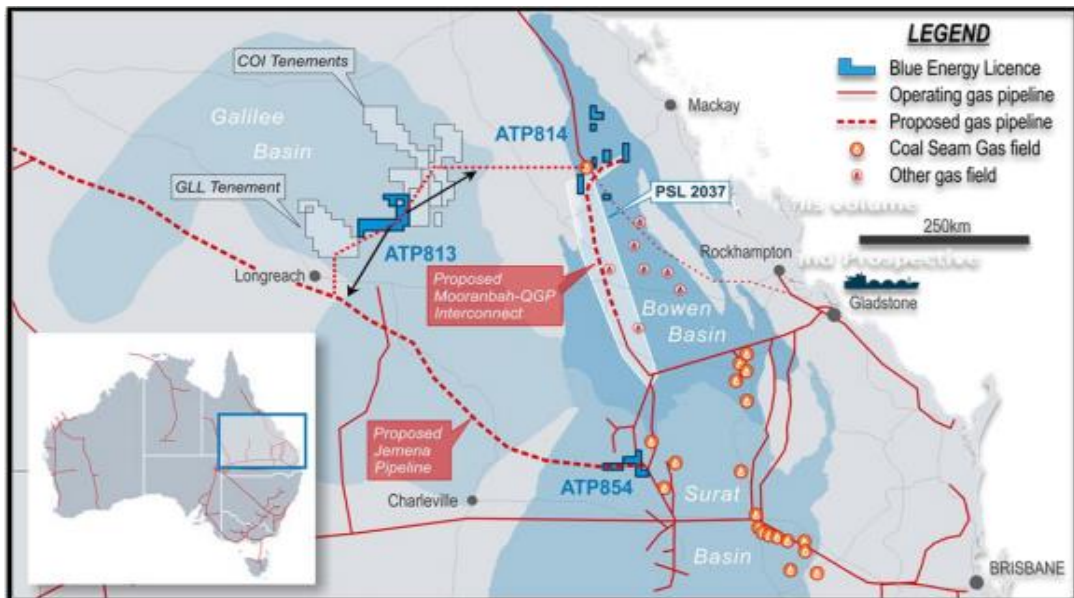


Figure 5: Galilee Basin permit ATP813, and pipeline routes proposed

Blue's permit ATP813 covers 4125 km², and is shown in figure 5 in context with its other Qld acreage locations. Blue drilled 6 wells between 2008 and 2013. These were Kyanta, Myross, Stainburns Downs, Carolina, Ballyneety and Stagmount. All targeted the Permian aged Betts Creek coal and Aramac seams. All wells intersected coal seams with thickness varying from 15m to 20m, but commercial gas flows could not be established. Infrastructure development, and equivocal technical success from others in the region, to spread knowledge and experience, are required to justify additional investment, although BLU's booked resource base is a very large at 830 PJ (3C).

Numerous gas saturated coal seams have been defined in the region by other operators, but a key development challenge to date has been isolating the coals from the water bearing sandstone above, below and in between the coal seams. Inability to de-water the coals and stop water influx from aquifers has been a barrier to establishing sustained gas production. Galilee Energy, and predecessors have invested substantial time and money to find appropriate well completion technologies, and any success on their part could be a game changer for all the local industry participants, but until then, the Galilee basin CSG geology is not de-risked.



The region is prospective for gas in conventional sandstone reservoirs too, and companies such as Exxon, Conoco and Enron were active in the 1990s exploring for conventional gas.

Comet Ridge and its partner Vintage Energy are the most recent to restart conventional gas exploration, at the Albany prospect, which is a re-drill of a prospect drilled in the mid 1990's. Permeability in conventional reservoirs is likely to be low but modern drilling technologies and well stimulation techniques are a key enabler, and in fact are widely applied already in mature regions such as the Cooper Basin. As with Galilee Energy and its CSG efforts, any success by Comet Ridge would help de-risk the conventional gas geology.

However, resources in the region are very large and have captured Government attention, and the Galilee Basin is now included as a "development focus area". Infrastructure providers are showing interest too. In 2019, pipe-line company Jemena proposed a long distance pipeline to connect interconnect Mt. Isa to the Northern Qld Gas pipeline at a location near Roma, via the Galilee Basin. If built, this pipeline would open the region to southern and east coast gas markets.

Wiso Basin & greater McArthur In the NT

The Northern Territory is hotting up with a growing belief in the region's large potential, highlighted now with the "Beetaloo Basin" on the Federal Government's "focus" list, despite the region's vast scale, remoteness and lack of logistic and production infrastructure. Much of the NT is believed to be prospective for oil and gas in Cambrian aged shales, and clastic sequences, with super-giant oil fields in Oman and East Siberia cited as geological analogues.

BLU entered the region in 2013 when it agreed to farm-in to 9 contiguous exploration blocks in the Wiso Basin, which is part of the Greater McArthur Basin. Refer to figure 6. The deal with incumbent owner Australian Oil and Gas (AOG), is for a multi-staged farm-in to earn up to 50%, via a succession of work programs beginning with geological studies, to be followed by gravity and aeromagnetic surveys and finally seismic surveys before committing to an exploration well(s).

However, activity was paused for a number of years after the NT Govt imposed a fracking "moratorium", and although the fracking moratorium has now been lifted, field work has yet to resume. Blue Energy's current working interest is 10%, satisfied by the payment of back-costs to AOG in 2013. Six of the 9 blocks are "under application" with the JV having to re-engage various stake-holders to secure a community license in order to proceed.

At this time our chosen valuation method does not capture value for this acreage, so implicitly the value we ascribe in our fair value is zero, although equity valuations for peers with acreage in this region confer a non-zero value for prospective resources. If a deterministic value the acreage can be established in due course, then it will add to our base case. Activities and transactions by others active in the NT will inform this. We note Origin Energy, Santos, and Empire Energy are all exploring in the region. These companies have reported positive exploration results this year and these results upgrade the McArthur "super-basin". Other companies planning to list publicly this year including Tamboran Resources and McArthur Oil & Gas will further inform investor appetite for exploration acreage in the region.

