Helium One Global

Tai-1 exploration well: confirmed presence of helium trapped at shallow depth

GICS Sector	**Energy**
Ticker	LN:HE1
Market cap 22-Jun-21 (US$m)	180
Share price 22-Jun-21 (GBp)	20.5

NAV summary (p/sh)

Asset	Unrisked	Risked
Kasuku	28	7
Itumbula	29	5
Mbuni	37	6
Tai	31	4
Cash/other	3	3
Total NAV	**128**	**25**

Tai-1 exploration well: interim drilling update. Worth 31p/sh unrisked

Helium One announced an update on Monday on the drilling of the Tai prospect at its Rukwa Project in Tanzania. The Tai-1 well was spudded on 12th June and, on 19th June, at a depth of 70.5 metres, a helium show of 2.2% concentration was detected in the drilling mud. This show was encountered over an interval of 4-6 metres, below a 20m thick sealing shale sequence. This helium-bearing interval was encountered earlier than expected in the secondary target Lake Bed Formation. The upper section of the Lake Bed Formation is comprised of poorly consolidated fluvial-deltaic sands. The unconsolidated nature of these shallow reservoirs means it is not possible to perform a drill stem test on any pay zone in this interval as the side wall of the well may collapse during testing. There have been no hydrocarbons detected to date.

Encouraging to have encountered a helium show

We see the key takeaways, so far, as Helium One having encountered a helium show that demonstrates that the subsurface system is working and that reservoir, seal and trap are capable of storing helium in this basin. This is a key indicator in a basin that has never been drilled for helium before and is the first direct evidence of subsurface primary helium in the African continent. The grade of helium encountered in the show could be commercial, as standalone helium production is possible with <1% concentration. However, grades identified in helium shows are not representative of in-situ grades and at present it is too early to read too much into the percentage encountered. The tools used to measure the helium had been lab calibrated but had not yet been calibrated in the field, therefore the actual grade at the collar could be higher or lower than reported. More importantly helium concentration is likely to have been diluted from the point of drilling to when the show was recorded at surface, therefore, there remains the potential for significantly higher helium concentrations to be encountered.

Helium show: a meaningful proof of concept

We think it is important to distinguish between a helium show in this basin and an oil and gas show when drilling a hydrocarbon exploration well. A helium show in a virgin basin is highly significant as for the first time it proves the existence of helium in the subsurface. Also, only a relatively small volume of helium is required for commercial production as it is a high value gas. We think that it is relevant that the helium show was directly below a shale sequence as it demonstrates that the helium is being trapped by traditional siliciclastic sediments which are found throughout the Rukwa sedimentary sequence.

Next steps for the exploration well: further drilling, logging and then testing

The well is likely to take around three weeks to reach total depth in the Basement. It will drill down to the base of the Lake Bed Formation at a depth of 400m, and will then continue into the Red Sandstone Group and the Karoo Group. The Karoo is the primary reservoir target and is expected to contain stacked reservoir and seal units which will be more consolidated due to the age and depth of these sediments. If helium is present, it will be possible to perform drill stem tests on this interval and recover undiluted helium samples for grade analysis. We see the potential for Helium One to release further details of helium shows being encountered over the coming weeks if they are significantly larger than the first helium show. We would expect details from logging data to be released with pay zones being identified and potentially drill stem testing details at the end of hole.

Valuation: ~6x upside on an unrisked basis

We are keeping our risked NAV is unchanged at 25p/sh for now as we await further detail on Tai, however we only carry 4p/sh in risked value for Tai, which is worth 31p/sh unrisked. On an unrisked basis, we have a NAV of £1.33/sh or ~6x upside. Further to this are the follow-on prospects that are not included in our NAV and its other exploration areas. A US$50/mcf increase in the helium price would increase our risked NAV by 6p/sh and unrisked by 33p/sh.

