

22 June 2026

Rec: High-Conviction BUY

NAV:

Riskd target price: 0.064p

Upside to target price: 113%

Market Data:

Market cap: £15m

EV: £8.5m

Share price:

Change 1m: 12.2%

Change 3m: -13.4%

Change 12m: -13.4%



Shares outstanding: 49.99bn

Research:

Peter Hitchens

+44 7921 262 627

Corporate Broking:

Jerry Keen

+44 207 468 7964

Henry Clarke

+44 7775 672 425

Damion Carruel

+44 7775 516745

Tim Dainton

+44 7976 830453

Richard McGlashan

+44 7879 646641

Hugh Rich

+44 7581 286981

Mungo Sheehan

+44 7788 266844

Email: peter.hitchens@oak-securities.com

Increasing Momentum

Quantum Helium has transformed over the past 18 months to become a US based explorer with its activities focused on the Four Corners helium fairway in Colorado. The company has now started work on these assets which we hope will prove up significant helium reserves to allow a development to commence. This could create significant shareholder value.

Sagebrush

Quantum has 10,000 acres in the Sagebrush project in Colorado. The company has now started a long-term test of the Sagebrush-1 well. This well was drilled in 1993 and found gas in the Leadville formation. After a DST, the gas was analysed and found to contain helium in concentrations of 2.7% which is well above the current commercial threshold. Sproule ERCE believes that this could contain 2U helium resources of 131 mmcf. The current test has found similar gas to the original well and work is ongoing to clean up the well to assess the potential gas flow rates. Oil was also found in the Leadville which opens up a new play.

Coyote Wash

Quantum has 4,320 acres in the Coyote Wash area which lies to the East of Sagebrush. 3D seismic data has been acquired the company has identified 6 drillable prospects. Sproule ERCE has estimated that these could contain a combined 2U helium resource of 970 mmcf. There is potential of oil in the upper Ismay formations. The company could look to start drilling these prospects once the Sagebrush testing has been completed.

Finances

The company has a relatively strong balance sheet following its placing in April 2026 which raised GBP 5 million gross and should leave the company with proforma cash of over USD8 million. This will allow the company to fund the testing programme and move towards a drilling campaign (such as well planning and long-lead items).

Valuation

We derive a valuation for Quantum of 0.064p/share which is derived from a RENAV (Riskd Exploration Net Asset Value). This uses a helium price US\$500/mcf. As the company progresses the operations, we believe that many of the risks should start to be mitigated.

Overview

This should prove to be an exciting time for shareholders as the company looks to become a major US helium explorer and producer. This is important at a time when supplies appear to be tight and demand continues to rise.

Initiation of coverage

Contents

Contents	2
Summary & Conclusion	3
Operations	5
Sagebrush	5
Coyote Wash	7
Development	9
Other operations	10
Finances	11
Valuation	12
Asset Valuation Methodology	12
RENAV	13
Management	16
Appendix 1: Helium – The Rare Element	17
Research Analyst Disclosures	23
Peter Hitchens Bsc Eng (Hons.)	23
DISCLAIMER: Investment Research	24
Notes	27

NOTE: “m” denotes thousands & “mm” millions

Summary & Conclusion

Quantum Helium has refocused its operations over the last eighteen months to become a US focused helium explorer and developer. The core of its operations is centred on its acreage in the proven Four Corners helium fairway. The company has now started work on this acreage which should allow management to start to prove up significant reserves and resources of helium and let a development to get underway. This could add a significant boost to shareholders value.

Sagebrush

Quantum Helium has a 90% working interest in 10,000 acres in the Sagebrush project in Colorado which is secured by a small level of oil production in the Ismay formation. The company has started an extended production test on the Leadville formation in the Sagebrush-1 well. This was originally drilled in 1993 and tested helium in a concentration of 2.7% – well above the commercial threshold. Additionally the gas had carbon dioxide (39.9%) and methane (19.5%) which are valuable by-products. Sproule ERCE has analysed the historic data and believes that this structure could contain 2U helium resources of 131 mmcf. Management believes, using a higher porosity, that resources could be closer to the 3U helium estimate of 269 mmcf. The well is currently undergoing an Extended Production Test. This has shown helium concentrations in the Leadville formation of 2.5% – similar to the original test. The well has also identified connectivity with a natural fracture system. Work is now looking to clean up the well and increase exposure to the reservoir in order to assess the deliverability of the well. Oil was also found in the Leadville which opens up a new play for the company. On top of testing the Leadville formation, Quantum is looking at testing the lower Leadville formation which was not tested in the original well and has not been included in Sproule ERCE estimates. *(For more details please see page 5)*

Coyote Wash

Quantum has 4,320 acres in the Coyote Wash area which lies to the East of its Sagebrush project. The company has acquired 3D seismic over the area and identified six drillable prospects. Wintershall drilled a well (Coyote Wash 30-12) in 1984 which tested non-flammable gas. It is estimated that this could contain helium in a concentration of approximately 2.5%. Sproule ERCE has analysed the data and believe that the six prospects could contain 2U helium resources of 0.97 BCF. Sproule has also identified a small Ismay oil prospect with 2U resources of 0.75 mmbbl. The oil prospects are not the main target for Quantum but would represent low-hanging fruit for the company as they would be cheap to bring on stream and the cashflow would reduce financing risks. Management are eager to drill this acreage and will probably happen after the results of the Sagebrush testing. *(For more details please see page 7)*

Development

Should resources live up to expectations, management is putting in place a potential development. It is envisaged that it will use a small in-situ separation plant which can be upgraded if required. This is expected to have an initial capacity of 2 mmcf/day of raw gas and is expected to cost US\$8 – 12 million, but can now be leased. The helium would be processed to a purity of 95 – 98% for sale. The methane would be used on site for power generation which would significantly reduce operating costs. The carbon dioxide is likely to be used in EOR (Enhance Oil Recovery). Elk Petroleum has already expressed an interest in buying the gas for use in its Aneth oil field nearby. *(For more details please see page 8)*

Valuation

We value the company on the basis of a RENAV (Risky Exploration Net Asset Value). This valuation is derived through using a DCF (discounted cash flow) methodology to the known fields and discoveries of the company. We usually add an element of value for the risky exploration upside to give an indication of how this asset value may change over the next 12 – 24 months. For pricing we are using US\$500/mcf for the helium and US\$2.50/mcf for the carbon dioxide. We derive a valuation for the company of 0.064p/share which represents a 120% premium to the current share price of 0.029p/share. *(For more details please see page 12)*

