

AUSTRALIAN

# RESEARCH

INDEPENDENT INVESTMENT RESEARCH

## Blue Star Helium Ltd (ASX:BNL | OTCQB:BSNLF)

November 2022

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## Investment Profile

Share Price (\$) at 11 November 2022 0.035

### Issue Capital:

Ordinary Shares (M) 1586.2

Options (M) 34.4

Performance Shares 91.0

Fully Diluted (M) 1711.5

Market Capitalisation (undiluted A\$MM) \$55.5

12 month L/H (\$) 0.025-0.069

## Board and Management

### Directors

Ross Warner – Executive Chairman  
Trent Spry - Managing Director  
Neil Rinaldi – Non Executive Director  
Peter Kondrat - Chief Operating Officer  
Scott Fenoglio - Chief Financial Officer  
Amanda Wilton-Heald - Company Secretary

## Major Shareholders

Credit Suisse 5.0%

Board & Management 4.0%

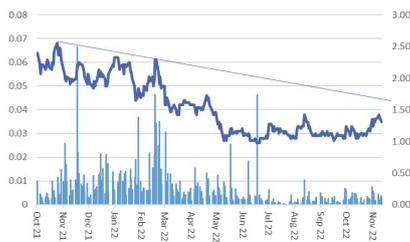
Pamplona 3.8%

Hugh Warner 3.1%

Nikola Krkovski 2.5%

Top 20 37.1%

## Share Price Performance



## INTRODUCTORY HEADING

Blue Star Helium Ltd (ASX:BNL | OTCQB:BSNLF) is a helium exploration company, headquartered in Australia, with operations in the USA. Its strategy is to find and develop new supplies of low cost, high-grade helium in the USA. Its land holdings surround the Model Dome field which produced helium at an average 8% concentration in the early 1900's. Helium is used to super cool Magnetic Resonance (MRI) scanners, in semi-conductor manufacture, purging tanks on space launch vehicles, and other specialty gas applications. Capital barriers to entering the industry will be low if Blue Star can drill up sufficient high grade helium. This report uses US oil and gas industry practice which uses M=thousand and MM= million for both volume and financial numbers.

## KEY POINTS

**News flow is accelerating** – During the company's successfully executed leasing program, there were frustrating delays to well approvals, which has tested the patience of shareholders. However, the speed of well approvals, the execution of well drilling and the company's own work around exploratory water wells is resulting in a significant increase in activity, and the results are delivering the hoped for outcomes, with low drilling costs and high helium grades.

**Commitment to construction in March 2023 quarter** - The company expects to deliver more Contingent Resources, project design and costings, sales contracts, funding and commencement of production over the next 12 months, and that news flow is expected to start very soon. Our valuation assumes US\$20MM per project for five production wells, separation plant and infrastructure processing 2.5MMcf/day raw gas.

**All In Costs in the first full year of operation** are estimated to be US\$65.6/Mcf; for Voyager at 8% helium concentration in the feed gas, US\$73.1/Mcf for Galactica at 5%, US\$72.9Mcf for Enterprise at 6%; and US\$114.3/Mcf for Pegasus at 3%.

**Our valuation assumes a selling price of US\$300/Mcf** - Current selling prices range from US\$250/Mcf to over US\$600/Mcf for bulk gas, with the higher prices for helium in liquid form. There is no spot market for helium that allows price discovery or monitoring, and sales require generally long term offtake contracts with pricing that can be only partly market related. Some of Blue Star's peers have negotiated sales agreements with price hints (eg Royal Helium provided market guidance of a selling price of US\$450/Mcf then negotiated an offtake contract and did not amend the guidance).

**CO<sub>2</sub> by-product is potentially valuable** – Galactica/Pegasus has 3-6% helium and 55-74% carbon dioxide, which can earn cash if sequestered, or if sold to the oil industry as a reservoir performance enhancer, or to the food and beverage industry. There are specialist carbon dioxide collection pipelines within 10miles of the western side of Blue Star's tenements.

**Cash on hand on 30 September 2022 was A\$9.05M** - with zero debt

### Strong news flow between now and mid 2023

- ◆ 13 wells proceeding in application with approval likely from December 2022 to May 2023, with 19 more wells approved by mid 2023
- ◆ Resource estimate update for Galactica/Pegasus due by year end
- ◆ Plan of development for the Voyager and Galactic/Pegasus processing facilities expected by year end
- ◆ With the completion of these announced programs, sales contracts/helium marketing arrangements are potential announcements which we believe will further focus the market's attention.

## VALUATION – COMPANY CURRENTLY TRADING ON 2X CY24 FORECAST EARNINGS

Our valuation is based on the development of Voyager, Galactica, Pegasus and Enterprise, and ascribes no value for Argo, Galileo, Serenity or Prometheus. The funding of any development is assumed to be by debt or leasing arrangements for Voyager and Galactica, and cash flow from those two will pay for the development of the others.

At US\$300/Mcf selling price long term, Blue Star is worth A\$0.131/sh and earnings at that price are forecast to be A\$0.016/sh in CY24 and A\$0.022/sh in CY25, meaning the company is trading on a Price Earnings Ratio of 1.6x to 2.3x. The Australian market trades on 14.9x at present, and on that multiple, Blue Star would be worth between A\$0.23/sh and A\$0.33/sh.

## INVESTMENT PROPOSITION

### EARNINGS ARE COMING

Initial earnings will be very strong, and as those earnings come into focus, the share price is likely to react upwards. Focus on earnings will be driven by news flow, of which there will be plenty in the next 12 months, with the most significant being a decision to start construction some time in the March 2023 quarter.

The major risks to our valuation estimates are the selling price, and our estimate of costs. Relative to the operating costs quoted by peers promoting other projects, our operating costs are high, in some cases double, so we believe the risk on costs is that they could be lower. On price, the US\$300/Mcf we have chosen is also close to the bottom end of the range.

### LOW PRE-PRODUCTION CAPEX ENTRY TO LONG TERM CASH FLOW

The investment proposition has not changed from the IIR June 2020 initiation report. Helium continues to be an appropriate business for Blue Star to be in for the following reasons:

- ◆ Given the high concentrations of helium that Blue Star is discovering, helium production will be a high margin business at over 60% (EBITDA/Sales).
- ◆ The pre-production capital cost to enter the business could be very low ie just the well drilling cost of an estimated \$400,000-500,000 per production well and surface infrastructure, with third parties available to supply power generation, gas separation, storage and trucking. If Blue Star paid for the processing plant, we estimate the pre-production cost to be US\$20MM per project.
- ◆ The exploration risk is mitigated by Blue Star's initial technical success with its exploratory water well drilling programs and the proximity of the Model Dome field (8% He), the Government drilled Cynthia True No1 well (8% He) and others. The helium shows detected in the soils within the leases indicate helium in the subsurface, and porosity and permeability data is available from past wells drilled on Model Dome and in the general region, close to the boundaries of the company's tenements. The risk is further mitigated by the low cost of drilling at US\$300,000-400,000 per dry hole.
- ◆ The support infrastructure is considerable, which significantly reduces the technical risks relating to exploration, construction, and operation, with a large community of contractors, consultants and equipment providers.
- ◆ Discoveries are scalable. Blue Star can start small and grow on the back of cash flow.
- ◆ There are a number of offtake parties, and the market, while opaque, is highly developed, with examples of small capitalisation peers signing long term contracts with specialty gas corporations as well as major end users and proceeding towards production.

### Helium price outlook

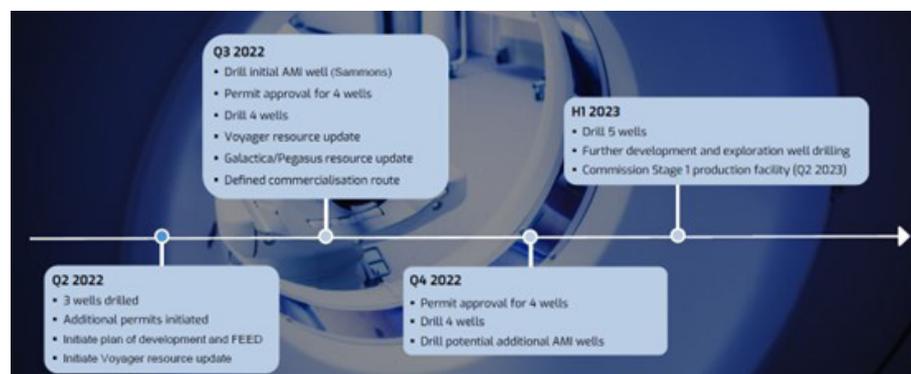
- ◆ The helium price is very strong at present due to the same unexpectedly strong demand growth post COVID as has been seen in other commodities and to the explosion at the Russian Amur Liquefied Natural Gas project which has delayed the bulk of expected new supply for the next two years. Beyond that period, the market may want to limit its dealings with Russia given the possibility of Ukraine conflict related sanctions. Presently, a number of demand segments are being rationed.

### Value adding stages

- ◆ Blue Star Helium must deliver on a number of steps, each of which should be rewarded by the market, subject to general market conditions outside Blue Star's control.
- ◆ Step 1 is to **convert the Prospective Resources** into Contingent Resources. This has been delivered for Voyager, and it is likely that sufficient drilling has been completed to generate Contingent Resources on Galactica and Pegasus with an announcement possible before year end.
- ◆ Step 2 is to **deliver a Feasibility Study/Plan of Development**. This could also take place in the next two months.
- ◆ Step 3 is **offtake contracts/marketing arrangements**. Other small capitalization helium project promoters have demonstrated that major gas supply companies and end consumers are prepared to offer offtake contracts at the project stage, and pre-pay in cash against the contract if requested.
- ◆ Step 4 is **funding**, with considerable likelihood that the plant could be leased from the manufacturer, and truck and trailer fleet required for product delivery to market can be leased or funded by haulage contractors. We expect that Blue Star will have to provide the capital for the drilling and well completion, the access roads, support buildings and general support infrastructure, and start up working capital. Our valuation assumes the transport fleet is leased and the rest is funded by debt. NASCO Energie, an unlisted peer of Blue Star, was able to borrow US\$83M in 2020 against an 11 year 130MMcf/yr contract with Praxair. The contract had a guaranteed minimum price of US\$105/Mcf and in 2020 the contract price was around US\$260/Mcf. Blue Star's Voyager plus Galactica on IIR forecasts will produce around 102MMcf/yr.
- ◆ Step 5 is **project execution** into full production.
- ◆ Step 6 is **upscale and grow** the business, using operating cash flow to fund further exploration, and adding additional production modules to increase production. This would be low risk organic growth, supported by the company's extensive lease portfolio.

## NEWS FLOW – THE DRIVER OF RE-RATING

Figure 1 Activity driven news flow to mid 2023



Source: BNL presentation 10 August 2022

### Drilling is accelerating with a high probability of discovery

Blue Star Helium is using water wells for exploration because they require only landowner agreement and allow reservoir testing to best locate the production wells. The gas wells approval process takes over eight months, and when approved they will be used for production. While this means that the company is spending cash on water wells that can never produce, the benefit is that the water wells dramatically upgrade its knowledge of field and reservoir in advance of starting the long approval process for gas wells.

### Well names vs prospect names

Wells are named after the owner of the land on which the tenement resides, so on the Galactica prospect, Blue Star is seeking approval to drill State 09 and State 16 on State of Colorado land, and Jackson 5, 7, 29, and 33, on land that comprises the Jackson Ranch. As wells get closer to approval the company switches reference from Galactica (2) to State 09 and 16.

The four well permits scheduled for November/December 2022 comprise the two Galactica and two Pegasus wells which have been approved by the Colorado Oil and Gas Conservation Commission and only need Form 2 approval which is almost certain to be by December.

The three Jackson wells estimated for approval in February 2023 have completed the review stage which tends to take the longest time and the remaining stages appear to take a fairly predictable amount of time.

**Table 1 Estimated timing of receipt of production well drilling approval permits – Permits=Drilling=Newsflow**

Month	Wells Permitted	Comment
Dec-22	4	Galactica (2) Pegasus (2) - Almost certain
Jan-23		
Feb-23	7	Jackson (3) Highly Likely; Galactica (3) Pegasus (1) - Likely
Mar-23	2	Voyager (2) - Likely
Apr-23		
May-23	6	IIR estimate
Jun-23	6	IIR estimate
Jul-23	6	IIR estimate

Source: Table 4

The six wells scheduled for February and March 2023 approval include three for Galactica, two for Voyager and one for Pegasus. They were lodged at the same time or earlier as the three Jackson wells, and the two Voyager wells completed the Review stage on 20 October 2022, so the other four wells could clear the Colorado Oil and Gas Conservation Commission Review stage any time. The Voyager wells should be approved for drilling by mid-February 2022. For the remaining we have assumed Review completion by 20 November followed by 116 days.

There are 18 applications in the final permit preparation stage, and we expect all those applications to start to flow into the approval pipeline from December onwards, with final approvals likely in a May to July 2023 timeframe.

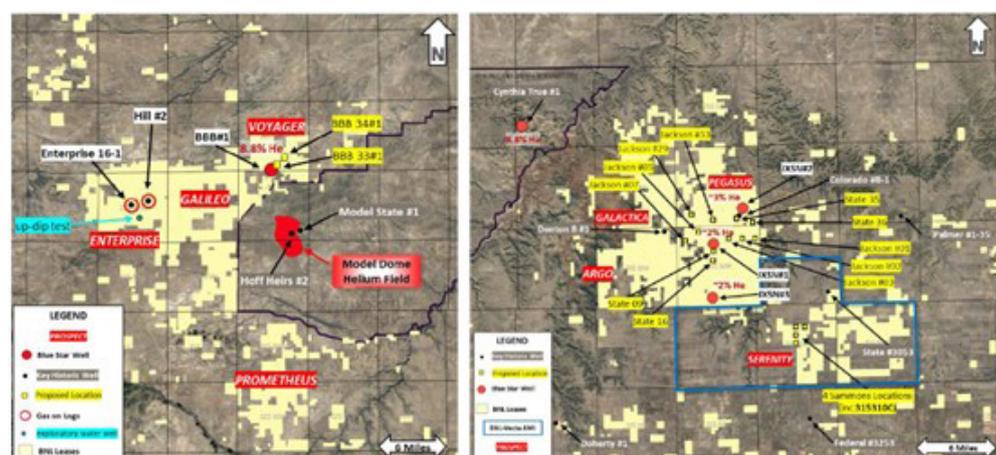
We expect a high degree of success from drilling all these wells, and that there is a very high chance that all will be completed as production wells, which is likely to be a significant positive for the market sentiment.

**Table 2 Blue Star Drilling to date (all in 100% working interest ground with 87.5-85% revenue interests)**

Drilling History	Date	Helium %	Gas Column ft	Net Pay ft	Stabilized Flow Rate Mcf/d
Galactica JXSN 1	16-Jun-22	1.98%	217.5	143.5	412
Pegasus JXSN 2	16-Jun-22	3.14%	101.0	101.0	202
Galactica JXSN 3	16-Jun-22	2.14%	230	153.5	412
Voyager BBB 1	17-Nov-21	8.8%	134.0		
Enterprise 16-1	21-Dec-21	Detected	3		
Hill 2	21-Dec-21	Detected	29.0		
Sammons 315310C (50%)	19-Sep-22	Pending	55.0	15.0	
Galactica JXSN 4	2-Sep-22	4.20-6.06%	233.5	133.5	N/A

Source: BNL releases at dates in column 2 – All are water wells except for Enterprise 16-1

**Figure 2 17 exploration wells (yellow) and one planned water well (blue) of the planned 56 wells**



Source BNL presentation 10 August 2022

**Table 3 Status of production well permitting at 3 October 2022 (including 9 wells added since the 23 May 2022)**

Prospect	Location Selected	Survey	Permit in Preparation	COGCC Review	COGCC Hearing	Form 2	Issued	Total
Enterprise	1	2	1				1	5
Galactica	4	3	5	3		2		17
Galileo			3					3
Pegasus			6	1	3	2		12
Voyager	10		3		2			15
Serenity (BNL 50%)						3	1	4
Total	15	5	18	4	5	7	2	56
Total 23 May 22	8	15	13	2	4	3	2	47

Source: BNL release 3 October 2022. COGCC means Colorado Oil and Gas Conservation Commission

- ◆ The two Issued (ie approved) wells are Enterprise 16-1 which has been drilled and tested and Sammons 315310C (Blue Star interest 50%) which has been completed and awaiting test results.
- ◆ The four wells which have completed the COGCC hearing are the program at Galactica/Pegasus prospects.
- ◆ Voyager prospect being fast tracked for development after breakthrough success of BBB#1 exploratory water well which returned a 134 ft gas column in the Lyons formation with a calculated air-free helium concentration of 8.8%. Five well are going through the approval process, with 10 more planned. The two wells in the COGCC Hearing column completed the review stage on 20 October 2022.
- ◆ Enterprise 16#1 well was on the edge of the structure. If additional drilling at Enterprise establishes Reserves sufficient to sustain production, this well is likely to be completed as a water injection well.
- ◆ Rolling permitting and drilling campaign is advancing with 54 additional well permits in process and 14 helium wells (including Enterprise 16#1 and Sammons 315310C) targeted to be permitted and drilled by mid 2023 with additional exploratory water wells front running gas well approvals. The cost of the 14 wells will be of the order of US\$5.6M or A\$8M, so BNL has sufficient cash if all the wells are approved on the hoped for time frame.