Flash: Empire Energy buys Pangaea

On April 15, listed company Empire Energy (EEG) announced it had acquired private company Pangaea Resources for cash and scrip with a value amounting to ~A\$54m, for acreage in the Beetaloo and McArthur Basin. The acreage acquired abuts Blue Energy's to the south. The transaction includes ~148 Bcfe of gas and equates to ~37c/GJc for 2C gas, in an area remote from markets. In the context of Queensland peer group valuations, it's a big figure.



Industry and investor excitement over the Beetaloo and surrounding areas is because of its potential for liquids-rich shale gas. The prospect of producing oil enhances the opportunity. Extraction of this will require horizontal wells and fracking, and Empire document that the vendors spent >\$110m since 2013 to work up an asset now vended for a half of that.

The ~\$110m invested paid for 5 wells and seismic. This is a very high-cost place to work, and in the specific case of Pangaea the money invested over ~8 years did not generate a return. Despite this capital is flowing freely into listed entities with any exposure to the NT. Given this, Blue Energy interests in the region may be under-appreciated and undervalued.

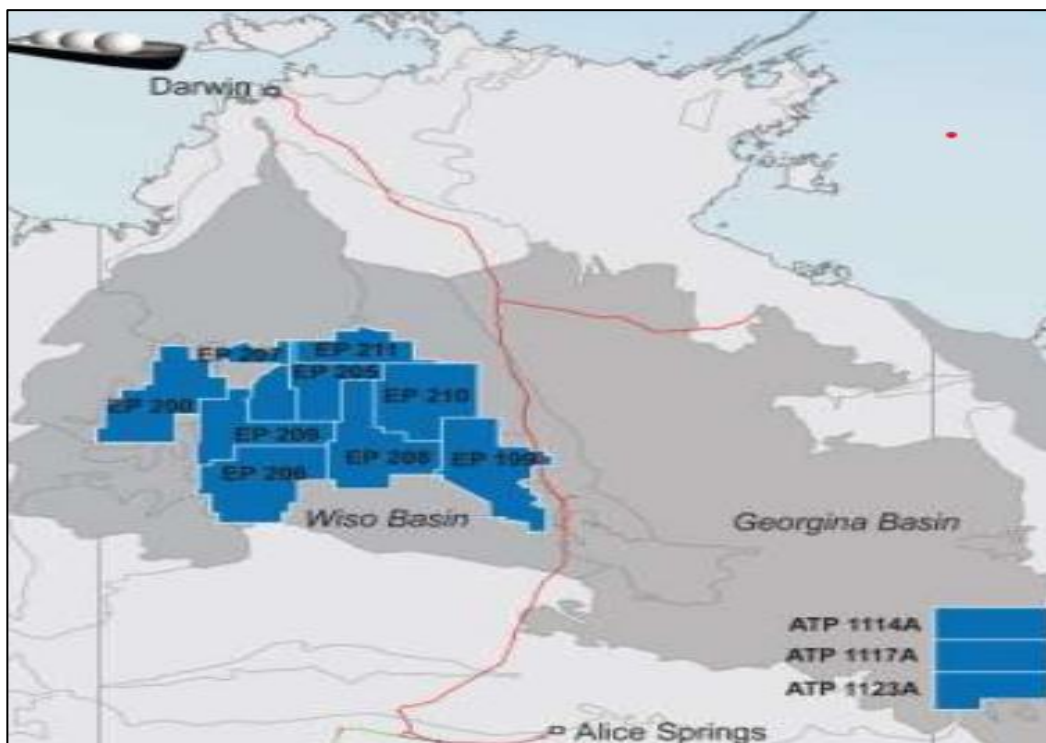


Figure 6. NT exploration acreage. Source: Blue Energy ASX release, August 6, 2013.

The three large Georgina Basin blocks in Western Qld are 100% owned and are “under application”. Activity in this region by BLU, and other acreage owners, has been minimal in recent times, with exploration capital being prioritised to other more prospective or conveniently located regions. There are no reserves or resources in this acreage.

Commercial activities, customer agreements and infra-structure deals to underpin a Bowen Basin gas development

Following Blue’s drilling and reserve booking phase from 2008-2014, the focus has shifted to commercial activities and stake-holder agreements required to move into a commercial development.

Milestones are:

1. June 20, 2017: BLU and APA announced a Bowen Basin gas pipeline MoU, to negotiate a Gas Transportation Agreement for delivery of Blue’s Bowen Basin gas to southern markets. The MoU allows for APA to undertake route selection, feasibility study and options to build, own and operate in-field gas infrastructure. Figure 7 pictures potential routes, which would bring gas into the southern markets via interconnection to APA’s existing Gladstone-Wallumbillah network.