Finances

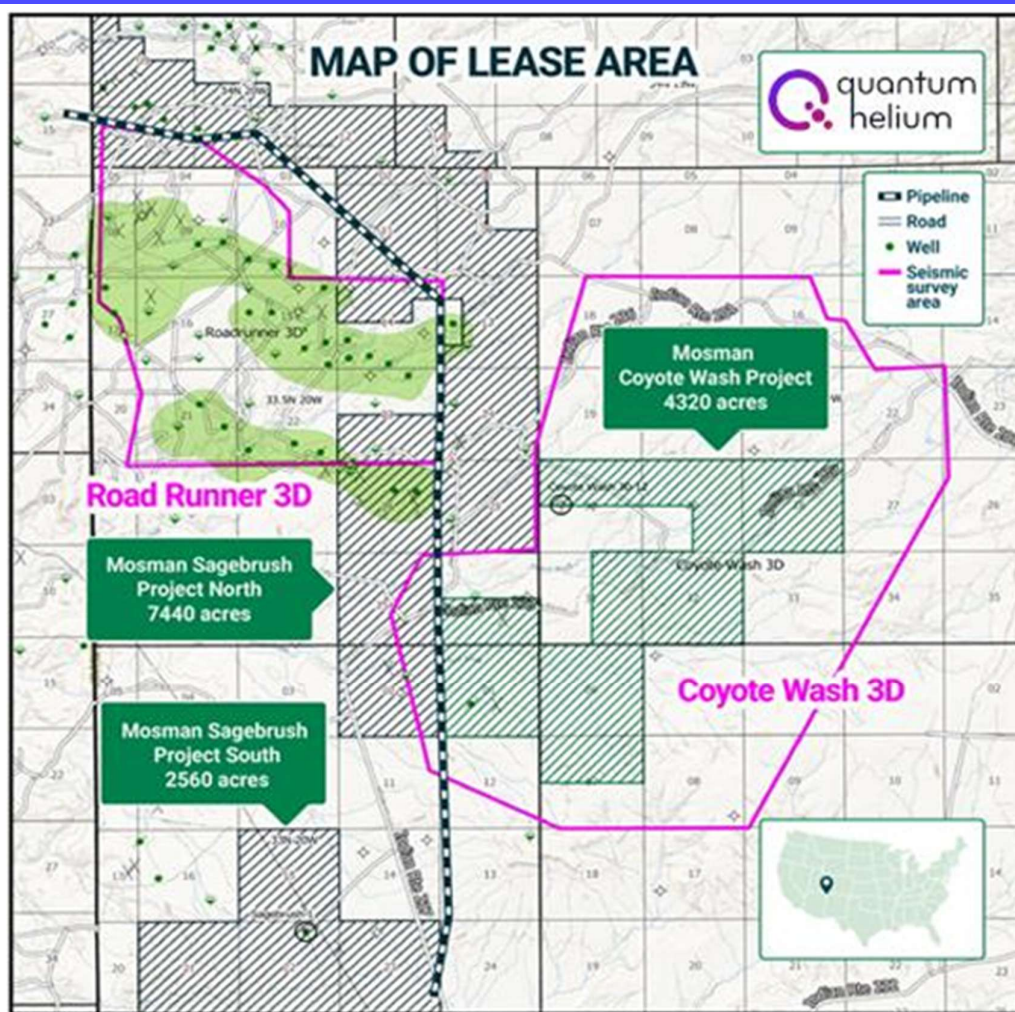
Quantum Helium has a relatively strong balance sheet following the placing in April which raised GBP 5 million gross through the sale of 16.67 billion shares at 0.03 pence/share. This takes the effective cash balance to approximately US\$8.6 million. This will be used to move the business forward. *(For more details please see page 11)*

Operations

Quantum Helium has refocused its operations over the last eighteen months with the aim of becoming a major US focused helium explorer and developer. The core of its operations is centred on the Sagebrush and Coyote Wash areas of Colorado. To reflect this more focused business, in November 2025, shareholders approved a change in name to Quantum Helium from Mosman Oil and Gas

Figure 1 Quantum Helium acreage

Location map



Source: Quantum Helium

Sagebrush

Quantum has a 90% working interest in the Sagebrush project, Colorado. This is a significant acreage position of 10,000 acres which is located in the proven Four Corners helium fairway. The remaining 10% is owned by Howard McLaughlin, the chief executive of Quantum, who is a paying partner. This project is split into two areas: South (2,560 acres) and North (7,440 acres). This acreage is held by production through a small oilfield which is producing approximately 40 bbl/day of oil through seven wells. Although this provides the company with a small amount

of cash flow, management is interested in the helium potential in the acreage. The original operator of the acreage, PetroCorp inc, drilled a well (Sagebrush-1) in 1993 which encountered gas in the Leadville formation. A DST (Drill Stem Test) was conducted and the gas was analysed where it was found that helium was present at a concentration of 2.76%. The other gases present were nitrogen (34.5%), carbon dioxide (39.9%), methane (19.5%). This concentration of helium is significantly above the current commercial threshold. In the drilling of this well, indications of hydrocarbons were seen in the Lower Leadville formation but these were not tested during this DST. Management believes that this zone could also contain helium.

At the end of 2025, Sproule ERCE conducted an evaluation of the original data for Quantum and concluded that this was a viable helium development. It estimated that gross 2U gas resources were 1,101 bcf of hydrocarbons and 134 BCF of helium. Sproule ERCE has taken a conservative view of a porosity (of 4.6%) for the 2U resource estimates. Quantum believes, after in-house petrophysics and core data analysis of analogous wells, that the porosity of the well could be 8% which would take the resources towards Sproule ERCE's 3U estimate of gross resources of 2,218 BCF of hydrocarbon and 269 BCF of helium. Prior to the Sproule ERC report, the company had an analysis carried out by Four Corners Helium LLC which found that 2C resources in the Sagebrush project could be 305 BCF of Helium (before royalties)

Investors should note that this estimate only covers the Upper Leadville formation and, as mentioned earlier, there is the potential of additional upside of the Lower Leadville. This has not been included by Sproule ERCE as this was not tested in the original DST.

Table 1 Sagebrush gross gas resource estimates (BCF)

Resource category	Hydrocarbon	Helium	CO2
1U	661	80	1,161
2U	1,101	134	1,964
3U	2,218	269	3,899

Source: Sproule ERCE

Going forward

Quantum Helium has now gathered additional 3D seismic data over the structure. This is to get a better understanding of the Leadville (helium-bearing) structure and to help identify any additional oil bearing structures in the Ismay interval – although the oil is a secondary target it does have the ability to provide cash flow quickly to fund some of the operations of the company. The 3D has shown that the initial well into the Leadville was drilled on the edge of a large structural feature and that better drilling locations can now be found.

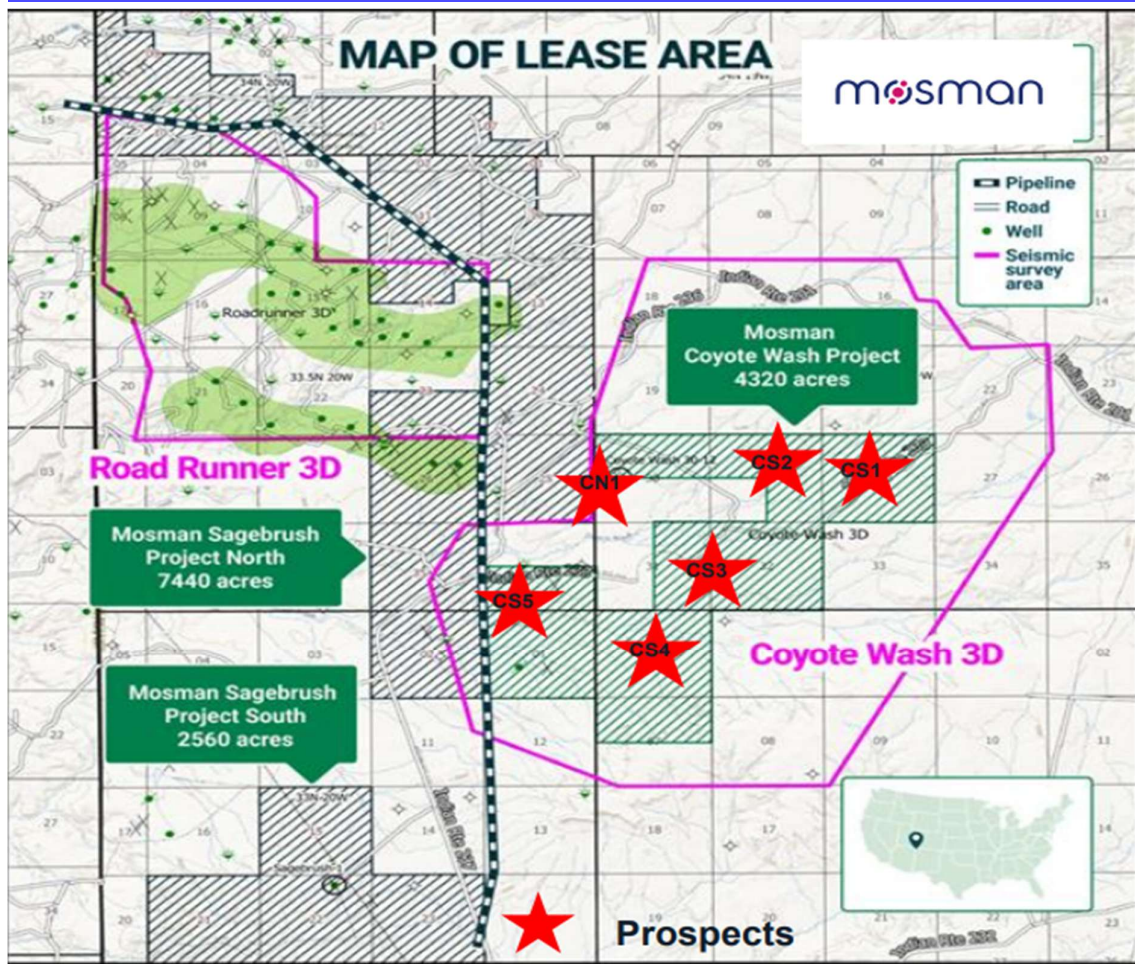
The company is now in the middle of an Extended Production Test on the existing Sagebrush-1 well. The integrity of the wells is good and, as such, no new drilling is required in this testing programme. The first stage was to test the Leadville formation that was tested in the original DST. This has found gas that was similar in