>US$1bn

Unrisked value of the 4 prospects planned to be drilled in 2021

>650%

Share price performance of the 3 primary helium E&P companies in 2020

Anish Kapadia
Research Analyst
T +44 (0) 207 907 8500
E anish@hannam.partners

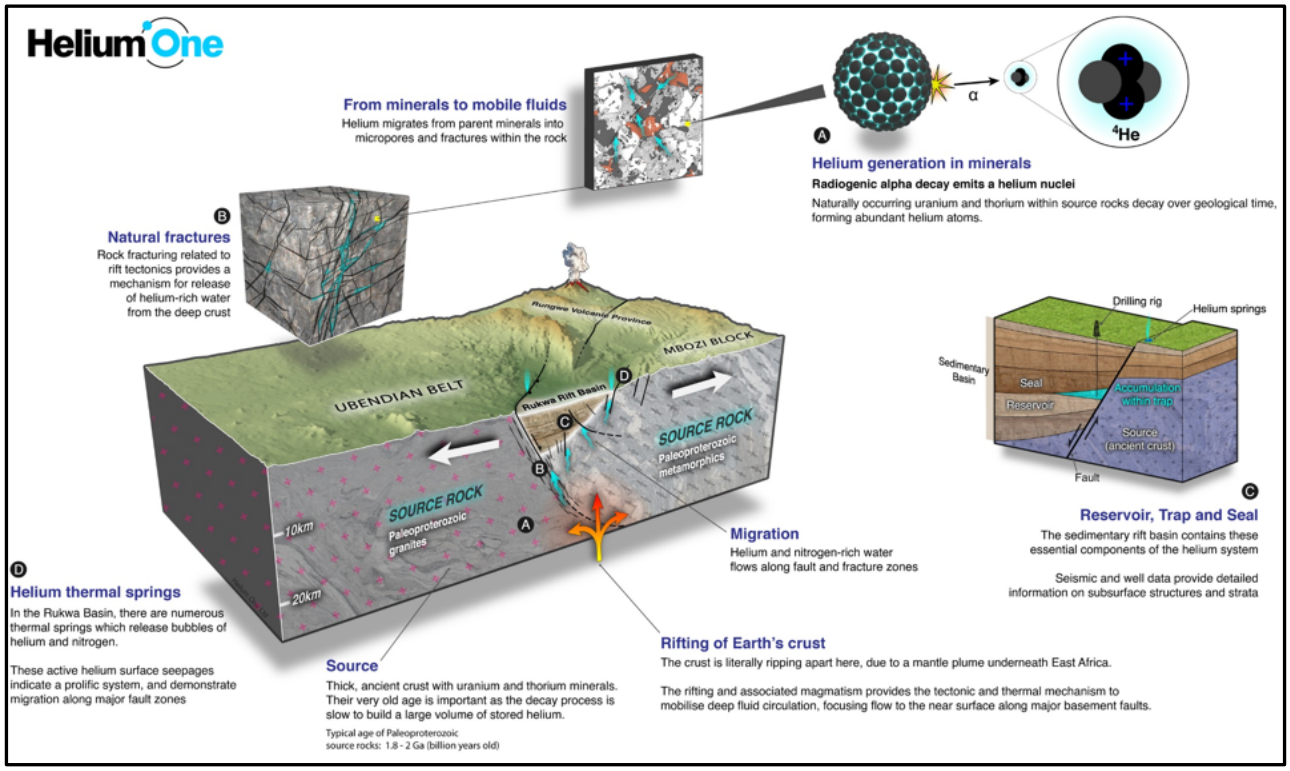
Jay Ashfield
Sales
T +44 (0) 207 907 2022
E ja@hannam.partners

H&P Advisory Ltd
2 Park Street, Mayfair
London W1K 2HX

Helium prospectivity

Geological risk

Helium play system model in Rukwa



Source: Company data, H&P estimates

The geological risks of finding helium are similar in many regards to finding natural gas. The requirements for success are the same, namely having source, migration, reservoir, trap and seal; however, the mechanisms are somewhat different. Rukwa appears to be in the 'Goldilocks' zone for helium generation, migration, and trapping. The Rukwa Rift Basin has 1km to 11 km of sedimentary fill, making it one of the thickest continental basins in Africa.