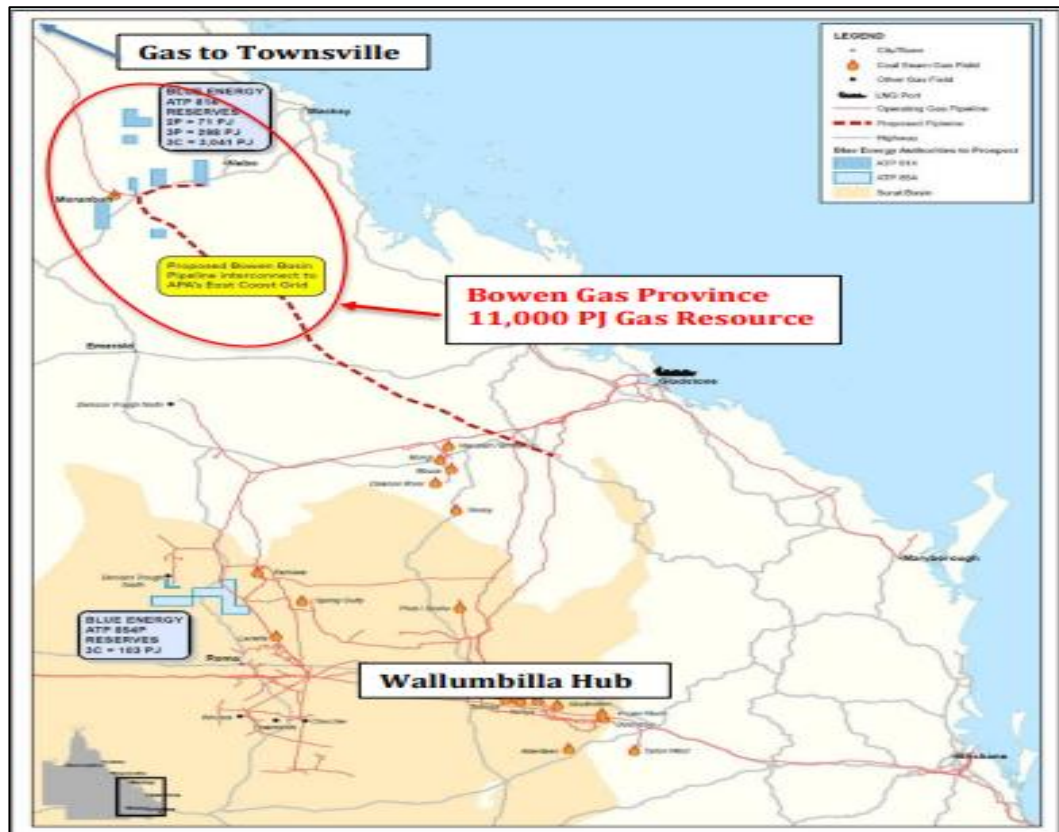


Figure 7. Bowen Basin permits and potential pipeline routes

2. October 9, 2019: Blue announced an MoU with owners of the Northern Queensland Gas Pipeline (NQGP) which connects the Bowen Basin Moranbah gas fields to Townsville. The NQGP is the only pipe connection to Townsville, an important regional hub for industry and commerce. The NQGP has been supplying gas to Townsville since 2005, from the Shell-owned Moranbah gas fields which are adjacent to Blue's Sapphire block. For Blue, this MoU facilitates access to the only gas pipeline going north, and facilitates introduction to potential customers in Townsville.

3. November 12, 2019: BLU and Queensland Pacific Metals (QPM) signed an MoU for the supply of gas to a proposed greenfield battery metal refinery to be built at Townsville. QPM is a subsidiary of ASX listed Pure Minerals Ltd. (ASX: PM1). Pure's strategy is to produce battery metals for the emerging EV sectors. The gas volume is 7 PJ p.a. for 15 years, for a total of 105 PJ. Blue proposes to supply this from the ATP814 (Sapphire Block), which has 216 PJ of 3P gas reserves and 59 PJ of 2P reserves.

4. October 29, 2020: Stanmore Coal and BLU signed an MoU for Blue to capture gas liberated in coal mining, from Stanmore's proposed Isaac Plains underground coal mine. The mine is located immediately west of Blue's ATP814 block in the Bowen Basin. For safety reasons, ordinarily this gas would be flared, in the absence of a customer to take it. This MoU would eliminate the flaring and the associated emissions, as well as provide Blue with incremental additional gas volumes to add to those it plans to produce from ATP814 for sale to either Townsville or Gladstone.

5. December 3, 2020: BLU executed a non-binding HoA with Energy Australia (EA). EA is Australia's third largest energy retailer, with 1.7 million customers. It is wholly owned by Hong Kong-listed conglomerate CLP Group. The HoA is for the supply of up to 10 PJ p.a. for 10 years, to be delivered to the Wallumbilla hub.



This is the first Bowen basin gas sale to the southern markets. It is significant volumetrically to EA and for this reason we think they would not have agreed to the MoU without reasonable conviction that the gas can be produced.

6. On March 19, 2021, Blue and Origin Energy executed a non-binding HoA for the supply of 20-30 PJ p.a, for a term of 10 years, with an indicative start date in 2024. Gas is to be delivered to Wallumbillah, and combined with the Energy Australia HoA, commits 400 PJ of gas from the Bowen Basin to be delivered south.

Origin Energy is eastern Australia’s largest gas retailer. It has extensive experience in CSG projects, and is an owner of substantial CSG assets in Qld via its equity in APLNG and also directly in various fields. The HoA with Origin is volumetrically very large, and very valuable to both Blue as a supplier and also Origin as a buyer.

Consider Origin’s access to alternative source of supply from its own resources and related party (APLNG) gas, and due diligence required to take a 300 PJ supply deal to its Board for approval. We view this as a very important endorsement for Blue’s project coming from a highly experienced coal seam gas owner and operator.

Origin Energy and Energy Australia are eastern Australia’s largest wholesale and retail gas suppliers, and the supply commitments while non-binding, will help open up much needed new supply regions for a mutually beneficial outcome. Both have inked 10-year supply deals, which are the longest contract terms we have seen in many years. These agreements provide the customer base and with Blu’s upstream supply, effectively book-end proposed pipelines.

7. Blue is progressing Production License Applications (PCA’s) for its three Bowen Basin blocks Sapphire, Central and Lancwood.

Financial considerations: Asset rich but no cash flow.

BLU has no production or other source or revenue income. Historically Blue has been reliant on equity capital, with 88% of all capital raised since 2008 going into the ground, for exploration and evaluation. Most of that investment was before 2014, reflecting drilling activities that were underway in many of the blocks. Administration and non-operational expenses have been minimal, at less than \$1M p.a.