composition to the original DST with a helium concentration of 2.5%. The well also demonstrated the presence of a significant natural fracture system. Oil was also found in the Leadville formation with the ability to produce up to 40 bbl/day which opens up a new hydrocarbon play in the Sagebrush area.

The next phase is underway. This will require additional perforations and completion modification to increase reservoir exposure. The company will also perform additional cleanup of the well bore with the removal of stimulation fluids and load water. This will restore the reservoir to production condition and allow the company to better assess the sustained gas flow rates. Quantum will then analyse the data which will provide a better indication of the resources and flow potential of the well. This would give management a better understanding of the discovery and allow it to start looking at potential development options for this find.

Coyote Wash

Quantum has a 100% working interest in the Coyote Wash project which covers 4,320 acres and lies to the east of the group's Sagebrush operations. This acreage was previously operated by Wintershall, which was Germany's largest oil and gas producer. In 1984, Wintershall drilled the Coyote Wash 30-12 well which discovered gas. Three DST were conducted in the middle and lower Leadville formations and flowed non-flammable gas. With little focus on helium at the time, this gas was not tested and analysed but it is estimated that there could be helium present at concentrations of approximately 2.5%. The test data showed that this well flowed 173 mcf/day demonstrating good reservoir. There is 3D seismic covering the acreage and with this, Quantum has identified six drillable Leadville prospects.

Figure 2 Quantum Helium**Coyote Wash prospect location**

Source: Quantum Helium

Quantum has also used Sproule ERCE to look at the potential volumes in these prospects in the Leadville Formation in the Coyote Wash area. It found that potential 2U prospective helium gas resources of 970 mmcf.

Table 2 Coyote Wash gross gas resource estimates (BCF)

Resource category	Hydrocarbon	Helium	CO ₂
1U	3,567	432	6,271
2U	7,998	970	14,055
3U	13,850	1,682	24,342

Source: Sproule ERCE

Sproule ERCE also identified up to 0.75mmbbl of recoverable oil in the Ismay formation at the Mariano Wash prospect. A previous well was drilled in the area, but the 3D seismic data indicates that this was at the edge of the structure. Management is also working on maturing additional Ismay prospects across its acreage. Although the oil is the secondary target it represents some low hanging

fruit that will quickly start to generate cash flow and will reduce the funding risks associated with the business.

Table 3 Coyote Wash Ismay gross oil & gas resource estimates

	Resource category	Oil (mbbl)	Gas (mmcf)
Single well development	1U	50	180
	2U	140	286
	3U	250	498
3 well development	1U	150	540
	2U	420	858
	3U	750	1,494

Source: Sproule ERCE

Quantum Helium will probably start drilling in the Coyote Wash acreage once it has completed the testing and analysis of Sagebrush-1 well and has a better understanding of the geology.

Development

Quantum Helium is looking at on-situ development of helium. The initial idea is of a small separation plant that is designed to be scalable so that more processing facilities can be added as more reserves are found. At the current stage it is envisaged that the plant will have an initial capacity of 2 mmcf/day of raw gas although this will be finalised once a better idea of the well performance and resources is understood. Management is in preliminary talks with a plant manufacturer and the costs is anticipated at US\$8-12 million and will take under a year to construct and commission. They have recently been offered the option of leasing a plant. We are currently assuming that Quantum will sell the helium at 95 -98% purity and not go through the expensive process of liquefaction to increase the purity of the gas stream.

Carbon Dioxide

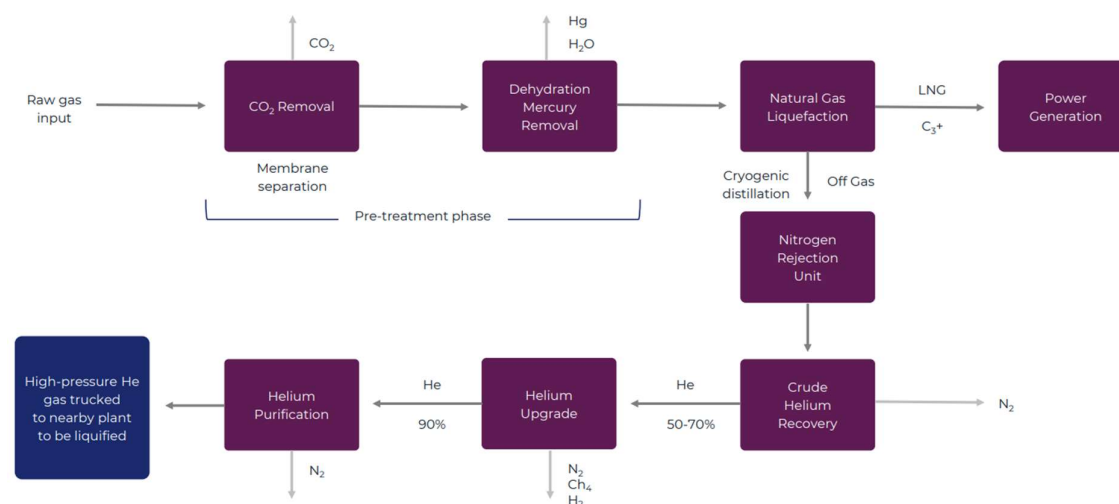
Approximately 40% of the gas stream is carbon dioxide which could prove to be a valuable by-product. Although there is a ready US industrial market (from areas such as fizzy drinks and food packaging), the obvious route for the gas is in the Aneth oil field where it would be used for EOR (Enhanced Oil Recovery). The Aneth oil field is the largest field in the Paradox Basin and is located in SE Utah. Elk Petroleum, the operator of the Aneth field, has already expressed an interest in buying the carbon dioxide. The advantage of selling the gas for EOR is that it will not have to be purified which can become a costly operation – to get to beverage grade the requirement is a purity of over 99.9%. There is also the potential for Quantum Helium to get sequestration credits for the gas that is sold for EOR which is currently approximately US\$7/tonne.