**Table 4 Historical approval timetable reported so far and our estimated time to approval**

	Enterprise 16-1	State 9,16, 35, 36	Jackson 1-3	G/P 4	V2
Initial Permit Submission	28-Apr-21	28-Jan-22	1-Aug-22	1-Aug-22	23-May-22
Completeness Review by COGCC	23-Aug-21	19-Jul-22	3-Oct-22	28-Sep-22	18-Oct-22
End of period pf public petitions	27-Sep-21	18-Aug-22	2-Nov-22	28-Oct-22	17-Nov-22
COGCC Hearing	27-Oct-21	14-Sep-22	28-Dec-22	23-Dec-22	12-Jan-23
COGCC Notified Approval Form 2A	28-Oct-21	15-Sep-22	29-Dec-22	24-Dec-22	13-Jan-23
Final Form 2 Submitted	11-Nov-21	3-Oct-22	16-Jan-23	11-Jan-23	31-Jan-23
Well Permitted and clear to drill	23-Dec-21	12-Nov-22	25-Feb-23	20-Feb-23	12-Mar-23
<b>Time in days between each step</b>					
Completeness Review by COGCC	117	172	65	100	148
End of period pf public petitions	35	30	30	30	30
COGCC Hearing	30	27	56	56	56
COGCC Notified Approval	1	1	1	1	1
Form 2A Submitted	14	18	18	18	18
Well Permitted and clear to drill	42	40	40	40	40
Total Days	239	288	210	245	293

Source: BNL releases on dates noted in table. Red = IIR estimates. G/P 4 means the 4 wells in Galactica/Pegasus projects at the review stage in Table 3

The time required to generate Initial Permit Submissions has not been evaluated. We believe the apparent delays in starting the process are a deliberate decision by Blue Star due to the need to see the results of additional drilling (usually water wells) before starting the process.

## NEW RESOURCE ESTIMATION UNDER WAY

The independent resource consultant, Sproule, has been engaged to update the Galactica/Pegasus Resource by the end of 2022.

Following the recent discoveries at Galactica/Pegasus, Blue Star expects that Sproule may have sufficient information to declare at least a Contingent Resources (Source 23 May 2022).

This is extremely significant because the Resources reported to date have been Prospective in category of confidence, and as Figure 14 shows, that meant they were “Undiscovered”, that is they are exploration targets.

The drilling completed by Blue Star will provide data on gas column height, helium grade, reservoir porosity and permeability, which is likely to be sufficient to allow the declaration of Resources for both targets as “Discovered”.

## PROJECT DESIGN AND PLANNING ALSO UNDER WAY

Consulting group SIGIT was appointed by BNL to plan the development of the Las Animas Helium project with the scope set to include:

- ◆ Plant asset optimisation including an assessment of power options;
- ◆ Gathering system design; and
- ◆ Front End Engineering and Design (FEED) for the processing plant including an evaluation of technology providers and other long lead suppliers, scheduling and total installed cost for the facilities.

The FEED study initially included consideration of a joint development of Voyager with the nearby Enterprise prospect (per release of 10 May 2022) and this scope was enlarged to include a separate development at the Galactica/Pegasus and Serenity prospects (per release of 23 May 2022).

This study is intended to be the equivalent of a final Feasibility Study, at least on the surface aspects of the project. On completion, it may still have to wait for the completion and testing of additional wells. However, if the planned well drilling program is completed and the results are as hoped, this study would lead rapidly to funding and a Final Investment Decision, with offsite plant construction potentially occurring at the same time as well approvals and drilling.

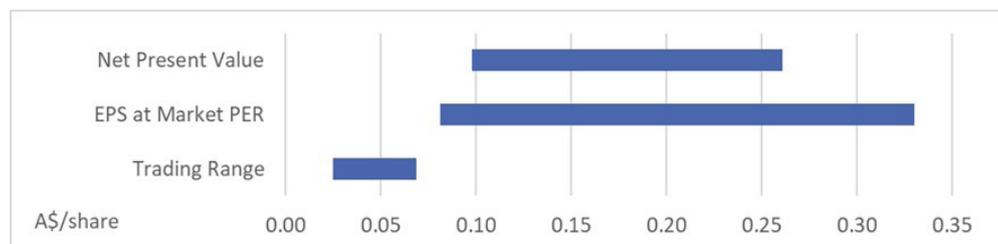
The study is scoped to assess potential equipment suppliers and is likely to include discussions and possible identification of a group of preferred suppliers or even the selection of the equipment suppliers.

Part and parcel of the supplier selection is likely to be the role of vendor finance, with the supplier either renting the plant, with or without operators, leasing the plant or selling the plant outright to Blue Star.

## VALUATION

### SUMMARY

Figure 3 Valuation range of A\$0.09/sh to A\$0.25/sh supported by both NPV and PER estimates



Source: IIR estimates

Table 5 Summary of valuation methods

	Low	High
Trading Range	0.025	0.069
EPS at Market PER	0.081	0.33
Net Present Value	0.098	0.261

Source: IIR estimates

- ◆ Net Present Value: Central value of A\$0.131/sh within a range of A\$0.081/sh to A\$0.261/sh
- ◆ Using Central Earnings Per Share at the ASX Market PER gives a range of A\$0.081/sh to A\$0.330/sh
- ◆ The wide variability on Resource data quality and disclosure makes comparative peer valuation problematic, so this form of valuation has not been applied. If Blue Star can start helium production and sales in the second half of 2023, it is likely that it will be a comparable business to Desert Mountain Energy, which has an Enterprise Value of A\$304MM. If that EV is adjusted for the US\$40MM in debt we expect Blue Star will have, the implied BNL share price would be A\$0.155/sh which is consistent with our valuation range.

**Table 6 Valuation range based on Central Case earnings and the average ASX Market PER at 18 November 2022**

	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27
Blue Star Earnings per Share AUD cps	0.005	0.016	0.022	0.023	0.025
Australian market PER	14.9	14.9	14.9	14.9	14.9
Valuation A\$/sh	0.081	0.232	0.330	0.345	0.372

Source: IIR estimates, ASX

## VALUATION BY CASH FLOW

### Blue Star pricing in US\$150/Mcf for helium when market is US\$300-500/Mcf

On our cost and volume assumptions, the Blue Star Helium at A\$0.035/sh (ie around the current price) is factoring in a helium gas price of US\$150/Mcf, at an AUDUSD exchange rate of 0.68 and no carbon dioxide by-product credits.

Our base case assumes a helium price of US\$300/Mcf and a carbon dioxide credit of US\$4/Mcf which we see as conservative. The price Blue Star will receive for its helium is dependent on its marketing strategy and on how the capital expenditure of its initial project or projects is or are funded. Marketing strategy and funding are linked.

If Blue Star can raise sufficient equity from the market, it will be able to build capacity then sell directly to end customers, which is the pathway to maximising its selling prices. If the equity market is unsupportive, Blue Star should be able to borrow the required capital, which is we estimate to be US\$20MM per project, but the lenders will require the project sales to be locked into a fixed price fixed volume offtake contract, and that kind of contract is likely to be priced at a lower level, which we believe would be in the US\$250-350/Mcf range.

At the current share price of around A\$0.035/sh, and a market capitalisation of around A\$60MM, debt with an offtake contract or leasing appear to be a better options for shareholders, on the initial one or two projects, leaving the balance to be funded from cash flow or equity issuance. Leasing may provide more marketing flexibility than would be required for debt.

### Base case valuation A\$0.131/sh

**Table 7 Net Present Valuation over time at US\$300/Mcf helium price (NPV at December 2022 is A\$0.131/sh)**

A\$MM	Dec-22	Dec-23	Dec-24	Dec-25	Dec-26
Voyager	62.1	89.2	82.6	73.2	63.4
Galactica	69.0	99.3	98.5	96.2	93.9
Pegasus	26.7	29.5	58.1	57.6	56.4
Enterprise	44.2	48.8	75.0	71.6	66.3
Corporate Overhead	-12.8	-12.6	-12.5	-12.3	-12.2
Cash on hand	9.1	30.8	18.8	56.5	97.7
Debt	0.0	-44.1	-33.1	-22.1	-11.0
Recognised Tax Asset	9.2	3.9	-4.7	-10.4	-11.9
Net Working Capital	0.0	-4.5	-4.0	1.2	1.2
Operating Assets	207.6	240.2	278.8	311.4	343.9
Exploration Risked 20%	0.0	0.0	0.0	0.0	0.0
Valuation A\$MM	207.6	240.2	278.8	311.4	343.9
Valuation A\$/sh	0.131	0.143	0.164	0.183	0.202
Issued Shares MM	1586	1684	1702	1702	1702

Source: IIR estimates

Based on our review of the US helium industry, we believe the lowest possible long term contract price would be around US\$250/Mcf, but more likely to be at least US\$300/Mcf or potentially more. This is based on the 2021 selling price achieved by unlisted peer NASCO Energie and forecasts from that company by an industry consultant summarised in Figure 28, as well as vague comments from peers.

Our valuation assumes zero inflation, which is effectively a forecast that in the current high inflation environment, prices will track costs and margin will be maintained. If we start trying to second guess cost inflation and price inflation in this environment, there could be unintended margin impacts.

### Sensitivity to helium prices A\$0.038/sh increase for US\$50/Mcf price rise

- ◆ Sensitivity to helium price: \$50/Mcf increase adds A\$0.038/sh to NPV
- ◆ Sensitivity to carbon dioxide profit: \$10/Mcf increase adds A\$0.048/sh to NPV
- ◆ Sensitivity to AUDUSD on the base case US\$300/Mcf is a reduction in NPV of A\$0.012/sh per 0.05 increase from 0.68

**Table 8 Sensitivity to helium prices**

Helium Sales Price US\$/Mcf	250	300	350	400	500
Voyager A\$MM	46.2	62.1	78.0	93.9	125.7
Galactica A\$MM	53.8	69.0	84.2	99.5	130.0
Pegasus A\$MM	18.4	26.7	35.0	43.3	59.9
Enterprise A\$MM	31.6	44.2	56.8	69.5	94.8
Corporate Overhead A\$MM	-12.6	-12.8	-12.8	-12.9	-12.9
Cash on hand A\$MM	9.1	9.1	9.1	9.1	9.1
Debt A\$MM	0.0	0.0	0.0	0.0	0.0
Recognised Tax Asset A\$MM	9.7	9.2	8.7	8.3	7.4
Net Working Capital A\$MM	0.0	0.0	0.0	0.0	0.0
Operating Assets A\$MM	156.1	207.6	259.1	310.7	414.0
Exploration Risked 20% A\$MM	0.0	0.0	0.0	0.0	0.0
Valuation A\$MM	156.1	207.6	259.1	310.7	414.0
Valuation A\$/sh	0.098	0.131	0.163	0.196	0.261
Issued Shares MM	1586.2	1586.2	1586.2	1586.2	1586.2

Source: IIR estimates

### Key valuation assumptions

Our earnings forecasts are based on the following assumptions:

- ◆ Helium price US\$300/Mcf.
- ◆ AUDUSD exchange rate 0.68.
- ◆ Royalty payments at 15% of gross revenue which is at the high end of the likely range.
- ◆ Each project starts with five production wells, a water disposal/carbon dioxide sequestration well, collection pipelines, separation plant and supporting infrastructure for a total cost of US\$20MM.
- ◆ Construction time is six months from the investment decision to completion of ramp up, so for Voyager and Galactica, the investment decision is in January 2023, and full production is from July 2023.
- ◆ Voyager and Galactica commence production first funded by US\$40MM of debt, Pegasus and Enterprise follow a year later, funded by cash flow.
- ◆ Operating costs assume the sales product is compressed helium gas in road trailers, and have been estimated using comparison with costs from peer company NASCO Energie in section starting p 29.
- ◆ Our base case also assumes a profit on carbon dioxide sequestration of US\$4/Mcf CO<sub>2</sub>, with most of the value being at Galactica and Pegasus.
- ◆ After the initial five production wells, additional production wells are added to maintain output, with an additional seven at Voyager, 19 at Galactica and Pegasus each and ten at Enterprise.

- ◆ Production life - In Voyager's case, that is limited by 2C Resources, but for the other projects, production ceases before 2U resources are exhausted. This is a conservative position in case the to be announced Contingent Resources volumes for Galactica and Pegasus are lower, despite indications that they will be higher.
- ◆ Contained helium for Galactica, Pegasus and Endeavour have been estimated using the 2U Prospective Resource raw gas (ie reported helium volume divided by 8% helium assumed by the consultants) and adjusting down the helium content to reflect the helium concentrations found in recent drilling (Galactica 5%, Pegasus 3%) and for Enterprise 6% has been used in the absence of any drilling results (See Recalculated Resource Table 19).

Table 9 shows the life of operation data for the four projects. The operating costs are for the life of operation averages and reflect the steep rise in operating cost at the end of life which is shown in Figures 4-7. That increase can be deferred by drilling more wells if sufficient Resources are confirmed.

Table 10 shows the operating costs for each project in the first full year of operation. These costs could be sustained if additional wells were added to maintain volumes, if there were sufficient Resources.

The economics of Pegasus would improve if the development was larger scale at the start (ie higher volume) and recovered more of the Resource.

### COST OF CAPITAL: WACC OF 10.3% USED IN VALUATION

The table below shows the standard build up of a weighted average cost of capital. The beta in this case is as estimated by IIR because the calculated beta from the source is -18.5 due to the Blue Star Helium share price being highly inversely correlated to the ASX All Ordinary Index. Using such a number would produce a nonsense cost of capital.

We have used a cost of capital that assumes zero debt, generating a cost of equity of 10.32%. If we had used a portion of debt, the Weight Average Cost of Capital that is lower. Our financial model assumes 100% debt for Voyager and Galactica and cash flow (ie 100% equity) for the others.