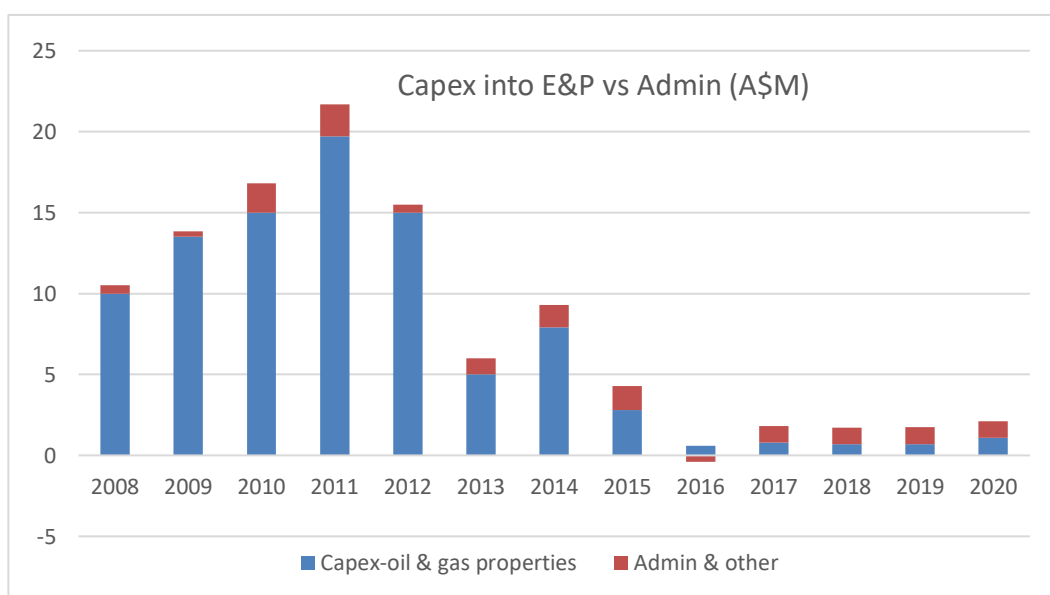


Figure 8. Source: Break-away, from Blue Energy Quarterly cashflow reports



Peak spending was in the 2008-2012 period and reflects peak drilling activity. After that, expenditures on field activity subsided as Blue's focus moved to commercialisation activities.

Modest equity capital raisings totalled \$6M in 2018 and 2019, the first since 2012, and enabled Blue to stay liquid during the industry downturn and at the end of December 2021, cash in the bank was \$3.4M. This is sufficient to run the company for a reasonable period, but any significant development activity in the field will require external funds.

Should BLU move into a capex phase, it has a few financing options, including:

1. Issuance of equity capital. If BLU can convert its non-binding gas sale agreement's to bankable sales contracts, then debt finance may be accessed.
2. Sell-down of specific acreage or working interests, via a sale for cash or farm-out in return for development. Blue has 100% working interests in key acreage, so can offer significant equity positions to incoming developers.
3. Government funding may become available, and we cite as a specific example the Queensland Government's financial support for a Bowen basin gas pipeline study. Governments appear willing to allocate capital, but it remains to be seen if this is to targeted companies, or industry bodies, or Governmental agencies.



Valuation. Best estimate 34.4c

Blue Energy has no production, so we cannot develop earnings or cash-flow based valuations. Asset transactions could be used as proxies, however there have been no acreage transactions or farm-in or farm-outs in recent years to inform value for acreage and undeveloped gas resources. The single exception is Empire Energy’s acquisition of private company Pangaea on April 15, which provides a data point for acreage in the NT.

In the absence of deterministic alternatives we rely on peer group valuations for reserves and resources in the ground. Other intrinsic factors need to be acknowledged. Blue Energy is the only ASX listed company, headquartered in Queensland, that offers substantial exposure to the emerging Bowen Basin. And while gas agreements to date total 505 PJ, more than any listed peer, this volume is still only ~15% of Blue’s Bowen Basin resource. Additional volumes of gas contracted would drive our best estimate of value higher, noting that that only 15% of Blue’s gas is subject to some form of gas sale agreement at this time.

Peer Group

Blue’s CSG peers are Comet Ridge (COI), Galilee Energy (GLL), Pure Hydrogen (PH2), State Gas (GAS), Armour Energy (AJQ), Empire Energy (EEG), and to a lesser extent Elixir which is active in CSG albeit in Mongolia. Most of these companies are active in regions of “government focus” including the Bowen Basin and Galilee Basin, or are active in coal seam gas overseas.

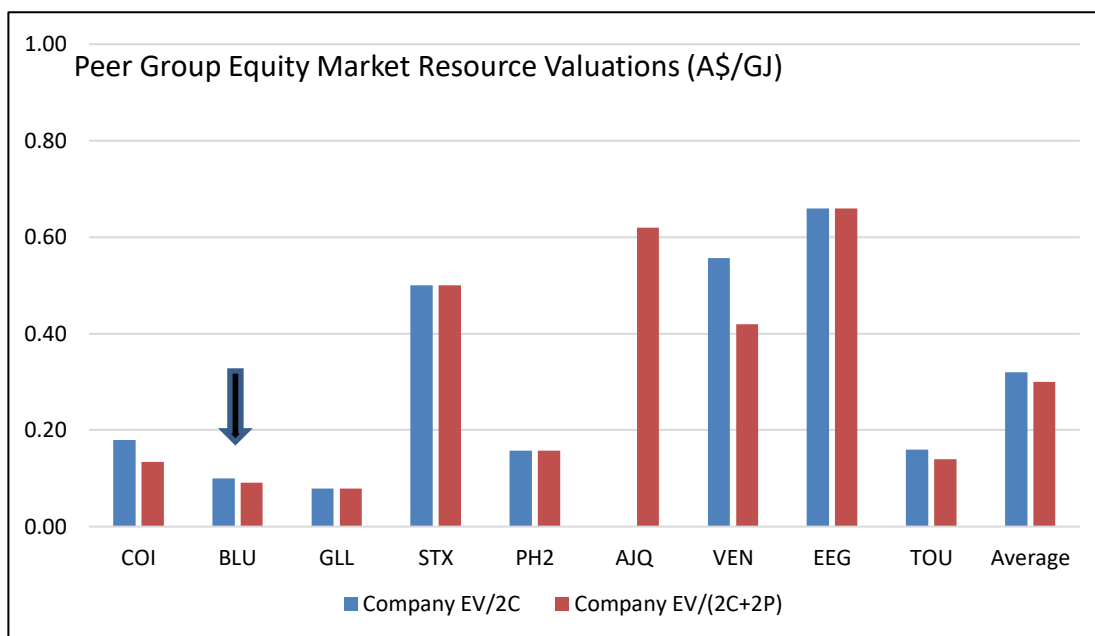


Figure 9. Source: Break-away research. EV’s as at April 16, 2021. Reserves and resources are latest reported

At this time, Blue is one of the few peer companies to move beyond an exploration phase into a commercial phase via non-binding gas sale agreements, and the size of those agreements are a clear point of differentiation.

