

Vulcan Energy Resources Limited

EV Materials

12 January 2022

Rating
SPECULATIVE BUY
unchanged

Price Target
A\$22.00↑
from A\$21.00

VUL-ASX

Price
A\$10.10

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A marathon at sprint pace

In mid-December, Vulcan agreed to acquire the Insheim geothermal plant and secured offtake rights for spent brine from the Landau geothermal plant. The acquisition, which was effective 1 Jan 2022, transitions Vulcan into an operator with revenues. However, more importantly, it is a platform for Vulcan to demonstrate its DLE technology in a commercial operation and how geothermal reservoirs operate (Li grades, flow rates, subsurface conditions). We [previously unwound some of our risking](#) to account for the potential acquisition, but we have now modeled the operation assuming €330m to upgrade the assets, construct the DLE, and contribution to the first stage of the Central Lithium Plant (CLP). We continue to 60% risk weight our valuation (unchanged), and our PT has increased to A\$22/sh (0.46x P/NAV) from A\$21/sh (Figures 1&2).

Insheim key details

- Purchase price of €31.5m, funded from existing cash
- 4.8MW of capacity however is currently operating at 2.9MW
- Generated €5.8m in revenue and EBITDA of €2.9m in CY20
- Contains a resource estimate of 722kt LCE
- VUL intends to invest in expansion and modernisation of the plant
- We understand the flow rates at the operation have been below its 80L/s nameplate, however, this could be lifted with either a well sidetrack or additional well

Landau key details

- Executed a 20-year brine offtake agreement to purchase brine from the Landau geothermal plant
- Landau has tested flow rates of 100l/s however another reinjection well must be drilled to sustainably produce at those levels
- The Landau plant will host VUL's DLE demonstration plant with a start up date of JunQ'22, following on from the current pilot plant operations at the site

Vulcan will aim to incorporate the two operations within its Phase 1 plan and has revised its DFS to include a larger operation. The company intends to deliver the DFS in 2H 2022 and continues to target 2024 for first production. Conceptually, the two plants are located close enough to share a DLE facility which would then produce lithium chloride for the CLP.

Vulcan continues to grow its licence holdings

Not missing a beat in the new year, Vulcan has announced it has been granted five new exploration licences in the Upper Rhine Valley. The licences grow Vulcan's tenements to 1,000km² and increase its footprint by ~50% (Figure 4).

Central Lithium Plant MOU seeks established partner

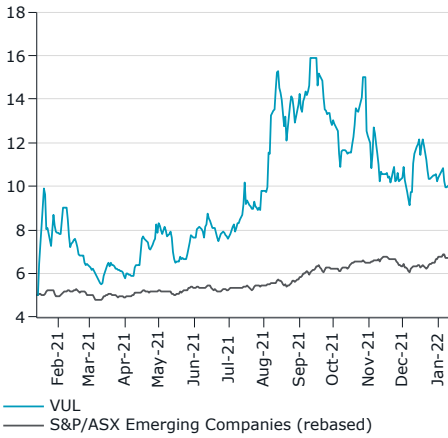
Vulcan has also recently signed an MOU with Nobian, a European chemical manufacturer with €1bn in revenue in CY20 and 1,800 personnel. Of particular note is Nobian's choral-kai experience (4th largest in Europe) which uses electrolysis (similar to the process Vulcan proposes to use to produce lithium hydroxide). The MOU has three phases with VUL and Nobian to assess the feasibility of jointly developing of the CLP in Phase 1. Phase 2 would see a demonstration plant built at Nobian's existing operations at the Hochst chemical plant (where VUL has land to build its plant). Phase 3 would see the development of the CLP, with Nobian potentially taking by-products of chlorine and hydrogen which it uses at its current plant. We see this as a solid derisking step for Vulcan, using the depth of experience at Nobian to fast track the development of the Zero Carbon Lithium project.

Recommendation and price target

We set our price target in line with our risked (60%) NAV, using US\$15,000/t LiOH, 1.58 EURAUD, and 8% discount rate for the lithium operation. We maintain a SPEC BUY rating.

Market Data

52-Week Range (A\$) :	1.03 - 16.65
Avg Daily Vol (M) :	8.0
Market Cap (A\$M) :	1,237.3
Shares Out. (M) :	122.5
Enterprise Value (A\$M) :	1,125
NAV /Shr (A\$) :	22.00
Net Cash (A\$M) :	16.8



Source: FactSet

Priced as of close of business 13 January 2022

Vulcan is a European lithium development company progressing the Zero Carbon Lithium project in Germany. The development envisages a 40ktpa lithium hydroxide operation using DLE from geothermal wells which will also generate carbon free power. The process is expected to be carbon negative based life cycle analysis and if achieved, Vulcan would fundamentally change the carbon emission structure of the lithium industry.