**Table 9 Estimation of Weighted Average Cost of Capital**

Cost of Equity	Blue Star	
Beta	2.00	IIR estimate see: <a href="https://au.finance.yahoo.com/quote/BNL.AX?p=BNL.AX&amp;.tsrc=fin-srch">https://au.finance.yahoo.com/quote/BNL.AX?p=BNL.AX&amp;.tsrc=fin-srch</a>
Risk free rate (Rf)	3.7%	<a href="https://www.rba.gov.au/statistics/tables/">https://www.rba.gov.au/statistics/tables/</a>
Market Risk over Rf	3.3%	<a href="http://www.market-risk-premia.com/au.html">http://www.market-risk-premia.com/au.html</a>
Market premium (Rm)	7.0%	<a href="http://www.market-risk-premia.com/au.html">http://www.market-risk-premia.com/au.html</a>
Cost of Equity	10.3%	$Ke = Rf + Beta(Rm - Rf)$
<b>Gearing</b>		
Gearing D/(D+E)	0.0%	
Gearing E/(D+E)	100.0%	
<b>Nominal WACC</b>		
Cost of Equity $Ke$	10.3%	
Cost of Debt $Kd$	8.1%	LIBOR plus 2.5%
Tax Rate	27.5%	
Weighted Average Cost of Capital	10.32%	$W = (Ke * (E/V)) + (Kd * (1-t)*(D/V))$
<b>Real WACC</b>		
Expected Inflation	2.0%	
Therefore, Real WACC	8.1%	$(1+real) = (1+Ke)*(1+I)-1$
Inflation linked Bond	1.6%	<a href="https://www.rba.gov.au/statistics/tables/">https://www.rba.gov.au/statistics/tables/</a>

Sources: as disclosed in column three

Table 10 Key financial and operating metrics for the four projects in the valuation

	Voyager	Galactica	Pegasus	Enterprise
<b>Share of Resource in Valuation</b>				
Resources Category	2C	2U	2U	2U
Raw Gas Volume MMcf	8038	54938	42788	27550
Helium concentration %	8.0%	5.0%	3.0%	6.0%
Recoverable Helium MMcf	643	2747	1284	1653
Helium Produced MMcf	596	769	459	564
Production/Resource	92.6%	28.0%	35.7%	34.1%
<b>Production MMscf/yr</b>	7445	15371	15289	9398
Helium Content	8.0%	5.0%	3.0%	6.0%
Recovery	98%	98%	98%	98%
Output Helium MMscf	584	753	449	553
Sales Gas Grade	98%	98%	98%	98%
Sales Gas Production MMscf	596	769	459	564
<b>Operating Costs</b>				
Staff	6.1	8.6	7.9	6.5
Heavy Equipment	2.1	2.9	2.6	2.2
Electricity (Variable)	1.5	3.1	3.1	1.9
Maintenance (Variable)	2.6	5.3	5.3	3.3
Hauling to Ladder Creek (Var.)	4.6	6.0	3.6	4.4
Helium trailers Leased	2.4	3.1	1.8	2.2
AMCS Plant Lease	0.0	0.0	0.0	0.0
Total Costs	19.3	28.9	24.3	20.4
Operating Cost US\$/Mcf	40.0	39.4	57.8	43.4
AISC US\$/Mcf	79.4	77.8	122.1	85.5
<b>Financials US\$MM</b>				
Net Revenue	155.0	234.6	145.5	143.8
Opex	-19.3	-28.9	-24.3	-20.4
D&A	-23.2	-29.4	-29.2	-23.4
EBIT	112.5	176.3	92.0	99.9
Tax	-31.5	-49.4	-25.8	-28.0
NPAT	81.0	127.0	66.3	72.0
Capital Expenditure	23.5	29.5	29.5	23.7
Free Cash Flow	80.8	126.8	66.0	71.7
NPV	34.7	38.6	16.5	27.2
<b>Cash Flow A\$MM</b>				
Free Cash Flow post tax A\$MM	118.8	186.5	97.0	105.4
NPV A\$MM	62.1	69.0	26.7	44.2

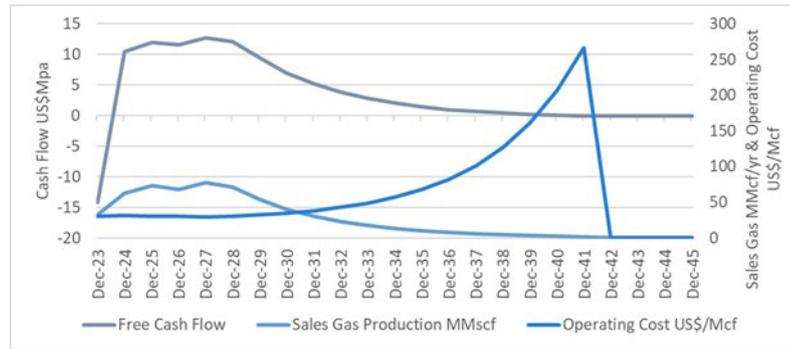
Source: IIR estimates

Table 11 Costs in first full year of production

	Voyager	Galactica	Pegasus	Enterprise
Production MMscf/yr	782	782	782	782
Helium Content	8.0%	5.0%	3.0%	6.0%
Contained Helium MMscf/yr	62.5	39.1	23.5	46.9
Recovery	98%	98%	98%	98%
Output Helium MMscf	61	38	23	46
Sales Gas Grade	98%	98%	98%	98%
Sales Gas Production MMscf	63	39	23	47
Operating Costs	1.6	1.4	1.2	1.4
Operating Cost US\$/Mcf	26.1	34.7	50.0	30.9
AISC US\$/Mcf including pre-production capital	65.6	73.1	114.3	72.9

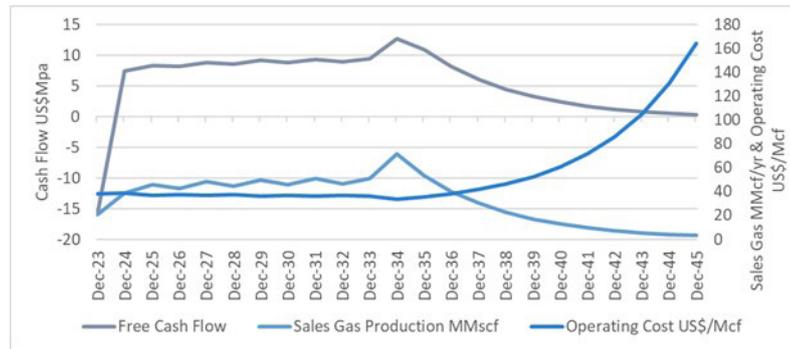
Source: IIR estimates

Figure 4 Voyager Project over its life limited by the 2C Resource



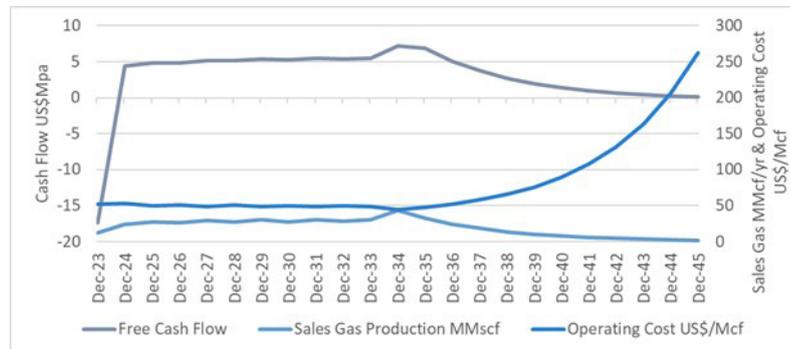
Source: IIR estimates

Figure 5 Galactica project over its life as limited the modelling limit of 24 wells



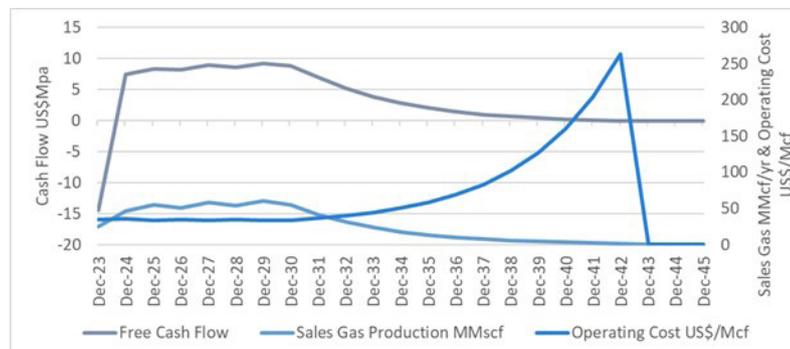
Source: IIR estimates

Figure 6 Pegasus project over its life as limited by the modelling limit of 24 wells



Source: IIR estimates

Figure 7 Enterprise project over its life as limited by modelling limit of 15 wells



Source: IIR estimates

## VOYAGER AS AN EXAMPLE OF OPERATING DETAIL

Table 12 Voyager Project - Key physical operating parameters and operating cost build up

Voyager	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27	Dec-28
<b>Well Performance</b>						
Capacity MMscf/d	2500	2380	2789	2597	2953	2720
Availability	90%	90%	90%	90%	90%	90%
Production Mscf/d	2250	2142	2510	2337	2657	2448
Production MMscf/yr	411	782	916	853	970	894
Helium Content	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
Contained Helium MMscf/yr	33	63	73	68	78	71
<b>Separation</b>						
Input Contained Helium MMscf	33	63	73	68	78	71
Recovery	98%	98%	98%	98%	98%	98%
Output Helium MMscf	32	61	72	67	76	70
Sales Gas Grade	98%	98%	98%	98%	98%	98%
Sales Gas Production MMscf	33	63	73	68	78	71
<b>Capex</b>						
Production Well Cost US\$MM	2.5	0.5	1.0	0.5	1.0	0.5
Salt Water Disposal Well Cost US\$MM	0.5	0.0	0.0	0.0	0.0	0.0
Dry Holes US\$MM	0.0	0.0	0.0	0.0	0.0	0.0
Infrastructure US\$MM	2.0	0.0	0.0	0.0	0.0	0.0
Separation Plant US\$MM	15.0	0.0	0.0	0.0	0.0	0.0
<b>Total Capital US\$MM</b>	<b>20.0</b>	<b>0.5</b>	<b>1.0</b>	<b>0.5</b>	<b>1.0</b>	<b>0.5</b>
<b>Operating Costs US\$MM</b>						
Staff	0.2	0.3	0.3	0.3	0.3	0.3
Heavy Equipment	0.1	0.1	0.1	0.1	0.1	0.1
Electricity (Variable)	0.1	0.2	0.2	0.2	0.2	0.2
Maintenance (Variable)	0.1	0.3	0.3	0.3	0.3	0.3
Hauling to Ladder Creek (Var.)	0.3	0.5	0.6	0.5	0.6	0.6
Helium trailers Leased	0.1	0.2	0.3	0.3	0.3	0.3
AMCS Plant Lease	0.0	0.0	0.0	0.0	0.0	0.0
<b>Total Costs</b>	<b>0.8</b>	<b>1.6</b>	<b>1.8</b>	<b>1.7</b>	<b>1.9</b>	<b>1.8</b>

Source: IIR estimates – refer pp 28-32 for background

Table 13 Voyager Project – Revenue calculation. Profit and Loss and Cash Flow

	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27	Dec-28
<b>Helium Revenue Calculation</b>						
Selling Price at Spiggot US\$/Mscf	300	300	300	300	300	300
Helium Gas Sold MMscf	33	63	73	68	78	71
Helium Revenue US\$MM	9.9	18.8	22.0	20.5	23.3	21.4
Royalty US\$MM	-1.5	-2.8	-3.3	-3.1	-3.5	-3.2
Net Revenue US\$MM	8.6	16.3	19.1	17.8	20.2	18.6
<b>Financials A\$MM</b>						
Net Revenue	8.6	16.3	19.1	17.8	20.2	18.6
Opex	-0.8	-1.6	-1.8	-1.7	-1.9	-1.8
D&A	-1.3	-2.4	-2.9	-2.7	-3.0	-2.8
EBIT	6.4	12.2	14.4	13.4	15.3	14.0
Tax	-1.8	-3.4	-4.0	-3.7	-4.3	-3.9
NPAT	4.6	8.8	10.4	9.6	11.0	10.1
Capex	-20.0	-0.5	-1.0	-0.5	-1.0	-0.5
Free Cash Flow	-14.1	10.7	12.2	11.8	13.0	12.4

Source: IIR estimates

**Table 14 Profit and Loss**

A\$MM	Dec-21	Dec-22	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27
Revenue	0.08	0.00	21.79	56.48	77.16	78.73	82.62
Operating Costs	0.00	0.00	-2.27	-6.38	-8.77	-8.95	-9.20
Corporate OH	-1.48	-1.20	-2.00	-2.00	-2.00	-2.00	-2.00
Costs	-1.48	-1.20	-4.27	-8.38	-10.77	-10.95	-11.20
EBITDA	-1.40	-1.20	17.52	48.09	66.40	67.78	71.42
Depreciation	0.00	0.00	-3.04	-8.45	-11.84	-12.25	-12.71
EBIT	-1.40	-1.20	14.48	39.65	54.55	55.53	58.72
Interest Costs	0.00	0.13	-1.75	-2.83	-2.16	-0.80	0.32
PBT	-1.40	-1.07	12.73	36.82	52.40	54.73	59.04
Tax Expense	0.39	0.30	-3.56	-10.31	-14.67	-15.32	-16.53
NPAT	-1.00	-0.77	9.16	26.51	37.73	39.40	42.51
Dividend \$M	0.00	0.00	0.00	0.00	0.00	23.64	25.51
Franking	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Payout Ratio	0.0%	0.0%	0.0%	0.0%	0.0%	60.0%	60.0%
Shares on Issue	0.00	1586	1684	1701	1701	1701	1701
Dilited Shares on Issue	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EPS A cps	0.00	-0.05	0.54	1.56	2.22	2.32	2.50
Options/Perf on Issue M	0.00	115.40	17.20	0.00	0.00	0.00	0.00

Source: BNL 2021 annual report, IIR estimates

**Table 15 Volumes by project and calculation of revenue**

Sales Gas MMcf	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27	Dec-28	Dec-29
Gross Production							
Voyager	33	63	73	68	78	71	54
Galactica	21	39	46	43	48	45	50
Pegasus	0	12	23	27	26	29	27
Enterprise	0	25	47	55	51	58	54
Total	53	139	189	193	203	203	184
Royalty	15%	15%	15%	15%	15%	15%	15%
Net Production							
Voyager	28	53	62	58	66	61	46
Galactica	17	33	39	36	41	38	43
Pegasus	0	10	20	23	22	25	23
Enterprise	0	21	40	47	44	49	46
Total	45	118	161	164	172	173	157
Sales Price US\$/Mcf	300	300	300	300	300	300	300
AUDUSD	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Helium Revenue A\$MM	20.02	51.97	71.05	72.52	76.08	76.30	69.07
CO2 Revenue A\$MM	1.78	4.51	6.11	6.21	6.54	6.53	6.58
Revenue A\$MM	21.79	56.48	77.16	78.73	82.62	82.83	75.65

Source: IIR estimates

**Table 16 Cash Flow**

A\$MM	Dec-21	Dec-22	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27
Receipts From Customers	0.01	0.12	21.38	55.81	76.77	78.70	82.55
Payments to Suppliers	-1.54	-1.77	0.65	-8.27	-15.54	-10.95	-11.19
Cash Flow from Operations	-1.53	-1.65	22.02	47.54	61.23	67.75	71.35
Exploration	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Revenue	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Received	0.00	0.13	0.01	0.26	0.05	0.52	0.77
Financing Costs	0.00	0.00	-1.76	-3.09	-2.21	-1.32	-0.44
Taxes Paid	0.00	0.00	0.00	-3.56	-10.31	-14.67	-15.32
Net Cash from Operations	-1.53	-1.51	20.27	41.15	48.76	52.28	56.35
PP&E	0.00	0.00	-44.12	-44.12	0.00	0.00	0.00
Exploration	-2.80	-5.00	0.00	0.00	0.00	0.00	0.00
Investing Activity	-2.80	-5.00	-44.12	-44.12	0.00	0.00	0.00
Issue of Equity, Option Conversion	16.02	0.00	1.44	1.93	0.00	0.00	0.00
Dividends	0.00	0.00	0.00	0.00	0.00	0.00	-23.64
Net Borrowings	0.00	0.00	44.12	-11.03	-11.03	-11.03	-11.03
Financing Costs	-0.97	0.00	0.00	0.00	0.00	0.00	0.00
Financing Activity	15.06	0.00	45.56	-9.10	-11.03	-11.03	-34.67
FX Difference	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Increase in Cash	10.72	-6.51	21.71	-12.07	37.73	41.25	21.68
YE Cash on Hand	15.63	9.12	30.83	18.76	56.50	97.75	119.43

Source: BNL 2021 annual report, IIR estimates

**Table 17 Balance Sheet**

A\$MM	Dec-21	Dec-22	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27
Cash	15.63	9.12	30.83	18.76	56.50	97.75	119.43
Receivables	0.12	0.00	0.42	1.08	1.48	1.51	1.58
Inventories	0.00	0.10	0.35	0.69	0.88	0.90	0.92
Other	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Total Current Assets	15.81	9.27	31.65	20.58	58.91	100.21	121.99
PP&E	0.00	0.00	44.12	88.24	88.24	88.24	88.24
Intangibles	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Expln & Mine Devt	6.77	11.77	8.73	0.28	-11.56	-23.81	-36.52
Deferred Tax Asset	0.00	0.30	0.30	0.30	0.30	0.30	0.30
Total Non Current Assets	6.92	12.22	53.30	88.97	77.13	64.88	52.17
Total Assets	22.73	21.49	84.95	109.56	136.04	165.08	174.16
Trade Payables	0.60	0.13	5.30	5.75	1.18	1.20	1.23
Borrowings	0.00	0.00	44.12	33.09	22.06	11.03	0.00
Leveraged Leases	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Current Tax Liabilities	0.00	0.00	3.56	10.31	14.67	15.32	16.53
Provisions	0.22	0.29	0.29	0.29	0.29	23.93	25.79
Total Liabilities	0.82	0.42	53.27	49.44	38.20	51.48	43.55
Net Assets	21.91	21.07	31.68	60.12	97.84	113.60	130.61
Issued Capital	26.44	26.44	27.88	29.81	29.81	29.81	29.81
Reserves	1.30	1.30	1.30	1.30	1.30	1.30	1.30
Retained Profits	-5.83	-6.60	2.57	29.08	66.81	82.57	99.57
Shareholder Equity	21.91	21.14	31.75	60.19	97.91	113.68	130.68
Minorities	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Equity	21.91	21.14	31.75	60.19	97.91	113.68	130.68

Source: BNL 2021 annual report, IIR estimates

## VALUATION BY PEER COMPARISON

The table below shows the listed peers that we have been able to locate so far. There are also another 11 companies that have significant exposure to helium, but they are unsuitable for peer valuation either because the helium business is swamped by other activities or because they are unlisted. All the current US and Canadian helium producers are in this category.