Blue has non-binding gas sale agreements for 505 PJ of gas in total. Most peers referenced in figures 9 and 10 have not advanced to a commercial phase yet. We use peer group metrics for valuation purposes, to form a view as to value for the contingent resources.

Figure 10 shows EV and reserves and resources for companies which we think are relevant peers. There is a very wide range of market valuations for companies which are still at an exploration stage and have no production. We value BLU on an EV-per-molecule basis, but choice of using 2P, 2C, 3C or 3P figures is complicated by inconsistency in reporting across the peer group.

In aggregate there are a dozen companies with combined equity value of \$1.9B, hosting 2C gas resources of 5.8 Tcf. That equates to 32c/GJ on average but with a very wide range that is asset specific.

Reserves & Resources (PJe)									
Company / Region	Price	EV	2P	3P	2C	3C	EV/2C	EV/3C	EV/(2P+2C)
Blue Energy (BLU)									
Bowen, Galilee, Wiso	0.087	112	71	298	1166	4179	0.10	0.03	0.09
Comet Ridge (COI)									
Qld, NSW	0.067	48	106	183	263	2790	0.18	0.02	0.13
Pure Hydrogen (PH2)									
Qld, Botswana	0.22	53			334	730	0.16	0.07	0.16
Strike Energy (STX)									
Cooper, Perth Basin	0.33	552			1093	0	0.50		0.50
Vintage Energy (VEN)									
Galilee, Otway, NT	0.065	26	15	43	46	125	0.56	0.20	0.42
Galilee Energy (GLL)									
Galilee Basin- Qld	0.755	199	0	0	2508	5314	0.08	0.04	0.08
Empire Energy (EEG)									
NT- McArthur	0.35	97	0	0	147	413	0.66	0.06	0.66
Tlou (TOU)									
Botswana CSG	0.065	37	43	454	228	3237	0.16	0.01	0.14
State Gas (GAS)									
Surat Qld	0.56	84	0	0	0	0			
Armour Energy (AJQ)									
Kincora field, Surat	0.03	87	170	370	46	0	0.51		0.40
Elixir (EXR)									
Southern Mongolia	0.45	362	0	0	0	0			
Warrego (WGO)									
Perth Basin	0.23	194	0	0	0	0			
Total		1849	406	1349	5831	16788	0.32	0.03	0.30

Figure 10. Australian gas exploration and production companies considered to be peers of Blue Energy. Share prices at EOT April 16, 2021

Our best estimate valuation results from an analysis of EV/(2P+2C) for gas in the ground across the peer group. Most of the peer group report a 2C figure but many do not have 2P or report on other reserve categories. While technically 2C and 2P figures should not be aggregated for valuation purposes, we observe the practise is wide-spread by investment banks and brokers. Therefore, we accept equity market resource valuations and EV/(2P+2C) measures as critical valuation tool.

The volume weighted EV/(2P+2C) average is 29.6c/GJ as shown in Figure 10, but with a very wide range from 8c to 66c. Blue's ~9c share price is ~1/3rd the peer group average. Comparing other reserve and resource categories is not useful in our opinion, due to a very wide dispersion between low and high values.



Premium is justified for HoA's and MoU's

Although the gas agreements Blue has signed with credible and large off-takers are not binding, these agreements are more valuable compared to gas resources that lack such agreements and otherwise could be stranded and worthless.

We believe that contracted, but not binding, gas volumes should be valued more highly in the equity market compared to resources which are not contracted.

We assert that at this time a 25% premium is reasonable, and over time should rise as Blue's projects are further de-risked for example by securing binding contracts, securing finance, moving into FEED, then FID and eventually production.

There-fore we consider a fair value for Blue's 2C+2P resources is 37.0c/GJ, a 25% premium to the peer group weighted average of 29.6c/GJ. We believe this is reasonable in context compared to other companies we have reviewed, such as Vintage Energy, Armour Energy, Strike Energy, Empire Energy and Elixir Energy.

Applying 37c/GJ to Blue's 1237 PJ of 2P and 2C resources and reserves results in a **best estimate of fair value of \$458M, equivalent to 34.4cps.**

Upside is large if resources can be developed

Blue Energy has ~3200PJ of gas resource in the Bowen Basin, of which only ~15% is subject to gas sale agreements, leaving 85% of this large resource available for additional sales. If the Bowen Basin is opened up to eastern markets by possible major multi-use gas pipelines, then Blue may be able to sell additional gas volumes. At this time this is a speculative upside event because we have no clarity on how much, and when. However, considering the peer group with gas resources in the Bowen Basin, there are none on the ASX with this scale of resource that Blue has and this differentiates Blue from peers.



Risk Factors

Financial & commercial risks. Development will require a significant investment into wells and processing plants. It is not clear how Blue will undertake the scope of work and fund it. Resource projects are increasingly being rejected by commercial banks and this may make raising debt a challenge, and equity raisings or asset sales to generate funds may dilute our price objective.

ESG. Coal seam gas projects in certain regions have attracted opposition from local residents and environmental pressure groups. This exposes development to time delays, additional costs and ability to operate without interference.

Counter party risk. All of Blue's agreements to date are either MoU's or HoA's and are non-binding. There are challenges in converting these agreements to binding and bankable contracts.

Economics. We have no insight into development costs, operating costs and gas prices. Thus we are unable to determine the economic robustness of future developments.

Geology. Large scale development will require drilling of hundreds of wells over a large region, in contrast to the limited sample of core and pilot wells drilled to date. Development drilling may result in wells which are less productive than currently predicted.