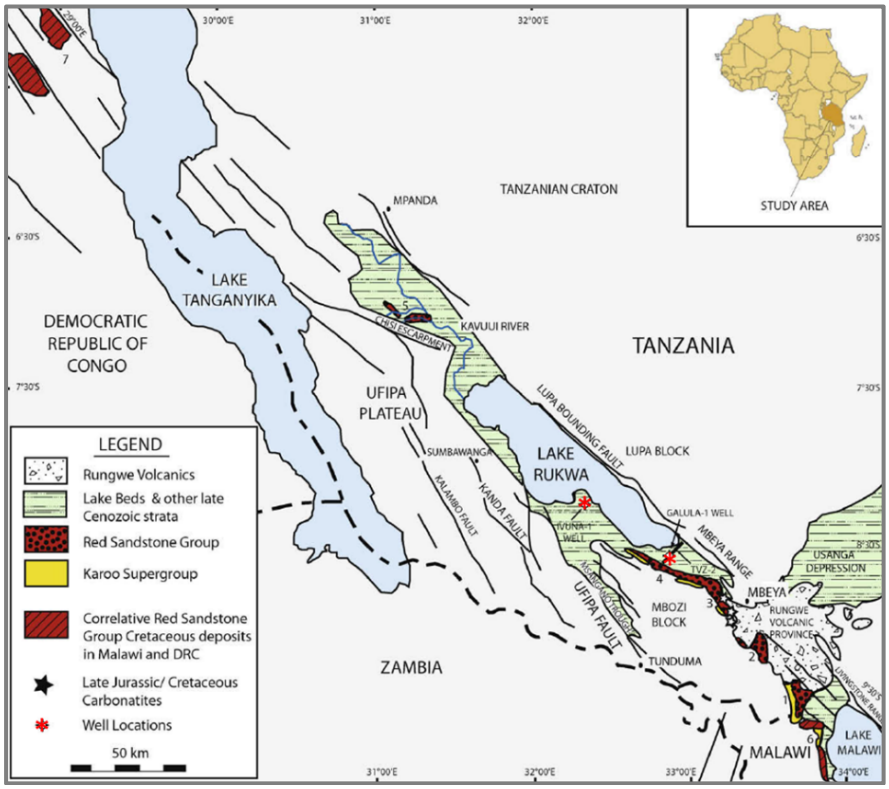
We see the source and migration risk as low. Given the numerous surface seeps of helium it is evident that helium is being produced and is migrating to surface. There are conventional trap structures, which have been defined on seismic/gravity data and known high-quality reservoirs (up to 30% porosity) and seals, which have been derisked by previous wells.

Helium surface seepage rates are not suitable for economic collection, but they demonstrate the potential to accumulate high reservoir helium since the time of formation of the local prospect traps. They have been sustained over a period, still going strong since the 1950s. Helium seepages are evidence of a prolific subsurface helium-rich fluid system. The position of the Itumbula seep is favourable for helium charge into nearby prospects.

Source

The helium in Rukwa is thought to be derived from the radiogenic decay of uranium and thorium within the Pre-Cambrian Basement. The extremely old age of the rocks means that there has been sufficient time for the slow decay process to take place and build a large amount of helium.

Rukwa Rift Basin showing major tectonic elements



Source: Company data, H&P estimates

Helium Macroseeps occur as springs located along the sedimentary basin margins in Tanzania. The widespread and prolific occurrence of helium-nitrogen thermal springs is unique globally.

Helium ($^3He/^4He$) isotope studies carried out at Oxford University identified a strongly crustal signature within the gases, which suggests that the helium is derived from the Pre-Cambrian basement. Local low-temperature hydrothermal systems (~110°C) are important as driving mechanisms in releasing and mobilising helium from basement rocks. The driving mechanism is thought to be related to the Rungwe Volcanic Province to the south and south-west.