The companies listed in the table below range from an Enterprise Value of A\$397M to A\$13M, with the most common Enterprise Values being A\$27-57M for companies with successfully completed wells including Blue Star, and A\$13-22M for explorers yet to deliver a definitive discovery well.

### Peers approaching production most relevant comparisons

At the top of the table there are two companies that have completed construction and are in or entering ramp up to full production.

Renergen is an LNG producer with a helium co-product and Desert Mountain Energy is helium producer with potential for a carbon dioxide by-product, and therefore the most relevant comparison for Blue Star.

Desert Mountain Energy has been very sparing in its descriptions of its business and has not published Resource information, so the main comparison metric is not available. Desert Mountain's planned production according to a broker research report is 91MMcf/yr, and we expect Blue Star start production from Voyager/Galactica at around that rate and quickly expand to around 180MMcf/yr, suggesting Blue Star should have a similar or larger market capitalisation to Desert Mountain, if both companies deliver.

However, the lack of reliable detailed information is a barrier to convincing comparative valuation.

For the balance of the peers that have reported resources, there are also data issues. There is a wide range of Contingent, Prospective and "internal estimates" of risked and unrisked Net Recoverable Resources, again making comparison unconvincing in our view. There are a number of companies with much larger Prospective Resources per A\$ of Enterprise Value, but some appear to be struggling to get a successful well into their target, whereas Blue Star is having a high success rate and is likely to convert its Prospective Resources in the near term.

We have not used peer comparisons to value Blue Star.

**Table 18 Peer group market capitalisation and Enterprise Value (EV)**

Name	Code	FX	Issued M	Price	Cap	Net Cash	EV	EV A\$M
Renergen Limited	RLT.ASX	AUD	135.1	2.44	329.7	-67.5	397.2	397.2
Desert Mountain Energy Inc	DME	CAD	77.5	2.79	216.2	12.2	203.9	304.4
Royal Helium Ltd	RHC.V	CAD	234.5	0.23	53.9	2.8	51.1	57.5
VVC Exploration	VVC.V	CAD	550.5	0.09	49.5	-1.6	51.1	57.4
Helium One Ltd	HE1.LON	GBP	622.3	6.00	37.3	9.7	27.6	41.2
Blue Star Helium	BNL.ASX	AUD	1586.1	0.035	55.5	9.1	46.5	46.5
Avanti Helium Inc	AVN.TSX	CAD	68.0	0.51	34.7	3.4	31.2	35.1
Grand Gulf Energy Limited	GGE.ASX	AUD	1546.0	0.022	34.0s	6.8	27.2	27.2
Total Helium	TOH.V	CAD	65.8	0.38	25.0	5.1	19.9	22.3
Noble Helium	NHE.ASX	AUD	210.6	0.15	31.6	10.3	21.3	21.3
Helium Evolution	HEV.V	CAD	96.0	0.29	27.8	15.5	12.4	13.9
Global Helium	HECO.CN	CAD	46.1	0.37	17.1	4.8	12.2	13.7
First Helium Inc	HELI.V	CAD	74.9	0.24	18.0	6.0	12.0	13.5

Source: Most recently published company quarterlies (ie September 2022 for ASX listed, June 2022 for others). The data on each line is in the currency identified in column three except for the final column which is converted to A\$. Share prices on 17 November 2022

## BRIEF DESCRIPTIONS OF PEERS

- ◆ **Renergen** is at the time of this report commissioning its A\$60M Phase 1 Project with capacity to produce 2.5TJ/day of LNG and 746Mcf/day of helium. The A\$942M Phase 2 is approaching financial close and will increase capacity to 24.4TJ/day LNG and 2007Mcf/day helium. This is an LNG project with a helium co-product.
- ◆ **Desert Mountain Energy** announced on 11 November 2022 that the McCauley plant would be completed and testing would start on 18 November 2022. The initial project is to use the existing 5-6 wells and a US\$10.5M helium finishing plant to produce an

unspecified amount of 99.999% helium. The number of wells will increase to 50-55 wells over the next six years with a total cost of US\$45M. The initial output is estimated at 280Mcf/d or 91MMcf/yr in a Cormack Securities research report that is available on the Desert Mountain website.

- ◆ **Royal Helium** has merged with Imperial Helium on 22 July 2022. Imperial's Steveville helium project construction contract was awarded to Arjae Design on 12 October 2022, and a helium sales contract with a helium aerospace consumer was announced by Royal on 29 August 2022 with delivery starting in 2023 from Steveville. The economics of that operation was calculated using US\$450/Mcf so the sales contract must be of that order. In the same release, Royal indicated that it was developing a combined 20,000Mcf/d of capacity including Steveville and the Nazare project at Climax.
- ◆ **VVC Exploration** is evaluating pathways to production with existing wells that have tested positive for helium and is seeking permitting for 15 helium well sites at its Syracuse Project in Kansas. It could deliver gas through the Tumbleweed Pipeline and Gathering System (see Figure 13) which it believes to be at 20% utilisation. It does not have a published Resource at the date of this report. VVC also owns 14% of the unlisted Proton Green which plans to be a producer of helium and hydrogen and a sequester of carbon dioxide. Based on Proton Green's last private placement, VVC's share is worth US\$750M.
- ◆ **Helium One** has an unrisks 2U Prospective Recoverable Resource of 138Bcf of helium with surface concentrations of up to 10.6% helium at its Rukwa project in Tanzania. The drilling of the target reservoir to date has not encountered free helium and technical issues with the holes has prevented definitive drill stem tests.
- ◆ **Avanti** announced an unrisks 2C Contingent Resource of 187 MMcf of net recoverable helium at a concentration of 1.1% for it WNG 11-22 well at Greater Knappen, Montana (24 June 2022). The 1C Resource was 374 MMcf and 3C was 66 MMcf. Drilling is continuing.
- ◆ **Grand Gulf Energy** is earning up to 85% of the Jesse ground in Utah, in a region already serviced by the Lisbon Helium separation plant and collection pipeline system owned by Paradox Resources LLC. Grand Gulf has an industry standard 80/20 revenue sharing agreement for processing its gas. Initial 2U recoverable net Prospective Resources for Jesse are estimated at 6.3Bcf of helium.
- ◆ **Total Helium** has been in production since 14 March 2022, reportedly at around 300Mcf/day of gas running at 61% methane and 0.58% helium. As a business, Total is a small methane gas producer with a helium by-product. As a helium investment, the company inherited a sales contract and a channel to market that appears to constrain its pricing power and activities. It has published some project numbers including US\$50M for a 350MMcf/yr production module with an operating cost of US\$15-20/Mcf excluding well drilling and is assuming a selling price of US\$350/Mcf (presentation 22 May 2022).
- ◆ **Noble Helium** is exploring a Prospective Resource (2U) of 176 Bcf at its North Rukwa project, Tanzania. Drilling is planned for 2023.
- ◆ **Helium Evolution** has a large tenement package in Saskatchewan in the same region as the unlisted producer North American Helium. Two wells were planned for the second half of 2022, and the first was spudded on 9 November 2022
- ◆ **Global Helium** has a tenement portfolio in Montana, Alberta and Saskatchewan with previously drilled wells that have tested positive for helium.
- ◆ **First Helium** has two tenements in Alberta with the first new well in the Worsley Area (15-25) testing 1.3% helium, and two light oil wells bought on stream to generate cash flow, while in the Lethbridge Area the first well is planned for H2 2022.

## ESG CREDENTIALS

### Blue Star has provided the following ESG commentary:

It is preparing Environment, Social and Governance (ESG) roadmap to guide the business as it grows:

- ◆ Aim to become a leading supplier of helium utilising a best practice approach to management of ESG risks and opportunities.
- ◆ Stakeholder engagement process guided by PwC.

Green helium with effectively zero hydrocarbon (methane) content

Planned long-term sale of CO<sub>2</sub> by-product for use by food industry (dominant consumer) and/or sequestered for tax credits

Evaluating significant renewable power penetration potential for helium production facility

Well established, deep landowner and local community relationships

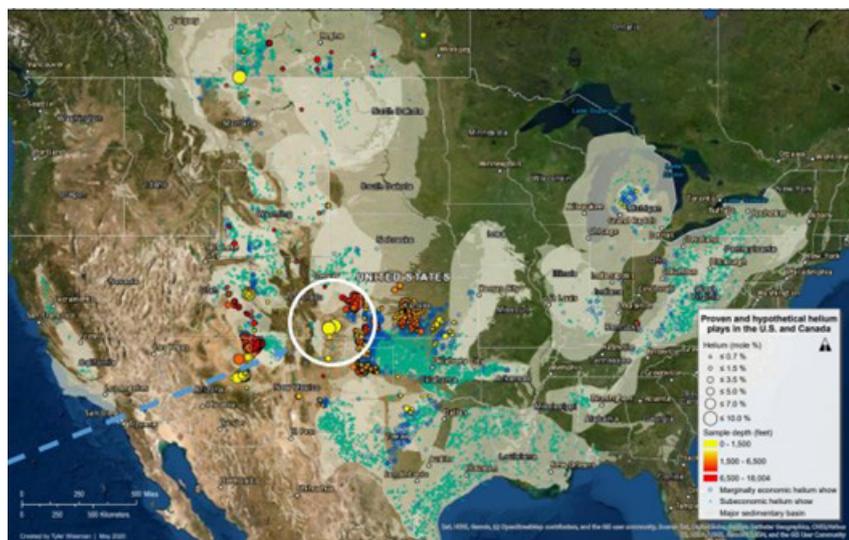
- ◆ Funding drilling of water wells for local ranchers
- ◆ Minimising surface disturbance
- ◆ Preferencing of local commercial engagement and supplies sourcing

#### IIR comments

- ◆ From what is known about the gas content of the reservoirs they are targeting, there is little or no methane, so the carbon footprint of the project is largely from generating the power required to operate the gas processing plant, and the carbon dioxide in the raw gas feedstock.
- ◆ The nature of the helium refining plant is that the carbon dioxide is separated out.
- ◆ Once separated, it can be sequestered back into an approved reservoir which would earn a Federal carbon credit in cash of US\$4/Mcf or it could be sold. There is a pipeline for transporting carbon dioxide to market that passes within 10 miles (16Km) of Blue Star's western lease boundary.
- ◆ Carbon Dioxide can be sold at a premium to the food industry for example to make tomatoes red, or to the beverage industry for example to put the bubbles into beer or soda water. The oil industry injects carbon dioxide into oil formations as a flushing agent to enhance oil recovery.
- ◆ If the gas Reserves prove to be large enough, Blue Star can consider renewables (solar and wind with battery storage), but that is likely to be a later phase of development.

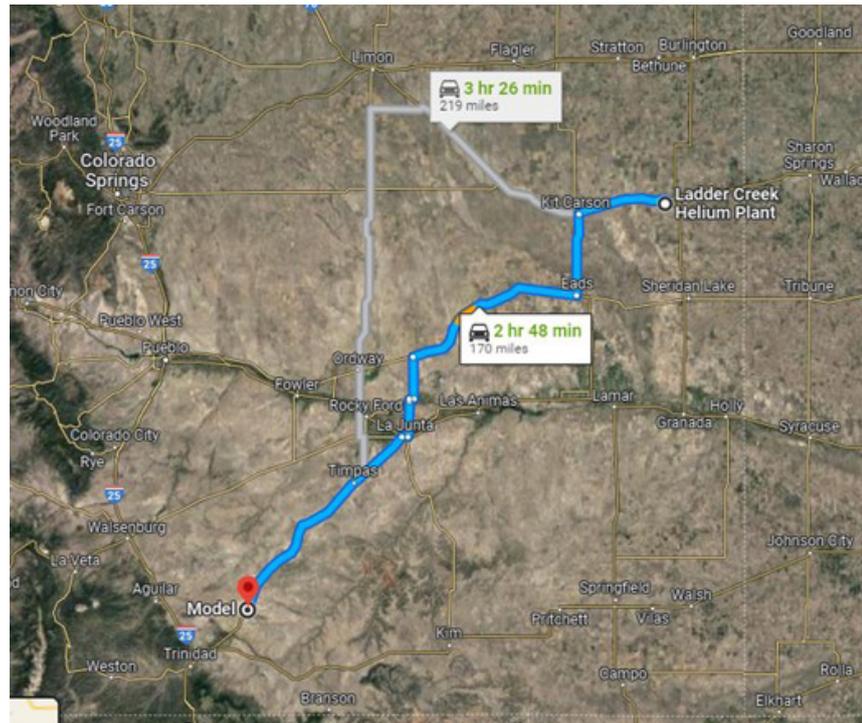
## PROJECTS

Figure 8 Blue Star tenements in close proximity to one of the three major helium fairways in the USA



Source: BNL presentation 31 May 2022

Figure 9 Haul route from Las Animas to Ladder Creek



Source: Google Maps

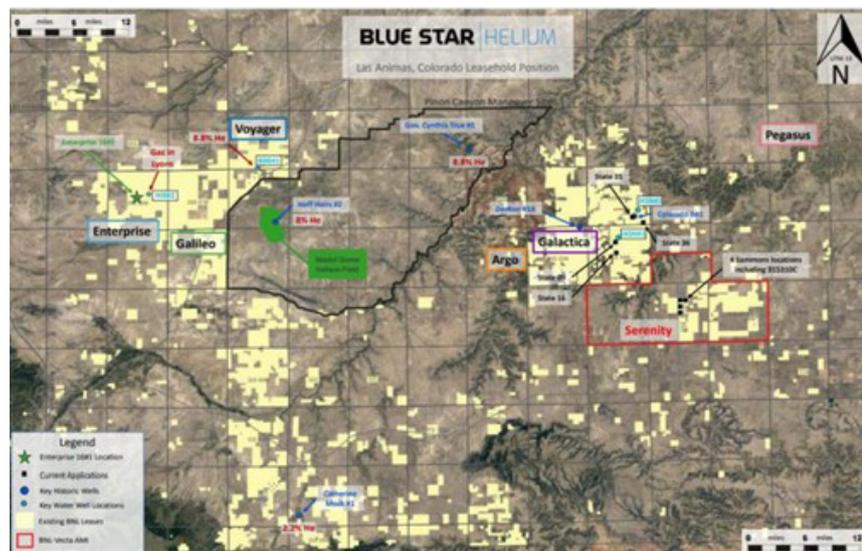
### TENURE AND LOCATION

The only project currently owned by Blue Star Helium is its helium exploration project in Las Animas County Colorado USA. On 30 September 2022, Blue Star controlled 298,958 gross acres and 219,254 net acres. The gross acreage is the physical area of the tenement package, while the net acreage is the portion of those tenements in which Blue Star has an economic interest, that is, net of state or vendor royalty interests. Typical royalty interests include:

- ◆ Fee mineral owners 12.5% to 17.3% BNL net 82.7% to 87.5%
- ◆ Colorado State 20% BNL net 80%
- ◆ Bureau of Land Management 12% BNL net 88%

Immediate neighbours in Las Animas County Colorado include Twin Bridges LLC (<http://www.twinbridgesllc.com/>) and joint venture partners Vecta Oil and Gas Limited and Prospero Oil and Gas LLC. All these companies are unlisted at present.