Methane

Approximately 20% of the gas produced is expected to be methane, with a further 3% of heavier petroleum gases. The current thought is that this will be used on-site for power generation which should provide a substantial reduction in operating costs compared to some similar operations in the area. Should there be surplus to requirements, this is likely to be sold to third parties with the potential of setting up a power-hungry data centre.

Figure 3 Quantum Helium

Helium separation schematic



Source: Quantum Helium

Other operations

As part of management's decision to focus on its US operations, Quantum has decided to convert its exploration interests in the Amadeus Basin, onshore Australia, to royalty interests rather than having a direct working interest. This allows the company to participate in any potential upside in the assets whilst retaining the ability to focus its capital expenditure on the US assets.

EP-145

Quantum has sold its 100% interest in this licence to Echelon Resources in 2025 but will retain a 5% royalty on any helium and hydrogen that is found. This based on sales price before any costs incurred. Echelon is the operator of the nearby Mereenie oil and gas field which is the largest onshore field in Northern Territory and is planning to start the acquisition of seismic over EP-145 ahead of a potential well. It is estimated that the potential 2U helium resources could be 26.4 BCF.

EPA-155 (Mt Winter)

Quantum has sold its 100% interest in EPA-155 (Mt Winter) in 2025 to Georgina Energy but retains a 2.5% royalty interest in production from any discovery. According to Georgina Energy the 2U gross prospective resources are estimated at 1,734 BCF of natural gas, 234 BCF of helium and 214 BCF of hydrogen.

Finances

Cash Balances

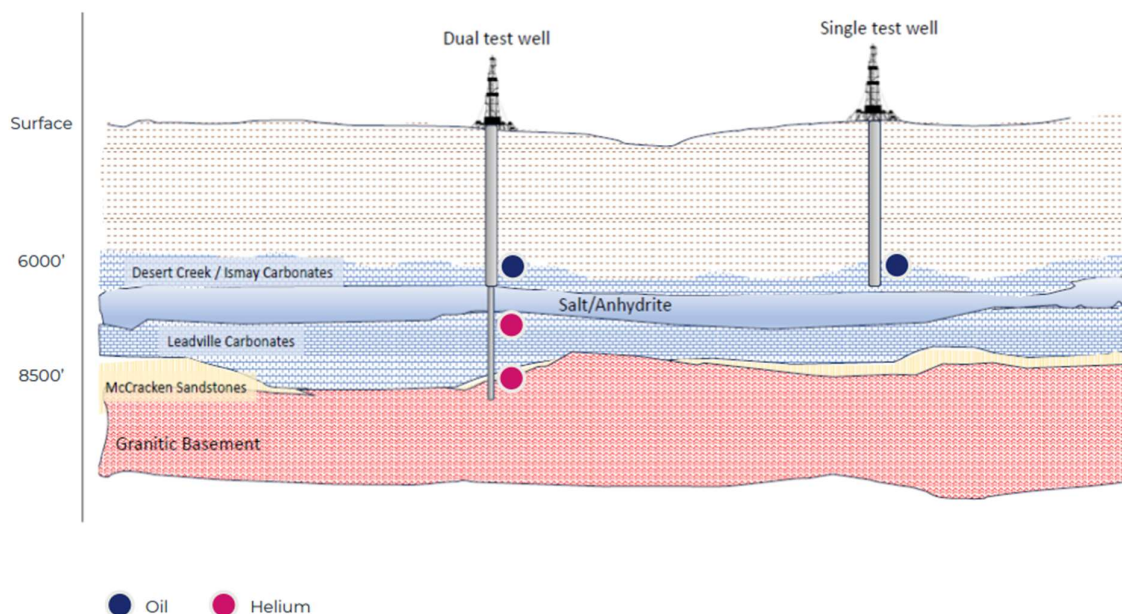
At the end of 2025, Quantum Helium had net cash of A\$3.4 million (US\$ 2.5 million). Since the end of the year (in April 2026), Quantum raised GBP 5 million gross from an institutional placing which saw the issue of 16.67 billion shares at 0.03 pence/share. This takes the effective cash balance to approximately US\$8.6 million.

Expenditure

The company is about to start a major investment programme. The first expense will come with the testing of the Sagebrush well which we believe will cost approximately US\$0.5 million. Depending on the results of this, the company will then look to drill further exploration or appraisal wells. Should the company decide to target the Ismay formation, these wells are expected to cost US\$2.0 – 2.5 million each. Management might want to drill dual test wells (which test the Ismay and Leadville formations). The cost of these deeper wells are expected to cost US\$3.0 – 3.5 million. Although more expensive, they will be targeting two exciting plays.

Figure 4 Quantum Helium

Single and dual test wells



Source: Quantum Helium

For the helium processing plant, management feels that this is a bankable project – once the reserves are established. This was demonstrated by Pulsar Helium which, in August 2025, was able to secure US\$12.5m in financing for its proposed plant in Minnesota. This is very much dependent on an independent reserve report confirming sufficient helium reserves to support the plant.

Valuation

Asset Valuation Methodology

For valuing Quantum Helium, we take the traditional approach of asset valuation which is widely used by the industry. This valuation is derived through using a DCF (discounted cash flow) methodology to the known fields and discoveries of the company. The field production profiles, capital expenditure and operating costs are modelled under the appropriate fiscal regime to give a cash flow profile, which is discounted to provide a net present value for each asset. We usually add an element of value for the risked exploration upside to give an indication of how this asset value may change over the next 12 – 24 months. The risk factor that we take is the GCS (Geological Chance of Success), which is based on the play chances (reservoir, source and seal) coupled with the local chances (seal, migration and trap). We also adjust for the balance sheet.

Costings

We are therefore assuming that the cost of the equipment is US\$8 – 12m for a plant that can process 2 mmcf/day of gross gas. We have assumed that there is a concentration of 2.7% for helium and 40% for the carbon dioxide – giving sales gas capacity of 54 mcf/day for helium and 800 mcf/day for carbon dioxide. We have assumed that the cost of processing is US\$20/mcf of helium produced. This is lower than some of its peers due to the use of hydrocarbons to generate in-situ electricity.

We are assuming that Quantum will be selling 98% pure helium and not going through the process of producing very pure grade 6 (99.9999%) helium which would require the costly process of liquefaction (although this will lead to a significantly higher sales price). This is a common method for helium developments.

Helium and carbon dioxide prices

For our valuation, we have assumed a flat helium and carbon dioxide prices which, we believe, are conservative and below the current prices achieved by the industry. In our base case, we have assumed a helium price of US\$500/mcf. We still believe that this is conservative price for helium. For example, General Helium recently announced that it had agreed a LOI (Letter of Intent) to sign a long-term take-or-pay offtake agreement with a NYSE listed cryogenic company for a minimum price of US\$550/mcf for compressed helium gas. This is expected to be finalised as soon as the gas compression unit has been installed. This style of agreement (a floor price with upside) is becoming increasingly common in the industry. General Helium also noted that current long term offtake agreements are currently averaging US\$600 – US\$760/mcf.

The carbon dioxide price we have forecast is US\$2.5/mcf (which includes a sequestration credit). Although this might appear low compared to seen by other

producers which believe that price exceed US\$8.50/mcf, Quantum has the ability to sell for EOR and can avoid the costly process of purifying and liquefying the gas.