Infrastructure. Blue is reliant on other companies to make large investments into gas pipelines and process plants in order to reach terminal markets. There is no certainty these investments will be made, and if they are, that process and transport costs are not injurious to end users.

Commodity prices. Weaker oil prices, should they occur, would flow back to weaker LNG netbacks and potentially lower domestic gas prices. This could impact on project economics, market sentiment, and ability to raise capital.



Australian East Coast gas market state-of-play: tightening

Investment in natural gas for the domestic market has been below what is required for maintenance of supply since 2014. Between June 2014 and December 2020, east coast gas 2P reserves have fallen from 49.5Tcf to 34.04Tcf, a drop of 32%. This drop reflects production of ~10 Tcf over the period, negligible replacement from new discoveries, and downgrading of contingent resources due to lower oil and gas prices.

Governmental support has arrived with money and ideas pledged to avert an east gas market shortage. Its yet to be determined how the promised funds are migrated into practical results.

The Australian Energy Market Operator (AEMO) publishes a “Gas Statement of Opportunity” (GSO) in March every year, and the most recent report released in March 2021, points to supply shortfalls in 2023, unless new supply is developed. This is essentially the same conclusion that was reached in the 2020 GSO. In the passage of a year little has changed with the single exception that the latest GSO acknowledges that LNG imports will be required to avert future shortfalls, emerging in peak winter demand from 2023. A critical inclusion in the latest GSO is an assumption of an import terminal built at Port Kembla. The identification by the AEMO in the March 2021 SGO that the east coast market now needs LNG imports, while Australia wears the crown as the world largest LNG exporter, is counter intuitive.

Meanwhile the E&P industry is tasked with investments into developments, most of which are remote and require new infrastructure, at a time when there is downward pressure on prices for oil and gas. Companies which are assumed will make this investment, are either small and lack financial capacity, or global companies that prioritise capital across a global portfolio. Numerous ESG challenges and impediments are additional constraints to timely developments. Recently, AGL had its planning application for an LNG import terminal at Cribb Point Victoria, rejected by the Victorian State Government, in the wake of social opposition. In another example of how hard it is to get anything done, Cooper Energy’s Sole gas development required 129 separate regulatory approval, from 25 different agencies and took 6 years.

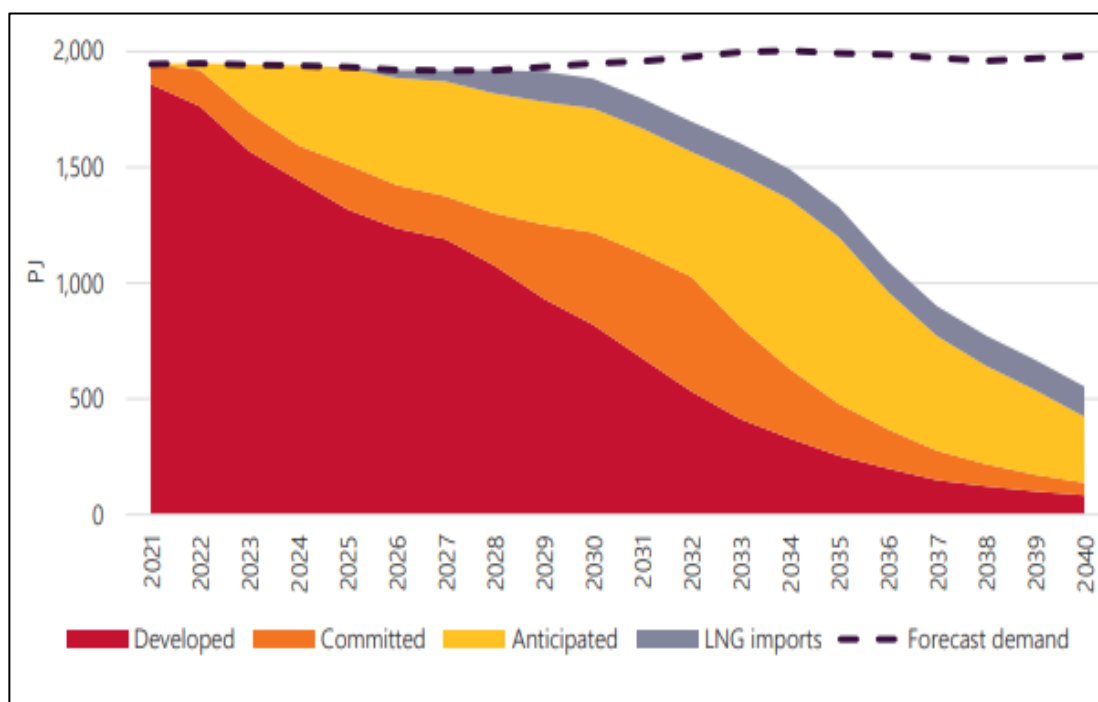


Figure 11: Source AEMO March 2021 Gas Statement of Opportunities



Federal Government Energy Plan

A number of energy policies were unveiled by the Prime Minister on September 15 2020, and funding to stimulate the industry was outlined in the 2020 Federal budget. The over-arching strategy recognises the importance of gas as a “transition” fuel, and the importance of longer term supply for an “industry-led recovery”. Key parts of the strategy are (1) enabling of major long-distance gas transmission pipelines into remote areas where gas is currently stranded, specifically the Bowen, Galilee and Beetaloo Basins, with the Qld Government pledging \$5M for a pipeline study to the Bowen Basin (2) facilitation of gas trading hubs, at Wallumbillah in Qld.

Theoretically, a more interconnected pipeline system, with storage options, will facilitate gas trading and the transparent pricing that producers and consumers need to see to make informed development and consumption choices.

However, for consumers, and Governments hoping for cheap and reliable gas, there are some new realities to digest. For decades, large gas fields in South Australia (Moomba) and offshore Victoria (Gippsland) supplied the majority of east coast gas. These fields were very large, benefitting from development scale, valuable liquids by products (such as oil, condensate and LPG) to effectively cross-subsidise the gas price, and produced gas from highly productive “conventional” sandstone reservoirs without the need for “fracking”, or other expensive production technologies.