Figure 10 Blue Star tenement holdings at 20 July 2022



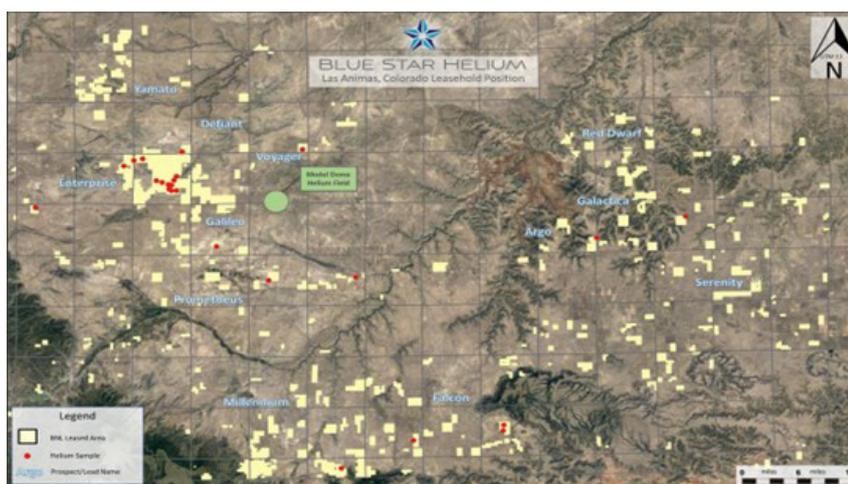
Source: BNP release 20 July 2022

Figure 11 An older tenement map showing the separate project areas



Source: BNL release 10 June 2021 (Red dots are helium detected in soils)

Figure 12 Blue Star tenement holdings two years ago – Note the build up of Galactica/Pegasus in particular

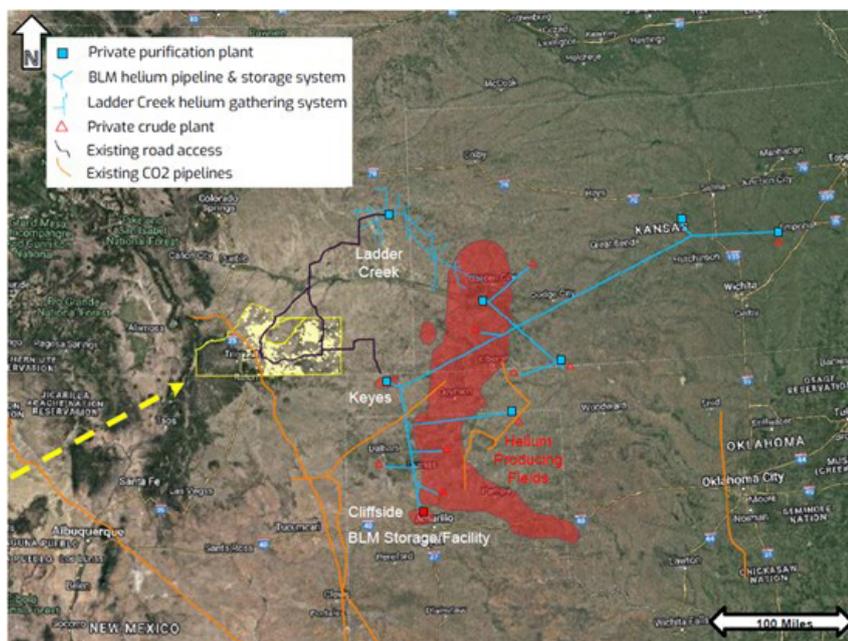


Source: BNL presentation 1 June 2020

While the last two years have been frustrating for management and investors due to the slow well approval process, Blue Star has significantly increased its leverage to drilling success over the same period by increasing its tenement acreage from 81,081 net acres to 216,254 net acres. The improved ground position means that any drilling success can be rolled out across a larger tenement package acquired at lower prices than would potentially be the case if the acquisitions occurred after drilling success.

**Close to significant infrastructure and channels to market for helium and byproduct carbon dioxide**

Figure 13 Pipeline infrastructure in the region of Blue Star’s Las Animas tenements



Source: BNL presentation 10 August 2022

The Ladder Creek system brings methane gas to a central hub and strips out the helium, with significant helium separation and liquification capacity. The BLM pipeline system is a dedicated helium collection system.

The orange lines are dedicated carbon dioxide pipelines. A major use of the carbon dioxide is re-injection into oil fields, where it acts to enhance oil recovery, particularly from existing wells in the run-off phase of their production lives.

## RESOURCES

The Voyager Contingent Resource is the most recent and is a guide to potential production if the commercial aspects fall into place. The Prospective Resources for the balance of the prospects were estimated as Net helium in place at 7-9% helium concentration. Subsequent drilling has generated lower in place helium concentrations at Pegasus and Galactica, so while the total estimated raw gas volumes have not been changed, the helium volumes have been reduced in Table 19 to reflect IIR estimates of lower helium concentrations, and these adjusted Resources have become the basis for the IIR valuation modelling.

**Table 19 Prospective Resources which are effectively Exploration targets**

MMcf	Helium %	1U (P90)	2U (P50)	3U (P10)
<b>Net Recoverable Helium at 7-9% He concentration</b>				
Galactica	7-9%	2131	4395	6846
Pegasus	7-9%	1970	3423	5092
Argo	7-9%	276	2104	3065
Enterprise	7-9%	372	2204	5494
Galileo	7-9%	495	1292	2329
BNL Net Recoverable	7-9%	5244	13422	22829
<b>Recalculated Net Recoverable based in helium grade from drilling</b>				
Galactica	5.00%	1332	2747	4279
Pegasus	3.00%	739	1284	1910
Argo	4.00%	138	1052	1533
Enterprise	8.00%	372	2204	5494
Galileo	8.00%	495	1292	2329
BNL Net Recoverable		3076	8579	15544
<b>MMcf Helium</b>				
	<b>Helium</b>	<b>1C</b>	<b>2C</b>	<b>3C</b>
Voyager	8.0%	299	643	1228

Source: BNL presentation 31 May 2022, with original sources for Galactica/Pegasus/Argo 10 June 2021 for Enterprise and Galileo 16 November 2020, and for Voyager 27 September 2022. Helium concentrations used for recalculation from Table xx

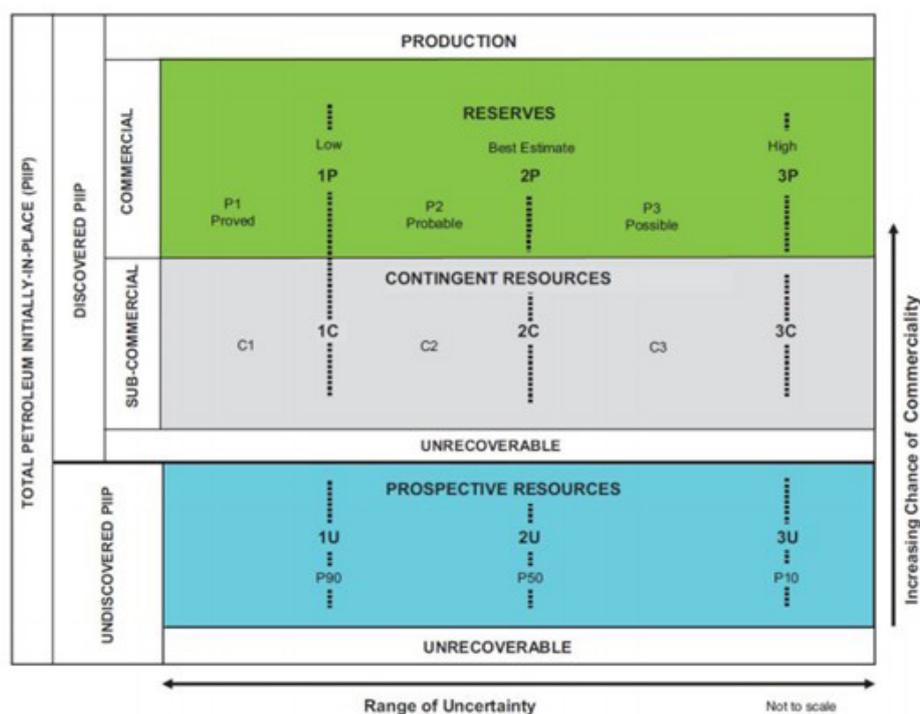
Blue Star is presenting its helium reserves using the same standards and terminology as the oil and gas industry.

The resource estimates have been prepared using the probabilistic method and are presented on an unrisks basis. In a probabilistic resource distribution, 1U (P90), 2U (P50), 3U (P10) estimates represent the 90% probability, 50% probability and 10% probability respectively that the quantity recovered will equal or exceed the estimate assuming a success case in the prospect. Resource totals have been arithmetically added. The same logic applies to Contingent Resources (1C 2C and 3C).

Contingent Resources convert to Proven Resources (1P 2P and 3P) once the pathway to commercialisation is defined. That requires offtake sales contracts, completion of engineering and costing of the project and funding of pre-production capital.

The distinctions between the different Resource categories is shown in the figure below.

Figure 14 Petroleum reserve and resource classifications



Source: Petroleum Resource Management System June 2018 release

## REVIEW OF MAJOR PROJECTS

### Tenements contain shallow and deep targets

Blue Star has been focused on the shallow targets in the Lyons Formation at depths of around 1000 feet to date. These are very low cost to drill, and present ideal targets for a small capitalisation company.

There is the potential for deeper targets. Blue Star has named the exploration for deeper targets the Leviathan Project, which is targeting the Pennsylvanian Formation at 2400 feet depth. This project has the potential to add life to the Las Animas development.

### Backgrounder on exploratory water wells: Water wells cannot be gas producers but can provide very valuable data and require no approval

In the Las Animas region, water wells can be drilled for as little as US\$100,000/well, while an unsuccessful gas well would cost US\$300,000/well. The difference is the strength of the casing, and well liner, and the surface fittings. Blue Star initially drilled traditional water wells but switched to drilling water wells to gas well specification so that the wells could be tested as if they were gas wells, generating helium concentrations and flow rates, and could be used to estimate Contingent Resources. While they cost more, and would not be approved for gas production, the significant improvement in data justifies the additional expense.

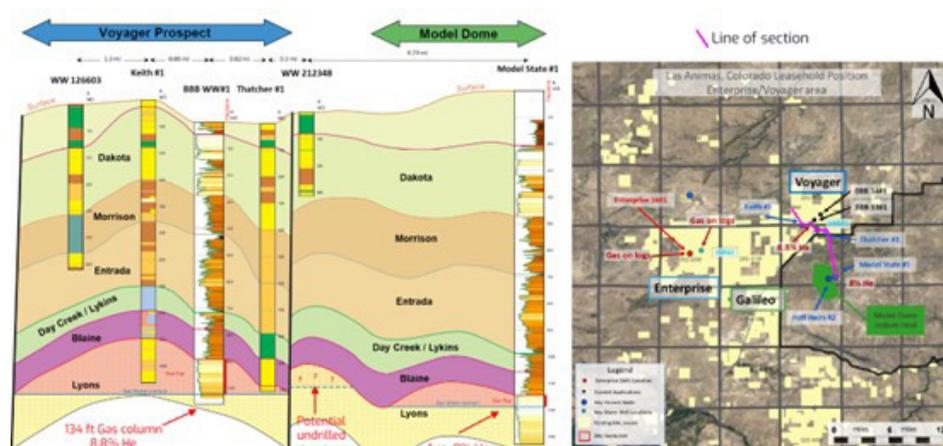
Any water wells are drilled by a contractor pursuant to a drilling contract between the contractor and the rancher. Blue Star is not a party to this contract. The well is the property of the rancher, and Blue Star does not have an economic interest in it. The approval of the Colorado Oil and Gas Conservation Commission is not required to drill water wells.

Blue Star agrees to fund the well if the rancher selects a location that may be of interest to the company, the company has leased the underlying minerals and the rancher agrees to let the company obtain any available data from the drilling program. Water wells are drilled for the sole purpose of producing water for use by the rancher.

Water wells may not produce helium and may not be converted into producing helium wells.

## Voyager

Figure 15 Voyager is located on the margin of the Model Dome field and tested by Blue Star's BBB#1 water well



Source: BNL presentation 10 August 2022

### Location and Tenure

The Voyager Prospect is located six miles or 10km north of the Model Dome field which produced at the average grade of 8.8% helium (see Figure 15).

The net mineral acres associated with the prospective resources comprise 5219.09 net acres under four BLM leases, 1280 net acres under two state leases, and 5617.014 net acres under private leases.

### Contingent Resource announced

Table 20 Voyager Contingent Unrisked Resource

	1C	2C	3C
Net Recoverable MMcf helium	299	643	1228
Weighted Royalty Burden	12.88%	12.91%	12.92%

Source: BNL release 27 September 2022

The Voyager Contingent Resource is based on the BBB#1 Water Well and the historical drilling, including Keith#1 and Thatcher#1. The estimate is unrisked and is presented on a net basis meaning net of royalties which range from 12.5% to 15%. The assumed helium concentration in Table 20 is 8.8%.

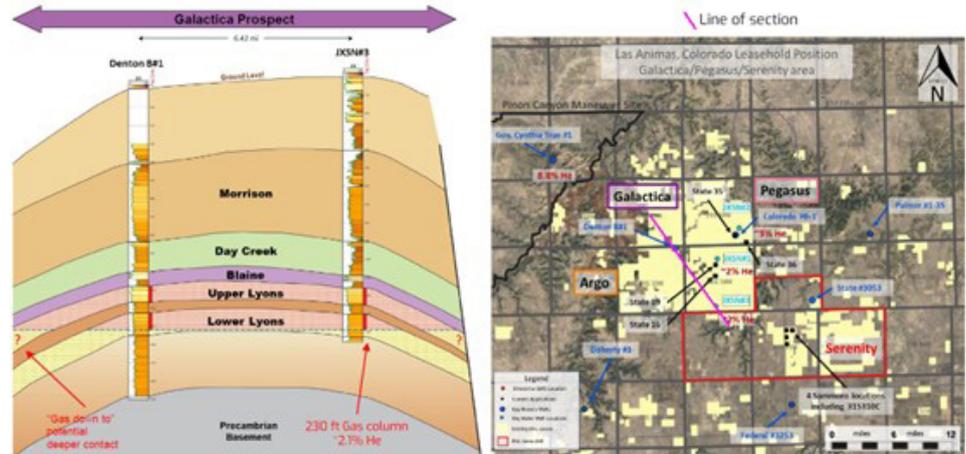
The BBB#1 water well reported results on 17 November 2021 encountering a gas column of 134 feet, with a helium concentration of 8.8%, along with nitrogen 78.7% and carbon dioxide 12.5%.

The Resource estimation was based on a Monte Carlo simulation based on:

- ◆ Mean Porosity 0.18 with a standard deviation of 0.023 resulting in porosities of 0.155 at the P90, 0.18 at the P50, and 0.21 at the P10.
- ◆ Gas Saturation (=1-fractional water saturation) was estimated at mean of 0.53 with a standard deviation of 0.125, yielding gas saturations of 0.52 at the P90, 0.59 at the P50 and 0.71 at the P10
- ◆ Net to Gross ratio with normal distribution resulted in 0.60 at P10, 0.72 at P50 and 0.84 at P10
- ◆ Initial reservoir pressures were estimated at 52psia at P90, 85psia at P50 and 119psia at P10
- ◆ Formation permeability is very high ay 500mD to over 1000mD based on Model Dome
- ◆ Gas Recovery Factor of 40% to 80%

### Galactica

Figure 16 Galactica is located east of the Model Dome field



Source: BNL Release 7 June 2022

### Location and Tenure

Galactica is located to the east of the Model Dome field

### Drilling History

The Denton#1 was not tested for helium but did record the thickness of the Lyons formation and the presence of top seal. The JXSN 1 and 4 water wells intersected reservoir and seal, and produced helium concentrations and flow data, which is likely to be sufficient for Sproule to calculate a Contingent Resource.

Table 21 Blue Star drilling history in the Galactica Prospect (all wells are water wells)

Drilling History	Date	Helium %	Gas Column ft	Net Pay ft	Stabilized Flow Rate Mcf/d
Galactica/Pegasus JXSN 1	16-Jun-22	1.98%	217.5	143.5	412
Galactica/Pegasus JXSN 4	2-Sep-22	4.20-6.06%	233.5	133.5	N/A

Source: BNL releases on dates indicated in table

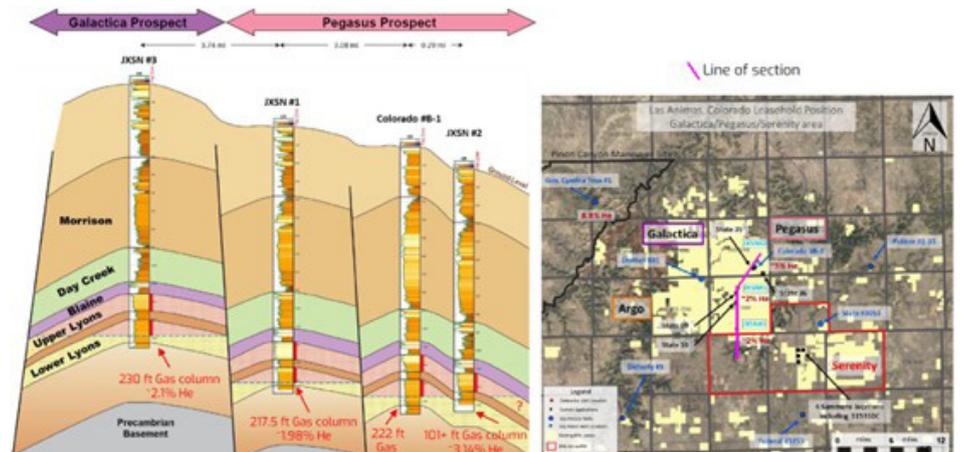
### Resources

Blue Star is expecting to be able to announce a maiden Contingent Resource for Galactica by year end. The existing Prospective Resources are detailed in Table 19. However, these estimates are at 8% helium and the JXSN#3 well is outside the closure boundaries use by Sproule in calculation the Prospective Resource (release 7 June 2022), so the revised Contingent Resource is likely to be lower concentration and a higher volume.

For our modelling we have used a 5% helium concentration and the Prospective Resource raw gas volume.