Discount rate & exchange rates

The discount rate that we use in the valuation is the standard 10%. Although it could be argued that this should be adjusted to reflect the company's WACC (weighted average cost of capital), this is the standard rate that is widely used by the industry in making acquisitions.

The helium industry very much works in US dollars, with the revenue and most of the costs priced in dollars. Therefore, we have modelled the assets in US dollars and will translate this through at the current exchange rate to allow UK investors to see a sterling-based valuation. Sterling is currently trading at a USD/GBP level of approximately 1.36. A strengthening US Dollar would prove beneficial for UK shareholders.

RENAV

For the RENAV, we have assumed that the chance of success for the 52.5% for Sagebrush which is based on a geological chance of success of 75% and probability of commerciality of 70%. We believe that a successful test will start to increase the chances of success. We have also included the potential upside that could be available if the 3U resource level proved to be possible. As we mentioned earlier this requires a high porosity, which is predicted by analogous wells in the area. For the exploration we have assumed that there is a 25% chance of success. As exploration wells are drilled then this would change. We believe that this is conservative given the discoveries that have been made in the region but decided to err on the side of caution. We have excluded any potential of further helium being found in the Lower Leadville formation but this could change once the current DST is completed. We have also excluded any follow-up exploration on the acreage as this will fall outside of usual window used in RENAVs.

Figure 5**Quantum Helium RENAV**

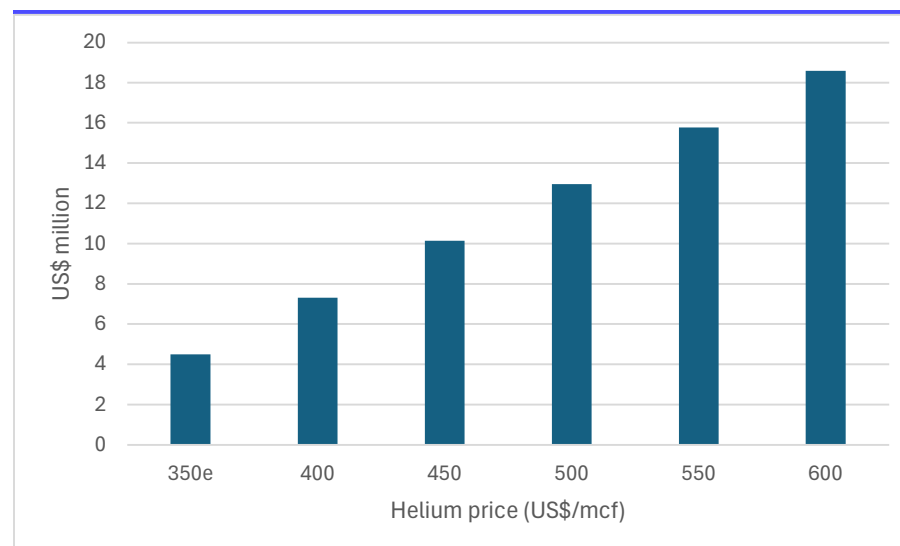
	Gross US\$m	Risk %	Net US\$m	£m	p/share
Helium					
Sagebrush	16.7	53%	8.8	6.5	0.013
Coyote Wash	89.9	25%	22.5	16.6	0.033
Sagebrush 3U	6.2	25%	1.5	1.1	0.002
Oil					
Sagebrush	0.6	100%	0.6	0.4	0.001
Mariano Wash	4.5	25%	1.1	0.8	0.002
Cash	8.6	100%	8.6	6.4	0.013
Total			41.6	30.8	0.064

Source: Oak Securities estimates

As can be seen from the table above we estimate that Quantum's RENAV at 0.0# p/share. Of this, a major proportion (##%) comes from the Helium operations. This represents a significant premium to the current share price of 0.03p/share.

Sensitivity

We have provided investors with a sensitivity analysis. The following chart shows how the value of Sagebrush (2U) would change for US\$50/mcf changes in the helium price from our main conservative scenario of US\$500/mcf.

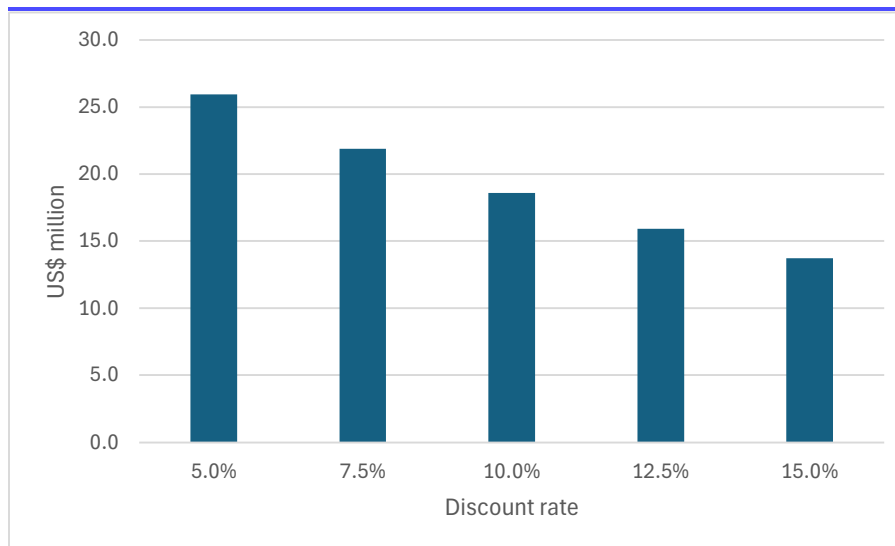
Figure 6**Changes in Sagebrush valuation with differing helium prices**

Source: Oak Securities estimates

We have also shown investors the changes that could occur to this valuation should they want to base the valuation at a different level to our main discount rate of 10%.

Figure 7

Changes in Sagebrush valuation with differing discount rates



Source: Oak Securities estimates

Management

With its refocus, Quantum Helium has relatively new executive board which was put in place in September 2025. It comprises three executive directors and two non-executive directors.

Howard McLaughlin

Howard McLaughlin is the CEO of the company. Although he was officially appointed in September, he was appointed interim CEO in June 2025 and prior to this was head of Mosman's US operations and was the driving force behind the company's strategic focus on US helium. Howard has a strong alignment with shareholders due to his direct 10% holding in Sagebrush. Prior to joining Quantum, he worked for BHP Petroleum where he became Vice President of Global Exploration.

Carl Dumbrell

Carl was appointed executive chairman in September (having previously been chairman). He is a partner in a Sydney accounting firm with 20 years' experience in taxation and assurance. He is also a director of Emperor Energy and chairman of the Kennedy Foundation.

Andrew Scott

Andrew was appointed an executive director in September having previously been a non-executive director of the company. He brings an extensive strategic advisory experience for resource companies listed on the LSE and ASX. He is also a non-executive director of ECR Minerals.

Appendix 1: Helium – The Rare Element

Overview

Helium is the second element and first noble gas in the periodic table. It is the second lightest of elements (after hydrogen) and has the smallest atomic radii. Although helium is the second most abundant element in the Universe, it is a very rare commodity on Earth since, due to its lightness and small radius, allows most of the free helium molecules to escape the Earth's atmosphere and go to outer space. Helium was first identified in 1868 during a solar eclipse – hence the reason it was named after the sun (Helios in Greek). On Earth, the gas is generated deep underground through the radioactive decay of nuclear elements such as Uranium-238. One of the first discoveries of the gas underground was made in 1903 in Kansas, US with a well discovering gas (called a "howling gasser"). Despite much excitement, the gas failed to ignite due to large levels of nitrogen and some helium being present in the gas.