Distance to the nearest volcanic province is important as it plays a significant role in the nature of the helium release, as well as initiating the driving mechanism for the release of the helium from the Precambrian basement source rocks. Results suggest that the distance from Rukwa to the nearest volcanic source is optimal – if too close to the volcanic province helium could be diluted by CO_2, if too far the driving mechanism of the hydrothermal system is weakened, and not enough helium gas is released.

Migration

There needs to be a thermal release of the helium produced in ancient deep crust and in Rukwa this is caused by the crust ripping apart due to a mantle plume (upwelling of abnormally hot rock) underneath East Africa. This is exceedingly rare, which is why it is unusual to find large primary helium deposits globally. This rifting and associated magmatism focuses the flow to the near-surface along major basement faults. Helium and nitrogen-rich water is thought to flow along fault and fracture zones. Numerous thermal springs release bubbles of helium and nitrogen through surface seepages, indicating migration along major fault zones.

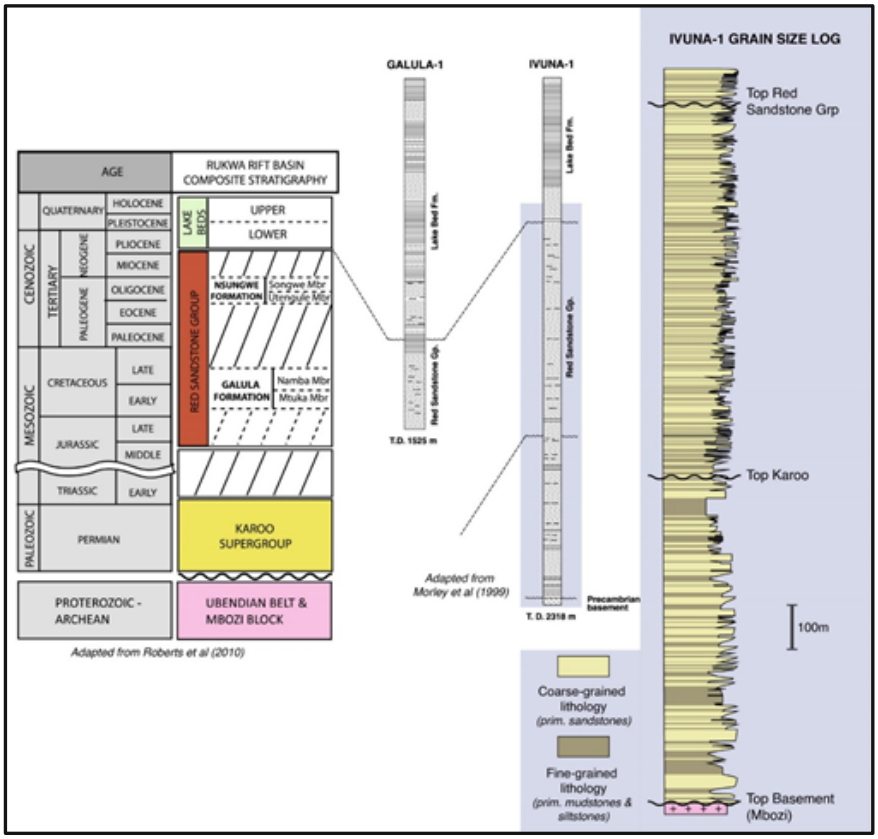
Reservoir

There are suitable reservoirs at multiple stratigraphic levels that have the capability to hold helium with good porosity. The sandstone reservoirs have been proven by the two wells drilled in 3 stratigraphic levels: the Lake Bed Formation, Red Sandstone Group and Karoo Super Group. The basin is dominated by sand (i.e. potential reservoirs) with shales (potential seals) more sparsely distributed.