### Pegasus

Figure 17 Pegasus geological cross section



Source: BNL Release 7 June 2022

## Drilling History

The Colorado#B1 was not tested for helium but did record the thickness of the Lyons formation and the presence of top seal. The JXSN 2 and 3 wells intersected reservoir and seal, and produced helium concentrations and flow data, which is likely to be sufficient for Sproule to calculate a Contingent Resource.

**Table 22 Blue Star drilling history in the Pegasus prospect (all wells are water wells)**

Drilling History	Date	Helium %	Gas Column ft	Net Pay ft	Stabilized Flow Rate Mcf/d
Pegasus JXSN 2	16-Jun-22	3.14%	101.0	101.0	202
Pegasus JXSN 3	16-Jun-22	2.14%	230	153.5	412

Source: BNL releases on date indicated in table

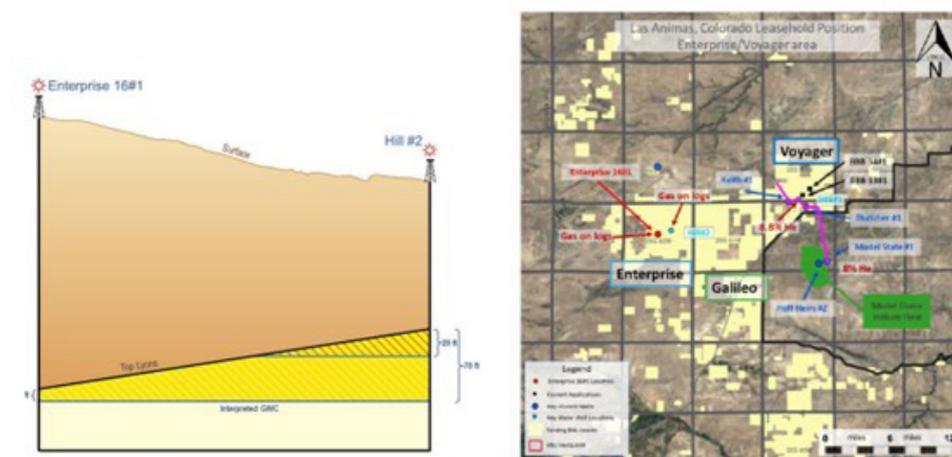
## Resources

Blue Star is expecting to be able to announce a maiden Contingent Resource for Pegasus by year end. The existing Prospective Resources are detailed in Table 19. However, these estimates are at 8% helium.

For our modelling we have used a 3% helium concentration and the Prospective Resource raw gas volume.

## Enterprise – Initial disappointment but good potential up dip

**Figure 18 Interpretation of Enterprise structure with further drilling planned up dip of Enterprise 16-1**



Source: BNL release 1 March 2022

## Location and Tenure

Enterprise tenements at 1 November 2020 comprised 7270 acres from the BLM, 327 acres from the Colorado State and 1893 acres from private owners. Galileo tenements at 1 November 2020 comprised 1667 acres from the BLM, 611 acres from the State and 4581 acres from private interests.

## Drilling History

The first well drilled by Blue Star was the Hill#2 water well, drilled as a low-cost water well and so could not be tested accurately for helium concentration, flow rates and other information to support a Resource assessment. The well did identify the presence, thickness, and depth of the Lyons Formation and the presence of seal.

The first gas well (as opposed to water well) drilled by Blue Star was Enterprise 16#1 which spudded (commenced drilling) on 16 February 2022. This well was interpreted to be at the edge of the structure, and due to technical issues, was unable to measure the helium concentration.

Both Hill#2 and Enterprise 16#1 were learning experiences for Blue Star. Water Wells are now drilled to the same standard as gas wells, allowing full testing, and the issues with Enterprise 16#1 have been avoided in subsequent drilling.

**Table 23 Drilling history**

	Date	Helium %	Gas Column ft	Net Pay ft
Enterprise 16-1	21-Dec-21	Detected	3	
Hill 2	21-Dec-21	Detected	29.0	

Source: BNL releases on date indicated in table

**Table 24 Enterprise and Galileo Prospective Resources at an assumed helium concentration of 7-9%**

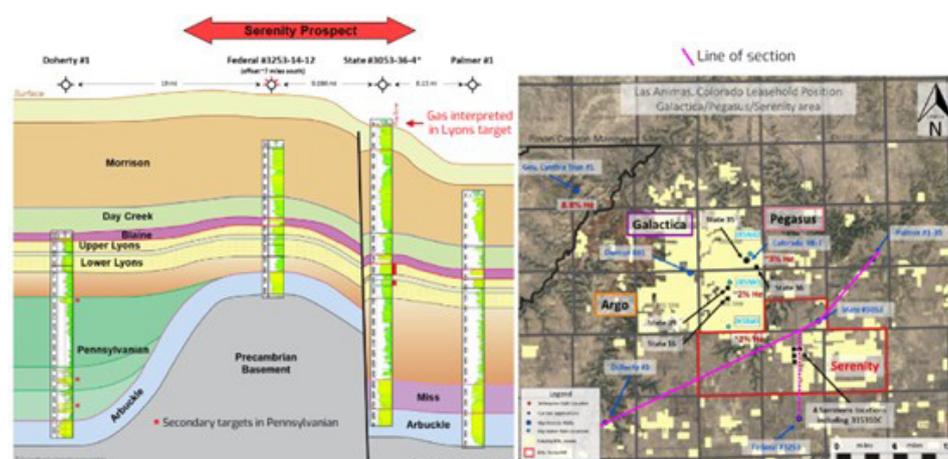
MMcf Helium	1U (P90)	2U (P50)	3U (P10)
Enterprise	372	2204	5494
Galileo	495	1292	2329

Weighted Royalty Burden			
Enterprise	15.03%	14.46%	14.67%
Galileo	13.53%	13.51%	13.97%

Source: BNL release 16 November 2020

## Serenity

**Figure 19 Serenity Geology in cross section**

Source: BNL release 10 June 2022

### Tenure (Source BNL release 22 December 2021)

Blue Star Helium has entered into joint venture comprising Blue Star 50%, Prospero Oil and Gas LLC 25%, and Vecta Oil and Gas Ltd 25% and operator. The Area of Mutual Interest includes 4334 net acres from Blue Star and 10212 net acres from Vecta and Prospero.

Each party shall have the right, but not the obligation, to participate in any further leases acquired in the AMI prior to 14 December 2023 in proportion to their respective interests.

Vecta is based in Denver and owns both operated and non-operated properties in Montana, Wyoming, Colorado, Utah, North Dakota, Louisiana and Texas. It currently produces and sells helium in Cheyenne County, Colorado, and San Juan County, Utah.

The joint venture was announced on 22 December 2021 and all conditions precedent have been satisfied.

Blue Star's wholly owned subsidiary, Las Animas Leasing Inc, is the Blue Star entity that is party to the Participation Agreement. The Participation Agreement has a term of 2 years and will terminate on 14 December 2023. Vecta will be the operator of joint operations in the AMI.

The Joint Operating Agreement is in the form of the AAPL Form 610-2015 Model Form Operating Agreement. Vecta and Prospero refer to their leases as Sammons Ranch and the Oil and Gas Development Plan in respect of the Sammons area may be obtained from the website of the Colorado Oil and Gas Conservation Commission (COGCC).

The lease being initially contributed by Vecta and Prospero is from a private mineral owner for an initial term expiring on 1 December 2022. If the lessee successfully produces helium or other products from the lease area, a 12.5% royalty in respect of 640 gross and net acres will be payable to the lessor and the lease term will be extended indefinitely until production ceases. The lease does not include any minimum work commitments.

The option entitles Prospero to acquire a mineral lease in respect of 9577 net acres by giving notice and paying a non-material consideration on or before 8 June 2022. The Company has the right to require Prospero to exercise the option.

### Approval and drilling activity

On 25 February 2022, Blue Star advised that approval had been received from the Colorado Oil and Gas Conservation Commission for the Sammons Ranch Oil and Gas Drilling Program submitted by Vecta and authorisation of the four well locations. Form 2A approval was received on 12 May 2022 for one well, with the Form 2A process for the balance awaiting the results of the first well.

Drilling of Sammons 315310C has been completed on 19 September 2022, intersecting a gas column of 55 feet with a net pay of 15 feet. As an approved gas well, this could be used for production. At the date of this report, there has been no information published regarding helium concentration or flow rates.

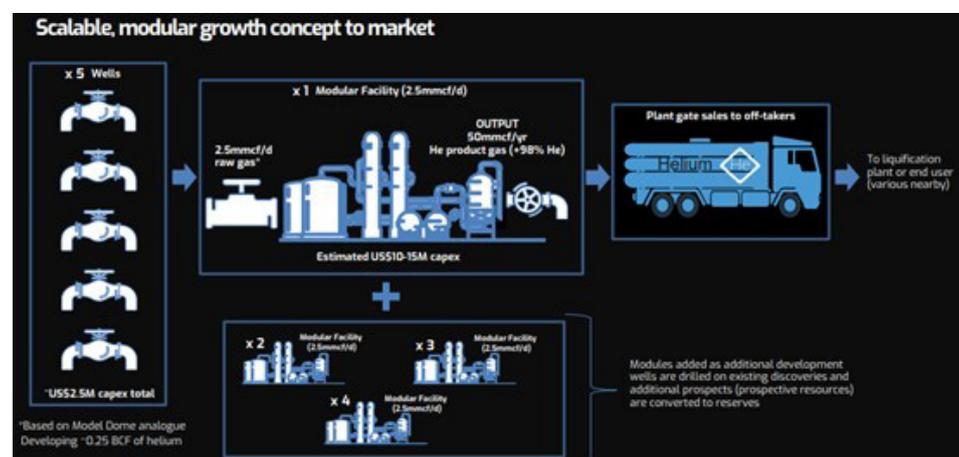
### ECONOMICS OF PRODUCTION

In its presentation dated May 2022, Blue Star indicated that the cost of drilling a dry hole is US\$300,000/well, and previous commentary indicated US\$400,000 for a completed producing well, but the data in the figure below indicate that is now US\$500,000/well.

A modular processing plant is estimated to cost US\$10-15MM for a separation and finishing plant for 2.5mmcf/d of input gas. A head grade of 8% helium, and 250 days per year of operating would produce output of 50mmcf/yr of helium. We assume 98% helium recovery and a sales gas grade of 98% helium.

BNL has yet to supply any information of actual production rates, feed grades or operating costs. Site variable costs will be largely energy, which would initially be diesel generators, and over time would move to grid or possibly renewables. Labour will be a relatively fixed costs, so there will be benefits of scale.

Figure 20 Conceptual helium starter project



Source: BNL presentation 10 August 2022

The Blue Star graphic above is consistent with the Form 2 applications to the Colorado Oil and Gas Conservation Commission, which lay out five well production plans, so it represents the company's thinking regarding starter project size as presented to the regulators for approval.

### Capital Costs in the order of US\$15MM to US\$20MM for a five well start up

Based on the above our estimated pre-production costs are:

- ◆ Five production wells US\$2.5MM
- ◆ Separation Plant US\$10-15MM
- ◆ Possible water disposal well US\$0.5MM
- ◆ Infrastructure and collection pipelines US\$2.0MM

In our modelling, we assume the preproduction capital cost of a five well project is US\$20MM.

Funding the preproduction costs with equity provides Blue Star with the most operational flexibility and the lowest operating cost. If the equity market is not supportive, there are the options of debt funding or funding by the equipment supplier or customer. The market and

the Blue Star share price will decide, but the advantages of equity funding are considerable, namely:

- ◆ The company would be free to sell its gas to the highest bidder, including end customers, if the quality was high enough, and at spot prices. Debt would require sales contracts with guaranteed offtake and price floors be locked in, and that will cost selling price upside. Likewise, customer funding would also require locked in sales contracts with agreed long-term pricing.
- ◆ Equipment supplier funding adds to operating costs, and potentially reduces operational flexibility, but has balance sheet advantages as well as potentially providing the company with operating expertise that it may lack as a start-up.
- ◆ Starting up any new plant on a new gas source always runs the risk of delays in getting to capacity production. Equity funding gives the company a greater ability to absorb any hiccups.

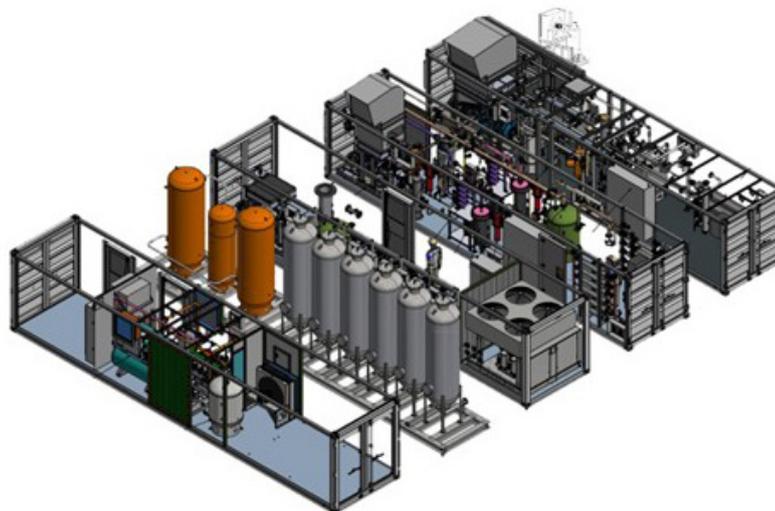
**Table 25 Calculations behind the volume estimates in Figure 20**

	Gas	He Grade	Contained He
Input Gas mmcf/d	2.5		
Operating days per year	250		
Input Gas mmcf/yr	867	8%	50
Recovery			98%
Product gas He grade mmcf/yr	50	98%	49

Source: BNL presentation 31 May 2022, IIR estimated recovery based on the BNL comment that the data in Figure 4 is based on Model Dome which produced at a feed gas grade of 8% He.

### Desert Mountain Energy is planning to start production by the end of 2022

**Figure 21 Desert Mountain Energy Holbrook (McCauley) plant layout – Note each module is a standard container size**



Source: <https://www.desertmountainenergy.com/helium/#holbrook>

Desert Mountain Energy announced that it has selected Generon as the main contractor for the build-out of its first Solar/Hydrogen powered Helium processing plant, located in Arizona for a delivered cost of US\$10.5M. The plant is basically four shipping containers that would be transportable from site to site if required.

Construction and delivery was quoted as between 28-30 weeks and actual performance was in line with that estimate.

Desert Mountain has not made it clear what the capacity of this initial plant will be, but a broker report (Cormack 26 October 2020 DME website) assumed 1.5MMcf/d which is smaller than Blue Star's 2.5MMcf/d modules.

For source of comments above see: [https://www.plant.ca/general/desert-mountain-energy-selects-processing-plant-builder-234277/?utm\\_source=rss&utm\\_medium=rss&utm\\_campaign=desert-mountain-energy-selects-processing-plant-builder](https://www.plant.ca/general/desert-mountain-energy-selects-processing-plant-builder-234277/?utm_source=rss&utm_medium=rss&utm_campaign=desert-mountain-energy-selects-processing-plant-builder)

### Estimation of production costs

While most of the producing North American peers are unlisted corporations which do not publish financial and operating data, there is one current producer with operations similar to what Blue Star is proposing that has placed detailed costs into the public domain.

In 2020, the only producing asset of Hamburg based NASCO Energie & Rohstoff AG was its 80% working interest in the Dineh Bi Kayeh (DBK) helium field in Arizona some 450 miles west of Blue Star's Las Animas tenements. NASCO secured debt of US\$83M in 2020 and as part of the financing lodged a Due Diligence report with the US Securities and Exchange Commission dated 23 December 2019. The costs estimated in the Due Diligence report were very similar to the actual costs reported by NASCO in its year to December 2020.

Blue Star is likely to develop production modules at each of Voyager, Galactica, Pegasus, Enterprise, and at its 50% owned Serenity targets based on initial and sustaining production wells feeding into separation and helium extraction units at each location. The NASCO DBK operation appears to be currently using 12 production wells, up from the eight wells in 2020.