Properties

Helium is a unique gas with many key properties. Through being a noble gas, Helium is colourless, odourless, non-toxic and totally inert. The gas has the lowest liquefaction point (just above absolute zero) and the element is the only one to remain in liquid form down to absolute zero. In a liquid form Helium, becomes a quantum fluid with properties that include superfluidity, superconductivity and possesses negligible viscosity. With its Houdini-like qualities, it is very difficult to recycle helium.

Demand

With its unique properties, helium has many valuable uses. Historically, this was used in inflatable blimps and airships (and party balloons) given that it is light and not flammable like hydrogen. This led to the US, under the Helium Act of 1925, to set up a helium reserve to have an advantage over other countries. This was the primary use of the gas prior to the end of the second world war. Although there is currently little military use, there is increased industrial interest in resurrecting the airship. However, its other properties give the gas a string of additional industrial uses.

Cryogenics

Cryogenics is currently the major use of helium accounting for approximately 32% of total demand. Due to the ability to cool helium to low levels, it has become a valuable commodity with perhaps the most well-known being the cooling of magnets in MRI (Magnetic Resonance Imaging) with the average scanner requiring approximately 700 litres/year of liquid helium. Another major use is in space craft where helium is used in cooling and pressurising of the hydrogen fuel ahead of launch.

Leak detection

With its small size, helium is used in leak detection. This ranges from checking of space craft through to the air conditioning in a car. This amply demonstrated with the recent Being Starliner space launch where helium leaks at the thrusters suggested problems, and led to the astronauts being left on the International Space Station.

Computing

Helium has major demand from the electronics industry where it is used in many aspects from the manufacturing of fibre optics through to semi-conductors. For example, helium filled hard drives are expected to produce a 50% increase in storage capacity with 23% less power required compared to a more normal drive.

Welding

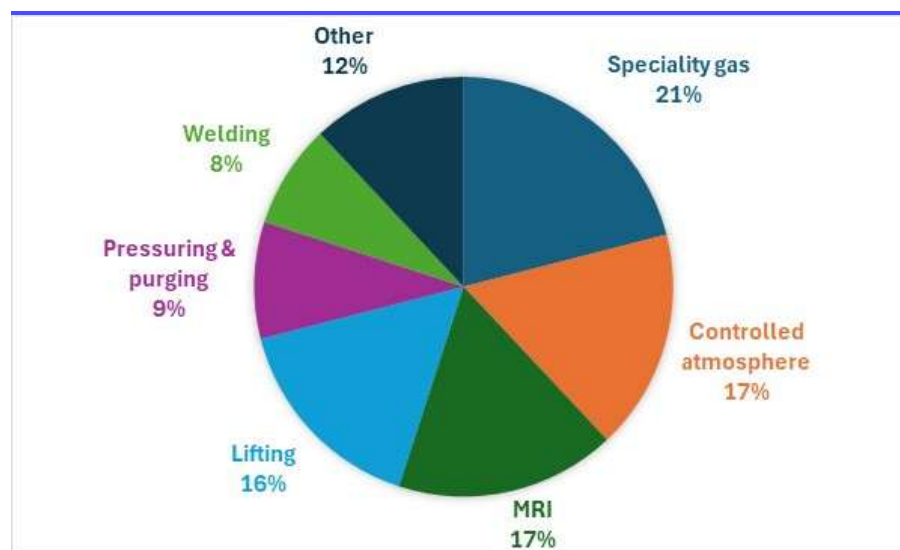
Helium has major use in arc welding as it is non-reactive (providing a barrier) and allows for a higher rate of heat transfer. In most welding, helium is mixed with argon. However with seam-welding, there is usually the need to use pure helium.

Breathing

Another major use is in breathing mixture where helium replaces nitrogen. Perhaps the best known is with Heliox which has a similar viscosity but lower density to normal air and is used in medical and diving operations. This is typically 80% helium and 20% oxygen – although mixtures vary as required.

Figure 8 Helium demand

Breakdown helium demand by use (%)



Source: USGS

Demand Growth

It is believed that 2023 global demand for helium is standing at approximately 6 BCF. This is expected to grow at a rate of 4% – 6% per annum. This would lead to

demand in 2030 of 8 – 9 BCF meaning the global market would have to find approximately 2 – 3 BCF of annual production to meet the demand. With recent advances in chip technology and the increase usage of space vehicles we believe that this could prove conservative.

Supply

As we mentioned previously, helium is formed from the decay of radioactive elements such as Uranium and thorium. This involves long timelines for its generation – Uranium-238 has a half-life of 4.5 billion years and Thorium 232 of 14 billion years. This would lead to the practical assumption that this is a non-renewable resource. Helium is predominantly formed deep within the Earth's crust and, given its small light size, tends to move upwards through the geological strata. Similar to hydrocarbons, the gas is sometimes caught in geological traps where there is an effective seal to stop the gas escaping into the atmosphere. Helium tends to be found in small trace concentrations (usually of less than 0.1% by volume) and it is widely thought that the commercial threshold for commercial extraction is above 0.3%. The gas is usually found in natural gas although sometimes it is found with other gases such as nitrogen, hydrogen and carbon dioxide. Although with increased efforts to find this valuable gas this could become an increasingly common occurrence. It is impractical to extract helium from the atmosphere where (due to its ability to escape to space) is only found in quantities of 4 – 5 ppm (parts per million).

As we alluded to above, most helium is mainly extracted from major natural gas deposits. The US has always proved to be the main producer of helium from its onshore gas fields which have high global concentrations of the gas. However, where there are major accumulations of natural gas, there is the potential of producing commercial quantities of helium. This has been seen in Algeria, Qatar and Russia which have emerged as new major producers.

Algeria

Algeria is a major producer of helium gas from its Hassi R'Mel which is a giant onshore natural gas field with gas reserves of 85 TCF of gas. The helium concentration is low at 0.19%, but this is commercial given the economics of the large natural gas reserves. The problem for Algerian supply is Hassi R'Mel is a mature field (which started production in 1961) and is now in decline leading to a potential decline in helium production.

Qatar

Qatar has huge gas reserves in the North field (which is believed to contain over 800 TCF of natural gas) and usually accounts (according to BP) for 20% of global LNG exports. Although the percentage of helium in the natural gas stream is very low, at 0.04%, the huge volume of natural gas gives the country the largest global helium reserves – although this has never been officially quantified. With the anticipated increase in LNG production, Qatar is expected to increase helium production from a current level of 2 BCF/day up to 4 BCF/day by 2030. This target

might be in doubt given the current war in the Gulf of Arabia where Qatar has seen some damage to its oil and gas infrastructure.

Russia

Russia has the largest gas reserves in the world. Although most of the fields have negligible helium, the volume of gas reserves leaves Russia with the fourth largest reserves of helium. Its helium gas production will be given a significant boost when it brings on stream the giant Amur gas processing plant. It is currently 90% complete and all six trains are expected to be on stream in 2026. The facility will have helium production of 60mmcm/day (2.1 BCF/day). This, however, remains subject to the current sanctions and it is unsure how much this plant will produce at this rate in the short to medium term.