Link to initiation: [Not unconventional... Untapped](#)

Canaccord Genuity (Australia) Limited has received a fee as Joint Lead Manager to the Vulcan Energy Resources Limited Capital Raising announced 2 February 2021.

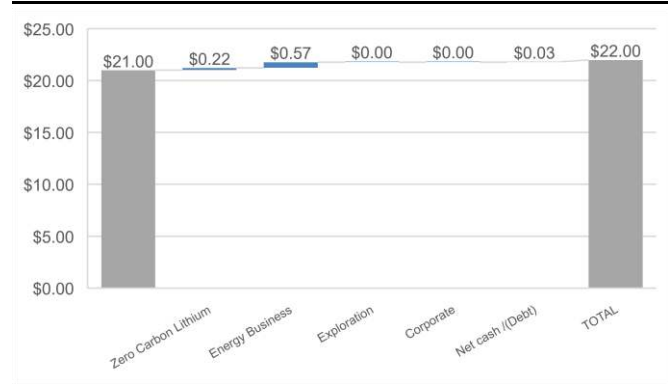
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Figure 1: SOTP valuation for Vulcan energy

Valuation Dec'22	A\$m	EQUITY	RISK ADJ.	A\$m	DILUTED/SH
Zero Carbon Lithium	4088	100%	60%	2453	\$17.73
Energy Business	417	100%	60%	250	\$1.81
Exploration	350	100%		350	\$2.53
Corporate	-45			-45	-\$0.33
Net cash /(Debt)	17			17	\$0.12
TOTAL				3025	\$21.86
				Target	A\$22.00

Source: Canaccord Genuity estimates

Figure 2: Waterfall chart for change in valuation



Source: Canaccord Genuity estimates

Figure 3: Financial summary

Vulcan Energy	ASX:VUL				
Analyst :	Tim Hoff				
Date:	12/01/2022				
Year End:	June				
Market Information					
Share Price	A\$	10.10			
Market Capitalisation	A\$m	1237			
12 Month Hi	A\$	16.65			
12 Month Lo	A\$	4.50			
Issued Capital	m	123			
ITM Options	m	16			
Fully Diluted	m	138			
Trading Volume - 90 Day Average	m	8.0			
Valuation					
		A\$m	Risking	A\$/share	
Zero Carbon Lithium	NPV 8%	2,453.0	60%	17.73	
Energy Business	NPV 5%	250.2	60%	1.81	
Corporate		(45.2)		(0.33)	
Net cash /(Debt)		16.8		0.12	
TOTAL		3,024.8		21.86	
		Target		22.00	
Assumptions					
	2021a	2022e	2023e	2024e	2025e
Lithium Hydroxide (US\$/t)	10,764	25,492	24,250	15,250	13,375
Power (€/kwh)	0.25	0.25	0.25	0.25	0.25
EUR:AUD	1.58	1.58	1.58	1.58	1.58
EUR:USD	1.22	1.22	1.22	1.22	1.22
Sensitivity					
Production Metrics					
	2021a	2022e	2023e	2024e	2025e
Zero Carbon Lithium					
Lithium Hydroxide (LiOH)	0.0	0.0	0.0	0.0	0.6
C1 Cash cost (US\$/t)	0.0	0.0	0.0	0.0	6,369.2
Power generation (MW)	0.0	12.7	28.0	36.8	63.9
Generation costs (€/kwh)	0.14	0.14	0.14	0.14	0.10
Reserves & Resources					
	Brine Volume (km2)		Grade (mg/l Li)		LCE (Mt)
Zero Carbon Lithium					
Taro	2.4		181		2.27
Ortenau	13.4		181		12.86
MOU area	0.7		181		0.72
Directors & Management					
Name	Position				
Francis Wedin	Managing Director & Founder - CEO				
Gavin Rezos	Chairman				
Rob Ierace	CFO				
Substantial Shareholders					
	Shares (m)		%		
Francis Wedin	13.00		12.0%		
Bianca Rinehart	7.24		6.7%		
Gavin Rezos	6.03		5.6%		
Clearstream Banking	5.66		5.3%		
John Hancock	5.38		5.0%		

Source: Company Reports, Canaccord Genuity estimates

Company Description

Vulcan Energy Resources is developing the Zero Carbon Lithium project in the Upper Rhine Valley, Germany. The proposed project will deliver 40ktpa of battery quality lithium hydroxide and 73MW of geothermal power generations capacity.