**Table 26 Estimation of potential Blue Star operating costs based on reported DBK costs**

	DBK 2020			BNL single module		
Input Gas Mcf/day	6970			2500	2500	2500
Input helium %	4.9%			3.0%	5.0%	8.0%
Output Gas Mcf/day	345			76	126	202
Input Gas MMcf/month	191			68	68	68
Output Gas MMcf/month	9.4			2.1	3.5	5.5
Utilisation	90%			90%	90%	90%
Number of Trailers	18			3	6	10
Haulage Distance miles	508			170	170	170
	US\$/mth	US\$MM/yr	US\$/Mcf (raw or He)	US\$/mth	US\$/mth	US\$/mth
Staff	26500	0.32		26500	26500	26500
Heavy Equipment	8900	0.11		8900	8900	8900
Electricity (Variable)	35000	0.42	0.1834	12553	12553	12553
Maintenance (Variable)	60000	0.72	0.3144	21520	21520	21520
Subtotal	130400	1.56	-83216	69473	69473	69473
Hauling to Ladder Creek (Variable)	200000	2.40	0.042	14697	24495	39191
Helium trailers Leased	34250	0.41	1903	5708	11417	19028
AMCS Plant Lease	194000	2.33		0	0	0
Subtotal	228250	2.74	-86081	5708	11417	19028
<b>Total Operating Cost</b>	<b>558650</b>			<b>89878</b>	<b>105384</b>	<b>127692</b>
Cost US\$/Mcf helium	59.2			43.3	30.5	23.1
Adjust for inflation 10%	65.1			47.7	33.5	25.4

Source: NASCO AG 2020 annual report, Arup Due Diligence report 2019. Notes 1: Electricity and Maintenance unit costs are US\$ per Mcf on input gas, 2: Haulage unit cost US\$/Mcf/Mile, 3: US\$/month per trailer. Arup Due Diligence Report available at <https://www.sec.gov/edgar/browse/?CIK=1797676>

Table 26 summarises the 2020 production and cost structure, and separates the costs between those that are fixed monthly payments (ie wages, equipment hire, trailer and plant lease costs) and variable costs (haulage, maintenance, and electricity). In the table above, the haulage cost is calculated as US\$0.042/Mcf/Mile. DBK is 508 miles to Ladder Creek point of sale, while Blue Star is around 170 miles.

The number of compressed gas trailers that need to be hired is likely to be proportional mainly to the volume of gas sales, and less dependent on the haulage distance. In DBK's case, we estimate there are six trailers on the road at any time, three full and three empty, six trailers at DBK being filled and six at Ladder Creek being unloaded. Higher or lower helium production volumes would change both the number of vehicles on the road and the trailers acting as storage at each end.

The Electricity and Maintenance is likely to be proportional to the volume of input gas, and not the output gas.

We have allowed for 10% cost inflation since 2020.

### Estimated Las Animas operating cost of US\$33.5/Mcf at 5% helium concentration

On the basis of the above logic, we estimate that Blue Star would have an operating cost of US\$47.7/Mcf if the helium in raw gas was 3%, US\$33.5/Mcf at 5% and US\$25.4/Mcf at 8%. These costs reflect the initial production at the volumes in Table 26. Costs rise as well productivity falls off.

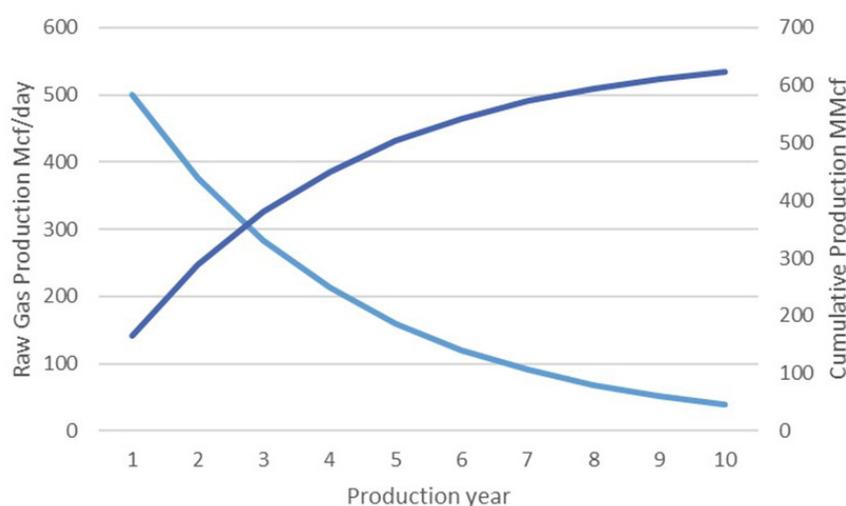
These costs assume that Blue Star purchases the processing plant. If the plant is leased then on the DNK numbers, adjusted for the lower BNL volumes, the operating cost would increase to US\$85/Mcf, US\$56/Mcf, or US\$39/Mcf respectively.

This cost does not include the drilling of additional wells and well workovers which are costed separately.

### Estimation of well production

The figure below shows our well production curve which assumes initial production of 500Mcf/day declining at a simple 33%pa. We believe this is a very conservative estimate. If we were to use a more standard industry Arps decline formula, production in years 1-3 would be similar but in later years Arps would predict higher production. For instance, year 10 would be 109Mcf/d vs the 38Mcf/d in Figure 22.

Figure 22 Estimated well production type curve with three years of stable production then 14%pa decline

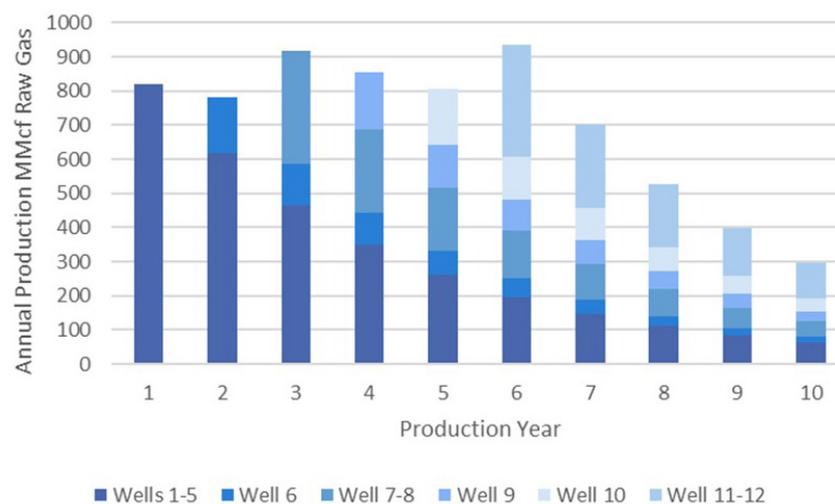


Source: IIR estimates

The initial production of 500Mcf/day is based on the initial reported production rates of the nearby Model Dome Field of 500-1000Mcf/day and the flow tests by Blue Star at Galactica/Pegasus of an initial 200-400Mcf/d flow rate, rising higher with time.

The decline rate is a conservative 33% pa in the absence of any available historical example wells.

Figure 23 Production profile based on 12 wells



Source: IIR estimates

The figure above combines the output of twelve wells, starting with the initial 5 production wells and adding one or two wells each year to stabilise production at around 800MMcf per year of raw gas.

Over the 10 years covered by the figure, the combination produces 7Bcf of raw gas and at a concentration of 8% 560MMcf of contained helium, or at 5% 350MMcf of helium.

### Helium production depends on helium concentration

Table 27 Estimated 10 year project life from 12 wells

Year	Annual Raw Gas Output MMcf/yr						Total	He MMcf/yr	Cum. He MMcf
	5	1	2	1	1	2			
1	821						821	41.1	41.1
2	617	164					782	39.1	80.1
3	464	123	329				916	45.8	126.0
4	349	93	247	164			853	42.7	168.6
5	262	70	186	123	164		806	40.3	208.9
6	197	52	140	93	123	329	934	46.7	255.6
7	148	39	105	70	93	247	702	35.1	290.7
8	112	30	79	52	70	186	528	26.4	317.2
9	84	22	59	39	52	140	397	19.9	337.0
10	63	17	45	30	39	105	299	14.9	351.9

Source: IIR estimates

The model is in yearly periods and if the introduction of new wells was timed monthly, as it would be in practice, the production profile would be much smoother.

The cumulative production over the 10 year period would be:

- ◆ At 3% helium concentration 211.2MMcf of helium
- ◆ At 5% helium concentration 351.9MMcf of helium
- ◆ At 8% helium concentration 563.1MMcf of helium

### Blue Star development include options to bunch, stack or accelerate projects

For Blue Star Helium, there are very strong prospects for the delivery of Voyager at 8%, Enterprise at 6%, Galactica at 5% and Pegasus at 3%, with potential for other projects.

Whether they are all bought into production at the same time or sequenced is a capital management decision. The company also has the option of starting production with more than 5 wells and more than one separation module on any site.

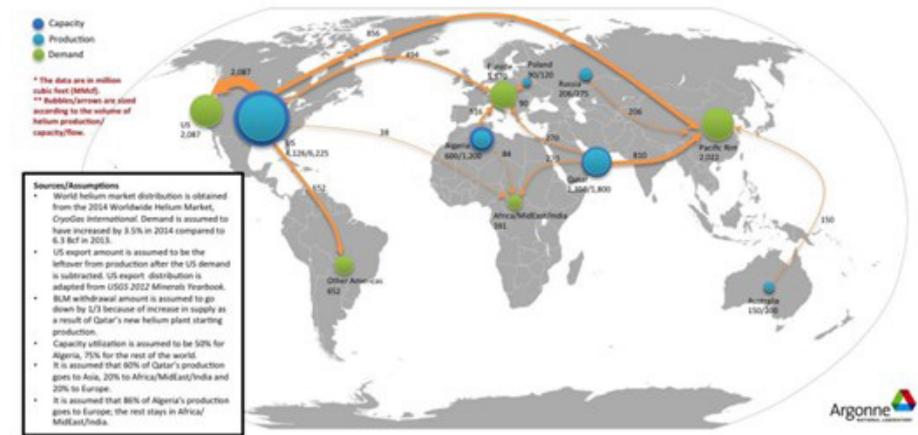
Higher volume would lower operating costs because the workforce to manage the plant would not change much. Lowering operating costs and generating a faster return on invested capital for infrastructure and access.

## GLOBAL HELIUM INDUSTRY

### STRUCTURE OF THE GLOBAL HELIUM MARKET

Most helium is produced as a by-product of natural gas (methane) production. It is traded globally in liquid form. To be liquid, Helium has to be -268.9 degrees Celsius below zero or less, and absolute zero is -273.2 degrees below zero. To maintain such a low temperature, helium is shipped in ISO containers, which are container sized tanks with built in refrigeration.

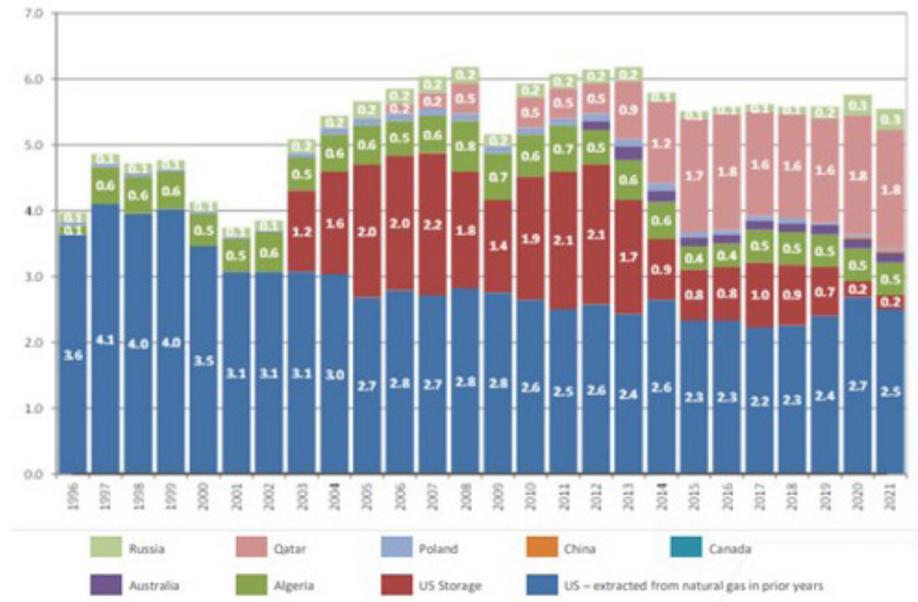
Figure 24 Helium trade flows in 2014



Source: <https://publications.anl.gov/anlpubs/2016/03/126223.pdf>

The figure above shows the major trade flows, and with the USA being the dominant global supplier.

Figure 25 Historical production of Helium by country (in Billion cubic feet per year -Bcf/yr)



Source: <https://www.heliumevolution.ca/wp-content/uploads/2022/06/22-06-08-Helium-Evolution-Corporate-Presentation-5Q-June-final.pdf>

Historically part of supply has come from production and part has come from the rundown of US Government controlled inventories built up in the first half of the 20th Century. Those inventories are largely depleted.

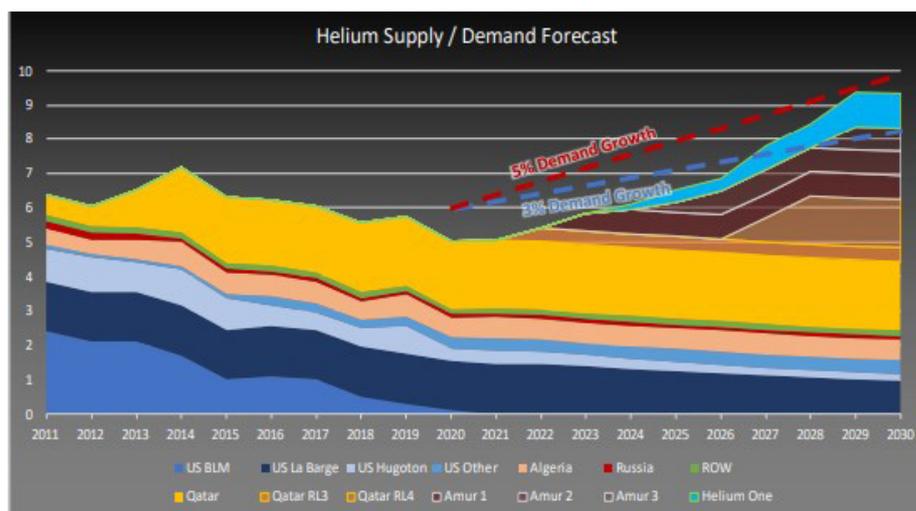
Qatar has emerged as a major supplier, producing byproduct helium as part of the production of LNG.

The major source of supply growth over the next five years is expected to be the Amur LNG project in Russian Siberia, also producing by-product helium, targeting the Chinese market.

The other source on new helium production, the cyan blue at the top of the Figure 26 below, is North American production from small producers like Blue Star Helium.

The total helium market has been 6Bcf per year, falling to around 5Bcf/yr during COVID and expected to grow at between 3%pa and 5%pa. Like most commodities, helium demand in the post COVID recovery has been surprisingly strong.

Figure 26 Supply and demand outlook in Bcf per year



Source: [https://www.helium-one.com/wp-content/uploads/2022/03/220201\\_Helium-One-Presentation\\_March\\_22-v2\\_1.pdf](https://www.helium-one.com/wp-content/uploads/2022/03/220201_Helium-One-Presentation_March_22-v2_1.pdf)

Since the forecast above was made, there has been a fire that damaged the Amur LNG and helium facility in Siberia, the outbreak of the war in Ukraine, and a re-ordering of the European gas supply networks.

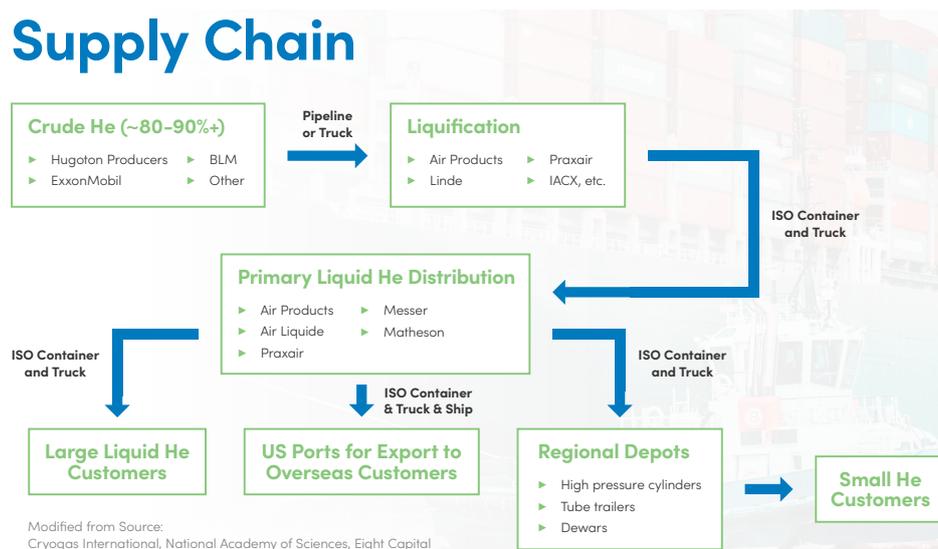
Table 28 Major global helium producers – Only four produces helium as the main product

Asset	Owner	He Output Bcf	He ie raw gas %	Main Product
Ras Laffan	RasGas	2	0.2%	LNG
Le Barge	Exxon	1.5	0.7%	CO2
Algeria LNG	Various	0.4	0.2%	LNG
Hugoton	Variuos	0.4	0.6%	Natural Gas
US Strategic Reserve	BLM	0.4	1.0%	Stored He
Concho Dome	Petrosun	0.2	4.0%	Helium
Doe Canyon	Air Liquide	0.2	0.4%	Natural Gas
Bayu-Udan	Various	0.2	0.3%	LNG
Dineh Bi Kayah	NASCO AG	0.2	5.0%	Helium
Tochito Dome	Tacitus	0.1	7.0%	Helium
Orenburg	Gaxprom	0.1	0.5%	Natural Gas
Odalonow	PGNiG	0.1	0.5%	Helium
Lisbon	Paradox	0.1	1.0%	Natural Gas

Source: BNL presentation 31 May 2022

Most of the world's supply is by-product helium from LNG production, with only four major primary product helium producers. Even in the US, most of the helium is a by-product of natural gas production, but in the US, the helium is stripped from the natural gas without liquifying the methane itself.