US

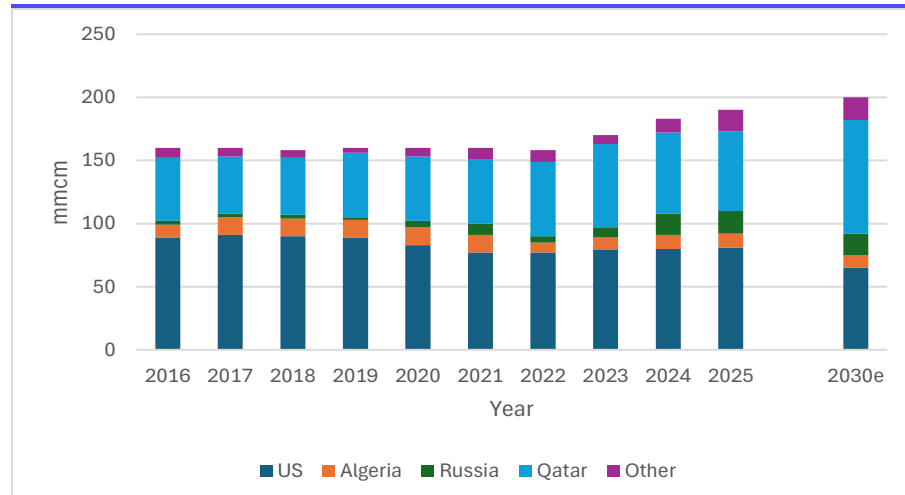
The US is the largest supplier of helium from its many gas fields with approximately 46% of global production. The country has been stable in its production but the fields are becoming increasingly mature and starting to decline. The other major issue with the country has been the sell-off of its strategic reserve of helium. Stocks of helium stored underground were 18,400 tonnes in 2022 compared to 161,000 tonnes in 2000.

Australia

Australia used to be one of the larger producers of Helium. This was supplied from the Conoco Phillips operated Bayu Undan field in the Timor Sea. This supplied helium which was extracted at the Darwin LNG plant. This field reached the end of its life in 2023 leaving Australia with, currently, no commercial helium production.

Supply Growth

As we mentioned earlier, the growth in the supply of helium will be driven by Qatar and Russia. These have the potential of adding up to 4 BCF/day which will be able to fill the gap between rising demand and falling production and leave the market balanced. However, there is increasing risk associated with this new production. As we have seen after Russia's invasion of Ukraine and the current unrest in the Middle East, this leaves the future supply coming from countries with higher political risks. The increased distances that have to be travelled to market will lead to some leakages.

Figure 9 Helium supply**Breakdown annual helium production by country (mmcm)**

Source: USGS

Table 4 2025 Global helium production and reserves (BCM)

Country	Production	Reserves
USA	81	8500
Algeria	11	1800
Russia	18	1700
Qatar	63	n/a
Other	17	424
Total	190	

Source: USGS

Extraction

Extracting concentrated helium from gas found underground has three distinct parts to the process and will very much depend on the associated gases and the level of purity required.

Membrane separation

This uses a high-pressure membrane. Given that the molecules of helium are small they are able to pass through this membrane whilst many larger molecules will be held back. This is a relatively new technology.

Adsorption

This technique uses changes in temperature or pressure to cause the adsorption of gases into a large surface area consisting of uniform pore sizes. PSA is pressure swing absorption and TSA is temperature swing absorption.

Cryogenic

This uses low temperatures which causes other gases to liquefy in the fractionation unit. This leaves purer helium given that it has the lowest condensation point of all the gases.

Research Analyst Disclosures

Peter Hitchens Bsc Eng (Hons.)

Peter has in excess of 35 years' experience in oil & gas equity research with a bias towards the Exploration & Production companies. Having trained as a chemical engineer, Peter was lured by the glamour of the city in 1986. He has worked for many forms including Lehman Brother, Williams de Broe, Panmure Gordon and HSBC. He has been rated on many occasions by Extel and Starmine. Peter has witnessed many cycles in commodity prices and investor sentiment through his long career.

Although his main focus has been equity research, he has also worked with corporate finance and been the broker for many companies such as Enterprise Oil, Faroe Petroleum and Broders & Southern.

DISCLAIMER: Investment Research

This document has been issued to the reader (“you”) by Oak Securities (“OAK”), the trading name of Merlin Partners LLP, to promote its investment services and is a marketing communication for the purposes of the European Markets in Financial Instruments Directive (“MiFID”) and Financial Conduct Authority’s (“FCA’s”) Rules.

Merlin Partners LLP is authorised and regulated in the United Kingdom by the FCA (Reg No. 449191) for designated corporate finance and investment business. The FCA’s address is 25, The North Colonnade, Canary Wharf, London E14 5HS.

OAK considers this note to be of minor non-monetary benefit as defined by the FCA, which may be received without charge as the content is either (i) considered to be commissioned by OAK’s clients as part of our advisory services to them; or (ii) is short term market commentary. Consequently, this document has not been prepared in accordance with the legal requirements designed to promote the independence or objectivity of investment research and is not subject to any prohibition on dealing ahead of its dissemination.

This document is for information purposes only and neither the information contained within it, nor the opinions expressed, are to be constituted or construed as an offer or a solicitation of an offer to buy or sell the securities or other instruments mentioned in it. Further, this document should not be interpreted as offering investment advice and no personal recommendation is being made to you; the securities referred to may not be suitable for you and should not be relied upon in substitution for the exercise of independent judgement.

This material is for the use of intended recipients only and only for distribution to professional and institutional investors, i.e. persons who are authorised persons or exempted persons within the meaning of the Financial Services and Markets Act 2000 of the United Kingdom, or persons who have been categorised as Professional Customers or Eligible Counterparties and is not intended for Retail Clients, as defined by the rules of the FCA.

Unless otherwise stated, the date displayed on the first page (the “Publication Date”) of this document may be considered to be the date of its completion and first dissemination. If this document references views of analysts or sources other than the author named herein, then you should refer that document, and its date, for that view.

The value of investments referenced herein may go up or down and past performance is not necessarily a guide to future performance. Where investment is made in currencies other than the base currency of the investment, movements in exchange rates will have an effect on the value, either favourable or unfavourable.

Securities that are either issued in emerging markets, or whose assets based in emerging markets, or are exposed to business areas such as those at the earlier stages of the natural resources development lifecycle, such as at the exploration and appraisal stages, are typically subject to greater volatility and risk of loss than would otherwise be expected.

The investments discussed in this document may not be suitable for all investors and the document does not consider the investment objectives and policies, financial position or portfolio composition of any recipient. Investors must make their own investment decisions based upon their own financial objectives, resources and appetite for risk.

Certain investments contained in the document may have tax implications for investors whereby levels and basis of taxation may be subject to change. OAK does not provide tax advice and investors should seek advice from a tax adviser.

OAK uses reasonable efforts to obtain information from sources which it believes to be reliable, but the contents of this document have been prepared without any substantive analysis being undertaken into the companies concerned or their securities, and while there has been independent verification of some elements contained within it, not all sources can be considered to be fully independently verified.

This document has been prepared in good faith and based upon sources believed to be reliable. However, OAK, its directors or employees, makes no guarantee, representation or warranty, (either express or implied), as to the factual accuracy, completeness, or sufficiency of information contained herein. Unless otherwise stated, any share prices used in this document are taken after market close on the business day prior to the date of publication.

Opinions expressed are the opinions of OAK as of the Publication Date only. The information and opinions provided herein are for the benefit of OAK’s clients as at the date of this document and are subject to change without notice. The opinions and information disclosed in this document may have been disclosed to the issuer prior to publication and subsequently amended. You should not expect OAK to provide you with updates on the subject matter contained within this document or commit to a regular programme of planned updates.

You should make your own investment decisions based upon your own financial objectives and financial resources. Neither past performance nor forecasts are a reliable indication of future performance, and you may realise losses on any investments, including possible loss of the principal amount invested. Products are not insured by any government or government agencies and are neither guaranteed, insured, nor a deposit account or other

obligation of any depository institution. OAK shall not be liable for any direct or indirect damages, including lost profits arising in any way from the information contained in this material.