Seal

The two historic (dry) petroleum exploration wells in the Rukwa Basin demonstrate stratigraphy with effective seal capacity. Additionally, bentonitic tuff beds described in the Lake Bed Formation and Red Sandstone Group have the potential for high-quality seals. Seals are present within and at the top of the Karoo section as evidenced by the Ivuna-1 well. Observed seismic amplitude anomalies are conformable to structural highs may be related to gas effect in the rock, in which case effective seal is demonstrated although well data is required to confirm this relationship.

Stratigraphic correlation of Ivuna-1 and Galula-1 petroleum wells

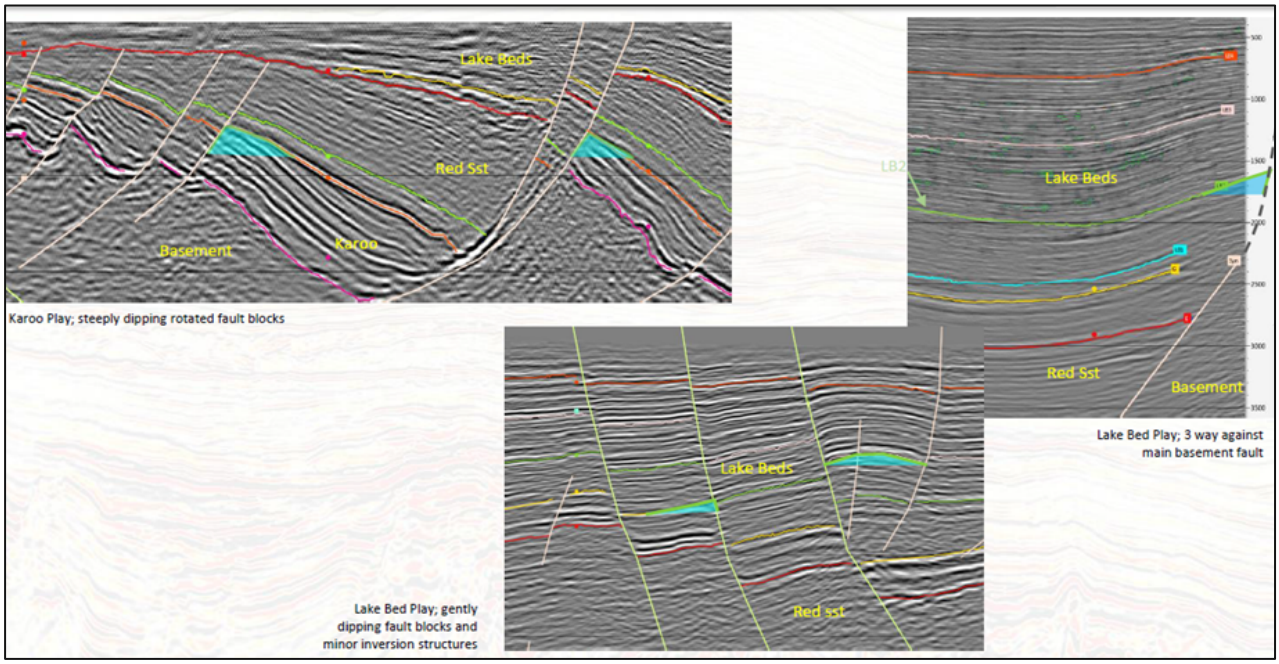


Source: Company data

Trap

Migration can be halted by seals or traps. If trapping structures are present on the migration pathway, a gas phase can accumulate. The trap will be filled with helium-rich gas until full and then spill. The excess spilt fraction if not trapped further up in the system will escape at surface seeps.