There are no longer any large, conventional gas fields sitting undeveloped and exploration for gas (which is banned in Victoria and NSW) has been stagnant since 2014. What remains as exploration targets, is gas in deep, tight reservoirs, or CSG in remote regions. Most of this is deemed to be “unconventional “ and variously would require fracking, as in the case of tight sands, or CSG which some sections of the media and society deem “controversial”.

The Santos Narrabri project is another example of a project that has been delayed several years due to pressure groups. The Narrabri gas resource was drilled and defined more than 10 years ago and has secured state planning approvals and despite this continues to be challenged by activists. The net of this is that new supply required from new regions will likely require fracking, will cost more to develop, and will face increasing scrutiny from pressure groups.

Gas prices: Hostage to LNG netbacks and world oil prices

LNG exporters supply the domestic market at the margin, and under threat of Govt intervention. As long as the export LNG prices are appreciably greater than the local price, then producers will seek to export, and gas supply will thus be prioritised to the export market. Gas prices have been very volatile since 2015, with significant upward pressure until 2019. Critics of the industry attribute this to the onset of gas exports from Eastern Qld. That is debateable. The CSG fields were developed specifically to deliver into export LNG contracts, where prices are linked to oil in US\$ and those fields would not have been developed without that price incentive. And before that, these fields were already a significant supplier of gas into eastern Australia.

In 2020, domestic gas spot prices fell sharply to the \$4-5/GJ range due to a set of unique factors and are unlikely to be sustainable for 4 reasons (1) Prices below \$5-6/GJ are below break-even for most producers trying to open up new basins, as documented by independent experts advising the AEMO (2) oil and LNG prices crashed in April 2020, and this flowed back to the domestic market via netback price structures, which link domestic gas to Asian LNG prices (3) one-off negative demand shock due to Covid19 (4) weak spending by large E&Ps which have to ration capex and prioritise to the highest returning projects. At low oil prices, there just isn't the excess capital to commit to exploring, or acquiring.



From late 2020, there has been a recovery in domestic gas spot markets, in line with demand recovery. Spot prices this year traded in the range \$5.50 - \$7.50/GJ, but historically have traded as high as \$14/GJ in 2016, and with a monthly average of A\$7.36/GJ since the creation of a spot market in Eastern Australia in 2015.

In our opinion the spot price trends and data are not relevant in arriving at a view as to prices for large volumes of gas over longer duration.

On April 16, 2020 the Beach Energy and Origin Energy Otway Gas Project price review was concluded. This review had been subject to independent arbitration, and the result of that review is a gas sale price which, according to Beach Energy, is “consistent with the midpoint of the 2020 southern states wholesale gas price of \$7.86-\$10.82, as reported by the ACCC in July 2020. (Ref: ACCC Gas Inquiry 2017-2025 Interim Report, July 2020).

From this statement, it would be reasonable to conclude a price approximating \$9.30/GJ. The guidance provided by Origin Energy, is for additional procurement costs in FY2021 and FY2022, of \$30-40M, and \$60-80M respectively on top of the original contract which was calculate from Beach Energy reports to be approximately A\$7/GJ. Based on contract volumes of ~13PJ in 2021, and 20-30 PJ in 2022, we calculate an increase in the range \$2.3-\$3/GJ which would evidence that this latest price review suggest a price for the Otway Gas project in the \$9.3-\$10/ GJ range.

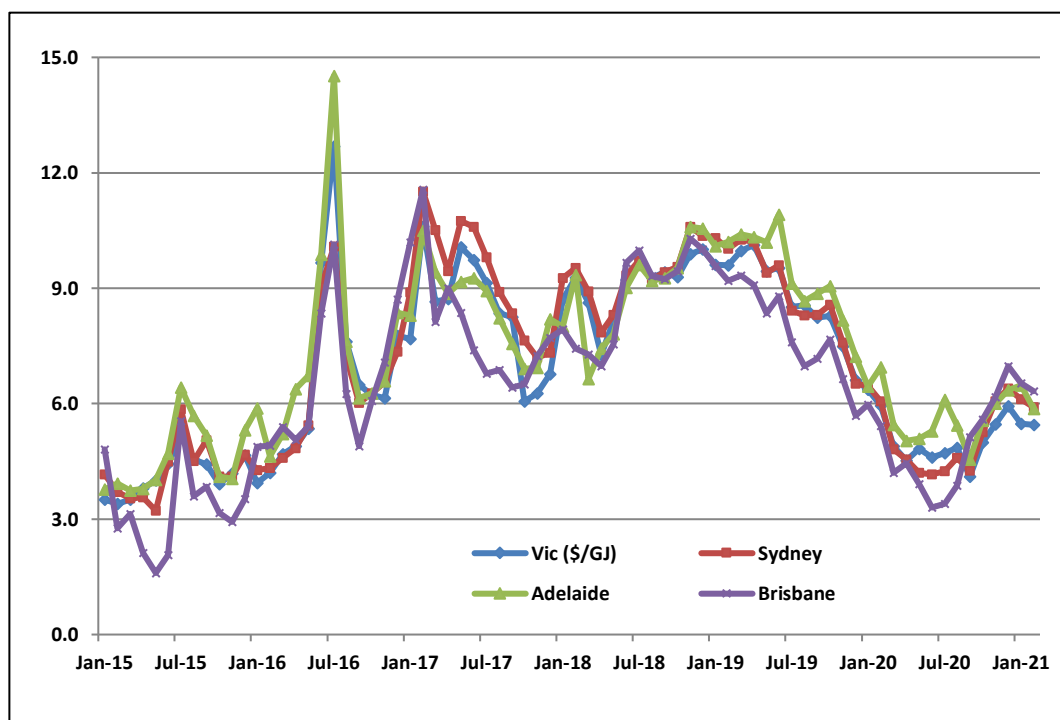


Figure 12: Monthly average gas prices at City Gate (A\$/GJ). Source: AER Weekly Gas Report



Appendix 1: Supporting Data on Qld CSG economics

Figure 13 shows financial results for Santos 30% owned GLNG coal seam gas project in the Surat Basin, Queensland. The critical data points are the average operating costs per unit of sales of US\$0.88, and the average unit capex for sustaining production, of US\$1.71, for a combined total of US\$2.6/GJ. Adjusting for the average A\$-US\$ exchange rate of 72c, generates a figure of A\$3.59/GJ. This data set had been adjusted from the Santos financial reports to remove LNG plant costs in order to derive costs for upstream production.