Figure 27 US helium supply chain



Source: [https://avantihelium.com/wp-content/uploads/2022/08/Avanti-Helium\\_Investor-Presentation-Ir-3.pdf](https://avantihelium.com/wp-content/uploads/2022/08/Avanti-Helium_Investor-Presentation-Ir-3.pdf)

The US supply chain is explained in the figure above. The crude helium is removed from natural gas by midstream operators who may operate pipelines that service the gas fields or may be specialty helium gas producers. The midstream producers and the primary helium producers generally sell to the specialty gas companies, like Air Products, Praxair and Air Liquide.

IACX is a vertically integrated midstream company that also manufactures the separation plant and is a potential source of funding for Blue Star's own plant. IACX can construct, install, operate, and market, and do one or more of the above, for a fee.

**Table 29 Australian LNG gas project helium tail gas grades – a grade of over 2% is likely to be cost competitive**

	Insitu Grade He %	Tail Gas Grade He %
Barossa/Bonapart	0.003%	11.22%
Prelude/Browse Basin	0.028%	8.51%
Ichthys/Browse Basin	0.051%	8.23%
Greater Sunrise/Bonapart	0.210%	5.55%
Bayu-Undan/Bonapart	0.128%	3.28%
North West Shelf/Carnarvon	0.038%	3.20%
PTTEP/Bonapart	0.028%	2.87%
Poseidon/Bonapart	0.010%	1.93%
FLNG/Bonapart	0.054%	1.80%
Gladstone LNG	0.045%	1.59%
Curtis Island LNG	0.025%	0.86%
Australian Pacific LNG	0.025%	0.86%
Scarborough/Carnarvon	0.025%	0.56%
Gorgon	0.013%	0.49%
Pluto	0.023%	0.29%
Wheatstone/Carnarvon	0.021%	0.21%

Source: Helium in the Australian liquified natural gas economy APPEA Journal 2018, 58, 209-237

The competitive position of the primary helium producers depends largely of the scale of their operation and the insitu concentration of the helium. In the table above, the concentrations of the raw gas and the tail gas is shown for the existing and potential LNG producers in Australia. The tail gas is what is left after the methane is liquified and is the feed stock for the Helium recovery and purification plant.

We do not have consistent data for the major LNG projects that currently produce helium, but what the table above shows is that a primary helium producer with an input concentration of over 5% is going to be in a similar production cost footing to the big LNG producers, especially if they have some scale.

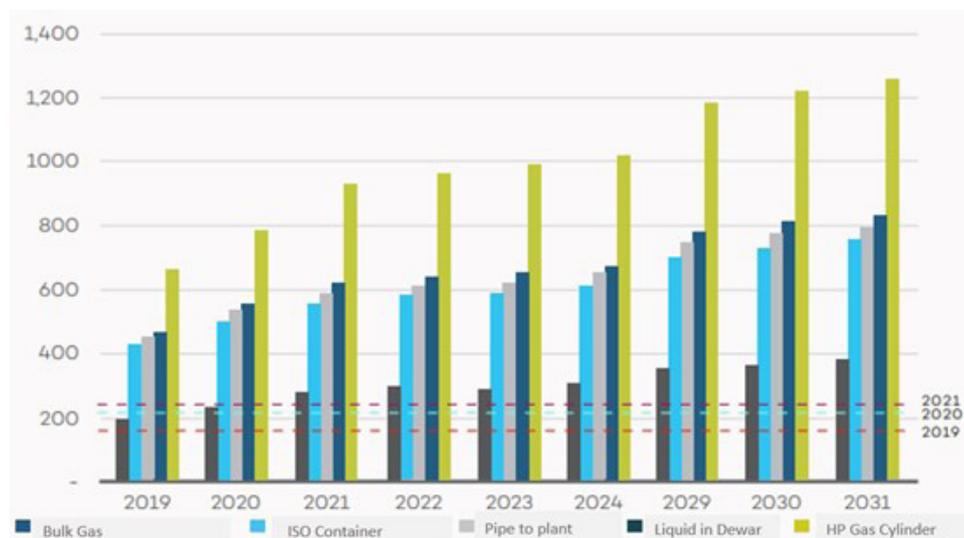
## PRICING HELIUM

**Table 30 Helium grades and uses**

Grade	Purity	Description
Grade 6	99.9999%	Used in the manufacturing of semiconductor chips and for scientific research, MRI machines and for gas chromatography. Derived through liquifaction process.
Grade 5.5	99.9995%	Like Grade 6 helium, it is generally considered "research grade". Similar uses as Grade 6 helium but additionally used in welding and as a cooling gas in fiber optics.
Grade 5	99.999%	Laboratory uses such as gas chromatography, mass spectrometry and also used for weather balloons and blimps.
Grade 4.8	99.998%	Highest use of industrial grade of helium (similar uses as below).
Grade 4.7	99.997%	Grade-A Helium, most often used for cryogenics and pressurizing/purging along with atmosphere control, welding, in breathing mixtures and leak detection.
Grade 4.6	99.996%	Used for weather balloons, blimps, leak detection, welding and coolant for rockets.
Grade 4.5	99.995%	Commonly used in the balloon industry and in certain MRI applications.
Grade 4	99.99% & Lower	Considered balloon grade helium.

Source: [https://avantihelium.com/wp-content/uploads/2022/08/Avanti-Helium\\_Investor-Presentation-Ir-3.pdf](https://avantihelium.com/wp-content/uploads/2022/08/Avanti-Helium_Investor-Presentation-Ir-3.pdf)

**Figure 28 Helium price forecasts for 2022 to 2031 by product category**



Source: Forecasts by JR Campbell & Assoc for NASCO Energie [https://www.nasco.ag/wp-content/uploads/2021/12/NASCO\\_Bericht\\_des\\_Vorstands\\_HV\\_2021\\_DE\\_s.pdf](https://www.nasco.ag/wp-content/uploads/2021/12/NASCO_Bericht_des_Vorstands_HV_2021_DE_s.pdf)

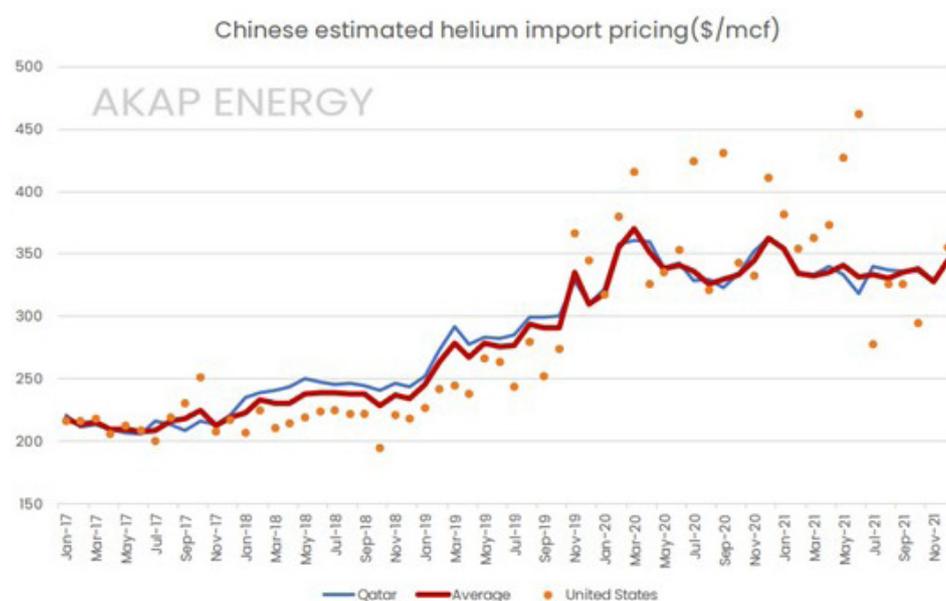
The pricing of helium depends on its purity, whether it is in gas or liquid form and the size of the container it is sold in.

The Figure 28 shows the pricing of bulk gas and industrial grade liquified helium as sold to the specialty gas companies like Praxair. There is a bunching of prices around US\$500/Mcf to US\$600/Mcf for liquid helium of grade 4 to 4.8. Bulk compressed helium gas trades at a discount and is forecast to trade at US\$300/Mcf to US\$350/Mcf.

The current average helium import price (Figure 29) landed in China appears to be US\$330/Mcf to US\$370/Mcf, with "spot" prices cargoes from the USA at up to US\$460/Mcf, but there is no clarity on what form the imported helium is in. Qatar would be delivering in liquid form in ISO refrigerated containers, and is likely to be priced under long term contracts which could reflect some historical base price which has escalated over time rather than a true spot market.

In all likelihood, the current price for a new contract would be above the average shown in the figure below.

Figure 29 Historical Chinese helium import prices (US\$/Mcf)



Source: <https://www.helium-one.com/wp-content/uploads/2022/10/220501-Helium-One-Presentation-May-22-121.pdf>

### For valuation purposes, US\$300/Mcf flat in real terms has been assumed

For our modelling purposes, we have used US\$300/Mcf for the bulk gas Blue Star Helium is expected to sell. If it adds liquefaction capacity and sells into the ISO contained market, that would provide substantial price upside, and if it bypassed the major specialty gas companies and sold direct to customers, it could achieve even higher prices.

## CAPITAL STRUCTURE

Table 31 Equity on issue at date of this report

millions	At 7 July 2022	Exercise A\$/sh	Cash A\$MM
Issued Shares	1586.2		
Options 4 Nov 2023	17.2	0.084	1.4
Options 4 Nov 2024	17.2	0.112	1.9
Performance Rights	91.0		
Diluted Capital	1711.6		3.4

Source: BNL release 7 July 2022

On 14 February 2022, the Company announced that its ordinary shares had received approval for trading on the OTCQB market (often referred to as a "QB" quotation). A listing on the OTCQB market provides increased accessibility for North American domiciled investors to the Company's shares, as well as providing Blue Star's US employees with a way to monetise any performance share awards.

The hurdles for the directors performance rights are set out in the table below. The hurdles for the existing 10M rights and those proposed for the CFO have not been published.

Table 32 Performance Rights hurdles

	R Warner	T Spry	N Rinaldi	Total
BNL Share price over A\$0.10/sh	4.8	7.8	1.6	14.2
Reserves/Resources <sup>1</sup>	4.8	7.8	1.6	14.2
Drill tested five separate prospects	4.8	7.8	1.6	14.2
FID <sup>2</sup> for one prospect	4.8	7.8	1.6	14.2
Selling helium	4.8	7.8	1.6	14.2
Total	24.0	39.0	8.0	71.0

Source: BNL AGM notice of meeting 6 May 2022 Note 1 Net recoverable helium reserves/resources must be more than P90, 10BCF; P50 20BCF; P10BCF. Note 2 FID means Financial Investment Decision made to invest in one project.

## SHAREHOLDERS

**Table 33 Major shareholders**

29-Apr-22	Undiluted	Fully Diluted
Board and Management	4.0%	8.5%
Pamplona	3.8%	3.5%
Hugh Warner	3.1%	2.9%
Nikola Krkovski	2.6%	2.4%
Rest of top 20	23.6%	24.0%
Top 20	37.1%	41.4%

Source: 2021 Annual Report

The fully diluted interest assumed all management performance shares are converted into ordinary shares, and that the owners of the options (Canaccord Genuity (Australia) Limited and Pamplona Capital Pty Ltd) convert the options into shares rather than selling them.

The share register is very open with no major share blocks.

## BOARD AND MANAGEMENT

### Mr Ross Warner - Executive Chairman

Ross is an experienced natural resources executive. He has held executive and non-executive director roles in several public companies listed on AIM and the ASX and a number of private companies. He has been involved in ventures with interests in operated and non-operated oil and gas assets in Texas, Louisiana and Oklahoma and upstream and gas to power projects in Indonesia. He practiced as a corporate finance lawyer with Mallesons Stephen Jaques in Perth and Melbourne and Clifford Chance in London.

### Mr Trent Spry - Managing Director and CEO

Trent brings to the Board significant ASX corporate experience, expertise in geoscience, exploration and project development as well as significant recent experience in the USA.

Trent has over twenty years of experience in the upstream oil and gas industry in exploration, appraisal and development. He holds a Bachelor of Science (Hons)(National Centre for Petroleum Geology & Geophysics, University of Adelaide) and is a graduate of the Australian Institute of Company Directors. He has originated numerous projects from concept or acquisition through to discovery, appraisal, successful development and exit in Australia, SE Asia, the Gulf of Mexico and the US onshore. Trent specializes in new ventures and project execution and has expertise in hydrocarbon and helium systems analysis.

### Neil Rinaldi - Non-Executive Director

Neil's successful career in the finance sector spans more than two decades, starting as an Investment Advisor at one of Australia's premier investment firms. He then spent considerable time working in Europe where he was the founding Managing Director of Truestone Capital Limited, a London based Corporate Advisory firm focused on delivering results for companies in the Australian resources sector.

Neil was appointed CEO at ASX listed Aziana Limited, a multi commodity, exploration company focused on assets in Madagascar and Louisiana, USA and was instrumental in recommending and completing the reverse takeover of Aziana Limited by Brainchip Limited (ASX:BRN.) He maintained a Non-Executive Director position with the company during a transition period until he resigned in November 2016. Neil has considerable experience in capital raising, asset acquisition and disposals, company structuring and positioning companies for growth.

### Peter Kondrat - Chief Operating Officer

Peter is a seasoned helium executive and industry professional. He has over 25 years' experience in the development of oil, natural gas and helium from conventional and unconventional reservoirs. This includes proven expertise in the identification, economic analysis and exploitation of new and additional helium from drilling, workover, recompletion, prospect development and deeper play testing.

Most recently, Peter was President and COO of US helium exploration and production business, Tacitus LLC (Tacitus). Under Peter's direction, Tacitus built a significant helium business in the Tocito Dome Field, New Mexico. This included leading Tacitus from operating at a loss to substantial positive cash flow, driven by the company's success in originating new helium discovery wells with high concentration and flow rates. Tacitus was ultimately sold to the Navajo Transitional Energy Company in October 2021 for an undisclosed consideration.

Peter will lead Blue Star's on-the-ground efforts in the US from his base in Colorado. He will be responsible for deployment of all aspects of the Company's exploration, development and production activities in Las Animas, Colorado. The timing of Peter's appointment corresponds with Blue Star's recent helium discovery successes at Voyager and Galactica/Pegasus, and its planned transition into development drilling and production operations while continuing to grow its resource base.

#### **Scott Fenoglio – Chief Financial Officer**

Scott brings almost 20 years of oil and gas executive and finance experience to the team. He is also a CFA (Chartered Financial Analyst) Charterholder. Most recently, Scott was CFO of Ossidiana Energy, a Colorado-based E&P business focused on the DJ Basin in Wyoming. Prior to that he held senior finance executive roles at Colorado-based Bonanza Creek Energy Inc. and Noble Energy Inc.

The timing of Scott's appointment corresponds with the development planning of Blue Star's recent helium discovery successes at Voyager, Galactica/Pegasus and Serenity. Scott will provide key input into the assessment of the various development scenarios being evaluated by the Company, which includes evaluating various facility options, suppliers and offtake strategies in the critically undersupplied helium market. He will also be a core part of analysing the economic benefits of these various scenarios and communicating with key stakeholders. Scott brings almost 20 years of oil and gas executive and finance experience to the team. He is also a CFA (Chartered Financial Analyst) Charter holder.

#### **Amanda Wilton-Heald – Company Secretary & Accountant**

Amanda has over 20 years of accounting, auditing and company secretarial experience, including in the oil and gas exploration industry, and listing and corporate advisory experience.

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