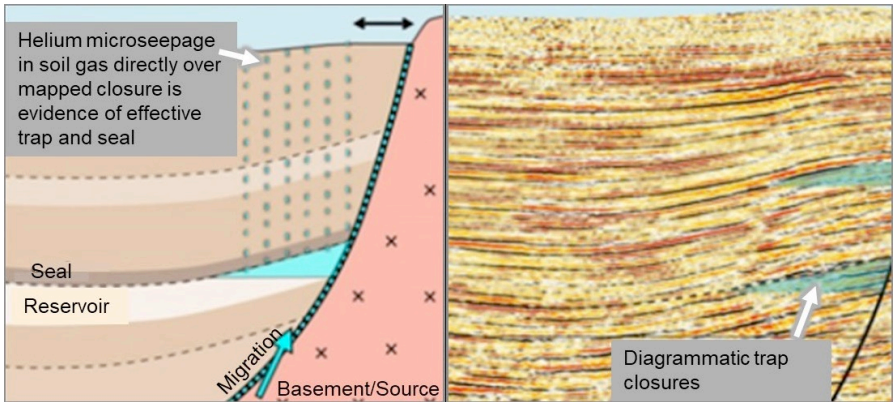
Rukwa Rift trapping styles



Source: InSeisive

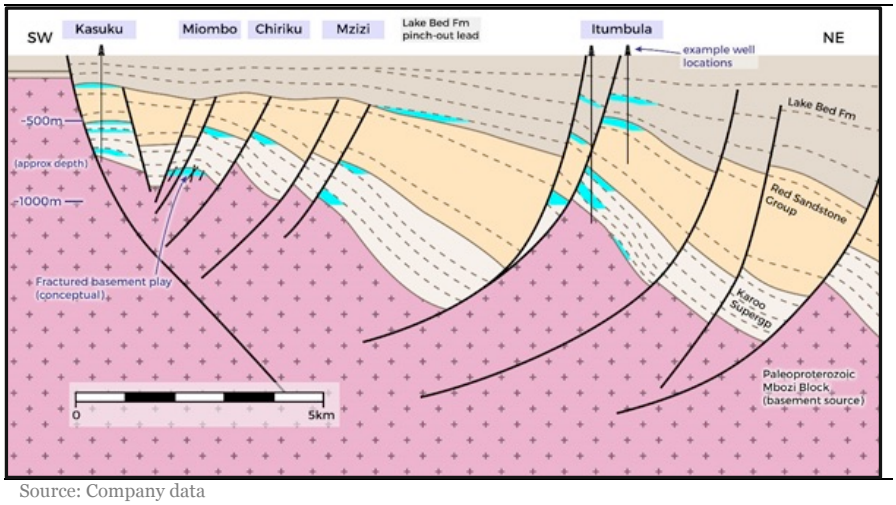
Helium can be trapped at the top of the Red Sandstone by lacustrine shales at the base of the Lake Beds and anywhere within alternating sand/ shales throughout the Lake Bed sequence. The traps can be identified using seismic data. In the Karoo play, the dominant trapping geometry is rotated extensional fault blocks creating 3-way dip closures with fault seal in the 4th direction. The trapping style within the Lake Bed play is more varied than for the Karoo: there are gentle 3-way closures against faults as tested by the Ivuna-1 well and minor inversion structures, low relief 4-way traps, stacked low-relief 3-way traps against the fault. Stratigraphic trapping may also be present within the rift.

Interpreted micro-seepage migration pathways and potential relationship with trap geometry



Source: Company data, H&P estimates

Geologic cross-section interpretation of Helium One Prospect and Leads



Source: Company data

NAV

Asset	Gross bcf	Interest	Net bcf	NPV US$/mcf	Unrisked US$m	Unrisked £/sh	Geo./techn. CoS	Comm. CoS	Well cost US$m	Risked US$m	Risked £/sh
Kasuku (Rukwa)	5.2	84.0%	4.4	$58	$257	£0.28	28%	85%	$1	$62	£0.07
Itumbula (Rukwa)	5.4	84.0%	4.6	$58	$267	£0.29	19%	85%	$1	$45	£0.05
Mbuni (Rukwa)	7.0	84.0%	5.9	$58	$342	£0.37	20%	85%	$1	$58	£0.06
Tai (Rukwa)	5.9	84.0%	5.0	$58	$290	£0.31	15%	85%	$1	$38	£0.04
YE'20 net cash					$7	£0.01				$7	£0.01
2021 capital raise					$14	£0.01				$14	£0.01
Working capital and other					$0	£0.00				$0	£0.00
Options proceeds					$7	£0.01				$7	£0.01
G&A	@	2.0x			$4	£0.00				$4	£0.00
Total NAV					**$1,187**	**£1.28**				**$233**	**£0.25**