Santos share of GLNG		2017	2018	2019	2020	Tot 17-20
Production	GJ	67.7	71.1	75.4	77.7	292
Sales volume	GJ	131	128	128	130	517
Revenue	US\$M	769	1016	1055	793	3633
Revenue per unit	US\$/GJ	5.85	7.94	8.25	6.09	
Opex Inc. 3rd party	US\$M	447	446	431	365	1689
Production costs	US\$M	68	71	56	63	258
Opex per GJ	US\$/GJ	1.00	1.00	0.74	0.81	0.88
EBITDAX	US\$M	322	570	624	428	1944
Cash margin	%	42%	56%	59%	54%	54%
Capex	US\$M	190	244	260	193	887
Capex per unit	US\$/GJ	1.45	1.91	2.03	1.48	1.71
Field cashflow	US\$M	132	326	364	235	1057
Operating netback-%	%	17%	32%	35%	30%	29%
Total upstream opex+capex	US\$/GJ	2.45	2.91	2.78	2.29	2.60
A\$/US\$ rate		0.767	0.745	0.695	0.691	0.724
Total unit opex+capex	A\$/GJ	3.20	3.90	3.99	3.32	3.59

Figure 13. GL:NG financial snapshot, from Santos Annual reports 2017-2020

Figure 14 are Origin Energy's financial results for its 37.5% working interest in APLNG for the past 4 years. The aggregate unit opex plus capex upstream over the past 4 years is \$3.10/GJ

Origin share of APLNG	YT June	2017	2018	2019	2020	Total 17-20
Production	PJ	229	254	255	265	1003
Sales volume	PJ	228	255	254	251	988
Revenue	A\$M	1408	2073	2791	2662	8934
Cash opex	A\$M	549	668	668	747	2632
Upstream costs		332	318	285	393	1328
EBITDAX	A\$M	859	1405	2123	1915	6302
Cash Margin	%	61%	68%	76%	72%	71%
Upstream Opex/GJ	A\$/GJ	1.4	1.3	1.1	1.5	1.3
Capex	A\$M	513	439	485	345	1782
Capex / GJ	A\$/GJ	2.24	1.73	1.90	1.30	1.78
FCF	A\$M	346	966	1638	1570	4520
FCF/GJ	A\$/GJ	1.52	3.79	6.45	6.25	4.57
Total upstream opex+capex	A\$/GJ	3.69	2.98	3.02	2.78	3.10

Figure 14: Origin Energy share of APLNG, from Origin Energy Annual reports 2017-2020



Board and Management

The Board and management team have been together at Blue since 2013. Both Mr Ellice-Flint and Mr Phillips worked at senior levels for global oil companies and have direct relevance and experience in the east coast gas market, and CSG in particular

John Ellice-Flint. BSc(Hons) Harvard, AMP Executive Chairman

Mr John Ellice-Flint is an Australian-born businessman whose foresight and wide-ranging oil and gas industry credentials are recognised internationally. John has over 45 years of exploration, production, operations and commercial experience in the oil and gas industry and has held many senior positions with multinational exploration and production companies. John's achievements in the oil and gas industry are well-known and highly respected. Following a 26 year international career at Unocal Corporation serving in a variety of senior executive roles within strategic planning, exploration and technology functions, John became Managing Director and CEO of Santos Ltd, Australia's largest domestic gas producer, from 2000-2008. John guided Santos through a major growth period which culminated in the recognition of the potential of coal seam gas development through the Gladstone LNG (GLNG) export project in Queensland

John Phillips. BSc(Hons), GAICD Managing Director & CEO

John is a Petroleum geologist with over 35 years' experience in the oil and gas industry. John joined Blue Energy as Chief Operating Officer in May 2009, was promoted to CEO in April 2010 and joined the Board in June 2010. John's career in the industry has involved oil and gas experience in a variety of petroleum basins domestically and internationally. John has gained extensive operational experience through his involvement with Delhi Petroleum, Esso, Conoco, Petroz and Novus, culminating in his role as Chief Operating Officer with Sunshine Gas Ltd, before its take-over by QGC and subsequently the BG Group.

Mark Hayward. Non-executive Director

Mark comes to the Board following a long and distinguished career with Ernst & Young (EY) where he held various Australian and International roles as a senior executive and audit partner, with particular experience acting for large clients in the domestic and international energy sector

Rodney Cameron. BAdmin (Hons), MBA, FAICD, CPA Non-executive Director

Rodney has over 35 years industry experience, particularly in the energy and resource sectors. He is a seasoned financial executive having been CFO for an ASX-listed multi-national renewable energy company, as well as an executive director and CFO for a multi-national independent power generation company. Rodney has also worked in various management capacities for the National Australia Bank, Rio Tinto, Telstra, and Atlantic Richfield Inc.



Analyst Verification

I, **Stuart Baker** as the Research Analyst, hereby certify that the views expressed in this research accurately reflect our personal views about the subject securities or issuers and no part of analyst compensation is directly or indirectly related to the inclusion of specific recommendations or views in this research.

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Breakaway Research Pty Ltd (AFSL 503622) and its associates, or consultants may receive corporate advisory fees, consultancy fees and commissions on sale and purchase of the shares of **Blue Energy Limited** and may hold direct and indirect shares in the company. It has also received a commission on the preparation of this research note.

We acknowledge that Senior Research analyst, Stuart Baker, holds shares in Blue Energy Ltd.

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