OAK, its directors or employees may have a position or holding in any investment mentioned in this document or a related investment, and such positions or holdings may be inconsistent with this research recommendation and may from time to time dispose of any such securities or instrument.

In the last 12 months OAK may have been a manager, or co-lead manager, in the underwriting or placement of securities to the issuers of securities mentioned in this document within the last 12 months or may have had corporate finance mandates or may have received compensation for investment banking services from such companies.

OAK may be, or may have been, party to an agreement with the issuer of the securities mentioned in this document relating to the production of this recommendation. OAK may receive or may intend to seek compensation for investment banking services from such companies within the next 3 months. A senior executive or director of OAK or a connected person may be an officer, director or advisor of any issuer of securities mentioned in this document. Accordingly, recipients of this document should not rely on this document being impartial and information may be known to OAK, or persons connected with it, which is not reflected in its material.

OAK has in place a number of mechanisms for identifying and managing potential conflicts which include policies and procedures to identify, consider, manage and monitor potential conflicts of interests. Internal guidance and training regarding the identification of possible conflicts before they arise. Procedures to ensure that potential conflicts are escalated to the appropriate level within OAK.

Internal arrangements (including physical separation and other information barriers) for regulating the flow of information between and within business areas have been implemented to maintain the independence of the document's author.

This document is being supplied to you solely for your information and may not be reproduced, re-distributed or passed to any other person or published in whole or in part for any purpose. This material is not directed at you if OAK is prohibited or restricted by any legislation or regulation in any jurisdiction from making it available to you and persons into whose possession this material comes should inform themselves about and observe any such restrictions.

If this note has been sent to you by a party other than OAK, or you have accessed this note from sources other than directly from OAK, the original contents may have been altered or comments may have been added. OAK is not responsible for any such amendments.

Important Disclosures for United States Persons

This document is not intended to be widely distributed in the United States ("US"). However, where OAK circulates this document to persons located in the US directly, it does so to persons that it considers to be "major US institutional investors" as defined pursuant to Rule 15a-6(b)(4) (each an "MII") in limited numbers and in reliance on Rule 15a-6(a)(2) of the Securities Exchange Act of 1934, as amended (the "Exchange Act").

With respect to any distribution of this report to a US person, the information contained in this report (i) is intended solely for use by MII, (ii) was prepared by the analyst named herein, who is a non-US research analyst and, as such, may not be subject to all requirements applicable to US-based analysts, (iii) is not subject to all of the independence and disclosure standards applicable to research reports prepared for retail investors, and (iv) may not be used or relied upon by anyone that is not a MII for any purpose.

Any US person receiving this report represents and agrees, by virtue of its acceptance thereof, that it is a MII and that it understands the risks involved in executing transactions in such securities.

Neither the report, nor its authors who prepared or approved the report, is subject to the full scope of US legal or regulatory requirements pertaining to research reports or research analysts. OAK is neither registered as a broker-dealer under the Exchange Act nor a member of the Financial Industry Regulatory Authority, Inc. or any other US self-regulatory organization.

To the extent this report relates to non-US securities, note that investing in non-US securities may entail particular risks. Such securities may not be registered under the U.S. Securities Act of 1933, as amended, and the issuer of such securities may not be subject to US reporting and/or other requirements.

Financial statements included in a research report with respect to such securities, if any, may have been prepared in accordance with non-US accounting standards that may not be comparable to the financial statements of US companies. Available information regarding the issuers of such securities may be limited, and such issuers may not be subject to the same auditing and reporting standards as US issuers.

Fluctuations in the values of currencies other than the United States dollar, as well as the potential for governmental restrictions on currency movements, can significantly erode principal and investment returns. Market rules, conventions and practices may differ from US markets, adding to transaction costs or causing delays in the

purchase or sale of such securities. Securities of some non-US companies may not be as liquid as securities of comparable US companies.

The information contained herein may include forward-looking statements within the meaning of US federal securities laws that are subject to risks and uncertainties. Factors that could cause a company's actual results and financial condition to differ from expectations include, without limitation: political uncertainty, changes in general economic conditions that adversely affect the level of demand for the company's products or services, changes in foreign exchange markets, changes in international and domestic financial markets and in the competitive environment, and other factors relating to the foregoing. All forward-looking statements contained in this report are qualified in their entirety by this cautionary statement.

If this note has been sent to you by a party other than OAK, or you have downloaded this document from a source unconnected to Oak Securities, the original contents may have been altered or comments may have been added. OAK is not responsible for any such amendments.

OAK does not accept any liability for any direct or consequential loss of any kind arising out of the use or reliance on the information given in the document or in connection with it. This document does not consider the specific investment objectives and financial situation of any recipient, nor does it provide individually tailored investment advice or offer tax, regulatory, accounting or legal advice.

Prior to entering any proposed transaction, recipients should determine, in consultation with their own investment, legal, tax, regulatory and accounting advisors, the economic risks and merits, as well as the legal, tax, regulatory and accounting characteristics and consequences, of any transaction. Investors seeking to buy or sell any financial instruments discussed or recommended in any research report should seek independent financial advice relating thereto.

The products discussed in this report are not FDIC insured, may lose value and are not guaranteed by any party.

Author Certification

The author identified in this report certifies, with respect to the companies or securities that are analysed, that (i) the views expressed in this report reflect their personal views about all of the subject companies and securities; and (ii) no part of their compensation was, is or will be directly or indirectly dependent on the specific recommendations or views expressed in this report.

Additional Disclosures

OAK has produced this material solely for information purposes. It is not to be reproduced under any circumstances and is not to be copied or made available to any person other than the recipient. This document does not constitute an offer of, or an invitation by or on behalf of OAK or its affiliates or any other company to any person, to buy or sell any security.

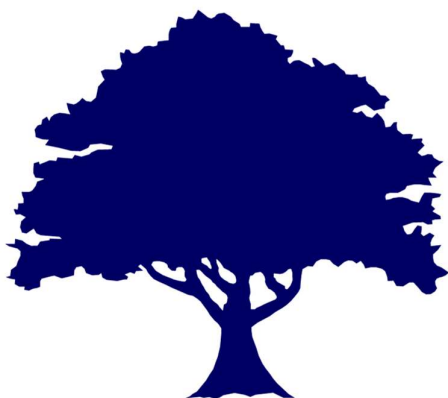
The information contained herein has been obtained from published information and other sources, which OAK or its affiliates consider to be reliable. OAK does not accept any liability or responsibility whatsoever for the accuracy or completeness of any such information. All estimates, expressions of opinion and other subjective judgments contained herein are made as of the date of this document.

By accepting this document, you agree that you have read the above disclaimers, acknowledge them and agree to be bound by all of the foregoing limitations, restrictions and provisions, and recognise that:

1. OAK or its affiliates may have been the beneficial owners of 1% or more of the securities mentioned in this report.
2. OAK or its affiliates may have managed or co-managed a public offering of the securities mentioned in the report in the past 12 months.
3. OAK or its affiliates has received compensation for investment banking services from the issuer of these securities in the past 12 months.
4. One or more persons of OAK, or its affiliates may, from time to time, have a long or short position in any of the securities mentioned herein and may buy or sell those securities or options thereon either on their own account or on behalf of their clients.

This document may not be distributed in or into Australia, Canada, or Japan.

Notes



Oak Securities

90 Jermyn Street
London SW1Y 6JD
United Kingdom

Tel: +44 203 973 3678
Email: info@OAK-securities.com
Web: www.OAK-securities.com