Source: H&P estimates

In our base case scenario, we use a helium price of US$250/mcf long-term flat from 2021 and a 12% discount rate from 1/1/2021. Our risked NAV is 25p/sh, which implies 25% upside from the current share price. On an unrisked basis, we have a NAV of £1.33/sh or ~6x upside. Further to this are the follow-on prospects that are not included in our NAV and its other exploration areas. A US$50/mcf increase in the helium price would increase our risked NAV by 6p/sh and unrisked by 33p/sh.

NAV sensitivity to helium price and discount rate

Risked		Helium Price ($/mcf)				
		$100.00	$175.00	$250.00	$325.00	$400.00
Discount rate	8%	10.1p	20.9p	31.6p	42.4p	53.2p
	10%	8.9p	18.5p	28.1p	37.7p	47.3p
	12%	7.9p	16.5p	**25.1p**	33.7p	42.3p
	14%	7.0p	14.8p	22.5p	30.3p	38.0p
	16%	6.2p	13.3p	20.3p	27.3p	34.3p

Unrisked		Helium Price ($/mcf)				
		$100.00	$175.00	$250.00	$325.00	$400.00
	8%	41p	103p	166p	228p	291p
	10%	34p	90p	145p	201p	257p
	12%	28p	78p	**128p**	178p	228p
	14%	23p	68p	113p	158p	203p
	16%	18p	59p	100p	141p	181p

Source: H&P estimates

Disclaimer

This Document has been prepared by H&P Advisory Limited ("H&P"). It is protected by international copyright laws and is for the recipient's use in connection with considering a potential business relationship with H&P only. This Document and any related materials are confidential and may not be distributed or reproduced (in whole or in part) in any form without H&P's prior written permission.

By accepting or accessing this Document or any related materials you agree to be bound by the limitations and conditions set out herein and, in particular, will be taken to have represented, warranted and undertaken that you have read and agree to comply with the contents of this disclaimer including, without limitation, the obligation to keep information contained in this Document and any related materials confidential.

This Document does not represent investment research for the purposes of the rules of the Financial Conduct Authority ("FCA Rules"). To the extent it constitutes a research recommendation, it takes the form of NON-INDEPENDENT research for the purposes of the FCA Rules. As such it constitutes a MARKETING COMMUNICATION, has not been prepared in accordance with legal requirements designed to promote the independence of investment research and is not subject to any prohibition on dealing ahead of dissemination of investment research.

The information contained herein does not constitute an offer or solicitation to sell or acquire any security or fund the acquisition of any security by anyone in any jurisdiction, nor should it be regarded as a contractual document. Under no circumstances should the information provided in this Document or any other written or oral information made available in connection with it be considered as investment advice, or as a sufficient basis on which to make investment decisions. This Document is being provided to you for information purposes only.

The distribution of this Document or any information contained in it and any related materials may be restricted by law in certain jurisdictions, and any person into whose possession this Document or any part of it comes should inform themselves about, and observe, any such restrictions.

The information in this Document does not purport to be comprehensive and has been provided by H&P (and, in certain cases, third party sources) and has not been independently verified. No reliance may be placed for any purposes whatsoever on the information contained in this Document or related materials or in the completeness of such information.

The information set out herein and in any related materials reflects prevailing conditions and our views as at this date and is subject to updating, completion, revision, verification and amendment, and such information may change materially. H&P is under no obligation to provide the recipient with access to any additional information or to update this Document or any related materials or to correct any inaccuracies in it which may become apparent.

Whilst this Document has been prepared in good faith, neither H&P nor any of its group undertakings, nor any of its or their respective directors, members, advisers, representatives, officers, agents, consultants or employees makes, or is authorised to make any representation, warranty or undertaking, express or implied, with respect to the information or opinions contained in it and no responsibility or liability is accepted by any of them as to the accuracy, completeness or reasonableness of such information or opinions or any other written or oral information made available to any party or its advisers. Without prejudice to the foregoing, neither H&P nor any of its group undertakings, nor any of its or their respective directors, members, advisers, representatives, officers, agents, consultants or employees accepts any liability whatsoever for any loss howsoever arising, directly or indirectly, from use of this Document and/or related materials or their contents or otherwise arising in connection therewith. This Document shall not exclude any liability for, or remedy in respect of, fraudulent misrepresentation.

All statements of opinion and/or belief contained in this Document and all views expressed and all projections, forecasts or statements regarding future events or possible future performance represent H&P's own assessment and interpretation of information available to it as at the date of this Document. This Document and any related materials may include certain forward-looking statements, beliefs or opinions. By their nature, forward-looking statements involve risk and uncertainty because they relate to events and depend on circumstances that will occur in the future. There can be no assurance that any of the results and events contemplated by the forward-looking statements contained in the information can be achieved or will, in fact, occur. No representation is made or any assurance, undertaking or indemnity given to you that such forward looking statements are correct or that they can be achieved. Past performance cannot be relied on as a guide to future performance.

This Document is directed at persons having professional experience in matters relating to investments to whom Article 19 of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 ("FPO") applies, or high net worth organisations to whom Article 49 of the FPO applies. The investment or investment activity to which this communication relates is available only to such persons and other persons to whom this communication may lawfully be made ("relevant persons") and will be engaged in only with such persons. This Document must not be acted upon or relied upon by persons who are not relevant persons.

This Document is not intended for distribution to, or use by any person or entity in any jurisdiction or country where such distribution or use would be contrary to local law or regulation. In particular, the information contained in this Document is not for publication, release or distribution, and may not be taken or transmitted into: (i) the United States or its territories or possessions, or distributed, directly or indirectly, in the United States, its territories or possessions or to any U.S. person as such term is defined in Regulation S of the Securities Act; or (ii) Australia, Canada, Japan, New Zealand or the Republic of South Africa. Any failure to comply with this restriction may constitute a violation of United States, Canadian, Japanese, New Zealand or South African securities law. Further, the distribution of this document in other jurisdictions may be restricted by law, and persons into whose possession this Document comes are required to inform themselves about, and observe, any such restrictions.

H&P may from time to time have a broking, corporate finance advisory or other relationship with a company which is the subject of or referred to in the Document.

This Document may contain information obtained from third parties, including ratings from credit ratings agencies such as Standard & Poor's. Reproduction and distribution of third party content in any form is prohibited except with the prior written permission of the related third party. Third party content providers do not guarantee the accuracy, completeness, timeliness or availability of any information, including ratings, and are not responsible for any errors or omission (negligent or otherwise), regardless of the cause, or for the results obtained from the use of such content. Third party content providers give no express or implied warranties, including, but not limited to, any warranties of merchantability or fitness for a particular purpose or use. Third party content providers shall not be liable for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees or losses (including lost income or profits and opportunity costs or losses caused by negligence) in connection with any use of their content including ratings. Credit ratings are statements of opinions and are not statements of fact or recommendations to purchase, hold or sell securities. They do not address the suitability of securities or the suitability of securities for investment purposes, and should not be relied on as investment advice.

In H&P's view this material is considered as "acceptable minor non-monetary benefit" under MiFID II as it is either: (i) "non-substantive short-term market commentary"; and/or (ii) making a brief reference to existing H&P research and, as such, is in-and-of-itself non-substantive; and/or (iii) paid for by a corporate issuer or potential corporate issuer as part of a contractual engagement with H&P.

H&P Advisory Ltd is registered in England No.11120795. Registered Office: 2 Park Street, London W1K 2HX. H&P Advisory Ltd is authorised and regulated by the Financial Conduct Authority (Firm Reference Number 805667).