Profit & Loss (A\$m)	2021a	2022e	2023e	2024e	2025e
Revenue	0.6	5.1	11.2	14.7	40.4
Operating Costs	0.0	-2.7	-6.0	-7.9	-15.9
Royalty	0.0	0.0	0.0	0.0	-0.7
Corporate & O'heads	-4.5	-6.0	-6.0	-6.0	-6.0
Exploration (Expensed)	0.0	-2.0	-2.0	-2.0	-2.0
EBITDA	-10.6	-5.6	-2.8	-1.2	15.8
Dep'n	-0.1	-1.1	-2.5	-3.3	-6.9
Net Interest	0.0	1.8	-3.6	-30.1	-61.9
Other	0.0	0.0	0.0	1.0	1.0
Tax	0.0	0.0	0.0	0.0	0.0
NPAT (reported)	-10.7	-5.0	-8.9	-33.5	-51.9
Abnormals	0.0	0.0	0.0	0.0	0.0
NPAT	-10.7	-5.0	-8.9	-34.5	-52.9

EPS	2021a	2022e	2023e	2024e	2025e
	-\$0.07	-\$0.12	-\$0.04	-\$0.07	-\$0.27

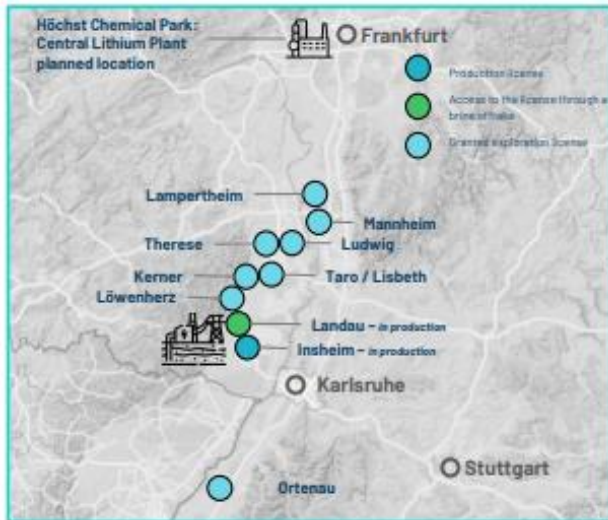
Cash Flow (A\$m)	2021a	2022e	2023e	2024e	2025e
Cash Receipts	0.5	5.1	11.2	14.7	40.4
Cash paid to suppliers & employees	-3.4	-8.7	-12.0	-13.9	-22.6
Exploration and Evaluation	-5.8	-2.0	-2.0	-2.0	-2.0
Tax Paid	0.0	0.0	0.0	0.0	0.0
Net interest expense	0.1	1.8	-3.6	-30.1	-61.9
+/- Other-working cap change	0.0	0.0	0.0	0.0	0.0
Operating Cash Flow	-2.8	-1.8	-4.4	-29.3	-44.1
Capex	-1.3	-143.8	-268.5	-873.6	-1,567.5
Other	0.0	-51.3	-1.3	-1.3	-1.3
Investing Cash Flow	-7.1	-197.1	-271.8	-877.0	-1,570.8
Debt Drawdown (repayment)	0.0	0.0	400.0	1200.0	1200.0
Share capital	124.4	203.1	0.0	500.0	0.0
Financing Expenses	-6.1	-6.0	0.0	-25.0	0.0
Financing Cash Flow	118.3	197.1	400.0	1675.0	1200.0
Opening Cash	8.6	114.7	112.8	236.6	1005.4
Increase / (Decrease) in cash	108.3	-1.9	123.7	768.8	-414.9
FX Impact	0.0	0.0	0.0	0.0	0.0
Closing Cash	114.7	112.8	236.6	1005.4	590.4

	2021a	2022e	2023e	2024e	2025e
Op. Cashflow/Share	-\$0.02	-\$0.02	-\$0.04	-\$0.20	-\$0.30
P/CF	-435.5x	-671.6x	-280.5x	-50.9x	-33.8x
EV/FCF	nm	nm	nm	nm	nm
FCF Yield	nm	nm	nm	nm	nm

Balance Sheet (A\$m)	2021a	2022e	2023e	2024e	2025e
Cash + S/Term Deposits	114.7	112.8	236.6	1,005.4	590.4
Other current assets	1.2	1.2	1.2	1.2	1.2
Current Assets	115.9	114.0	237.8	1,006.5	591.6
Property, Plant & Equip.	1.5	195.5	462.8	1,334.5	2,896.5
Exploration & Develop.	13.8	13.8	13.8	13.8	13.8
Liabilities					
Payables	2.1	2.1	2.1	2.1	2.1
Short Term Debt	0.0	0.0	400.0	1,600.0	2,800.0
Long Term Debt	0.0	0.0	0.0	0.0	0.0
Net Assets	129.0	321.1	312.2	752.7	699.7
Shareholders Funds	136.5	333.6	333.6	808.6	808.6
Reserves	7.9	7.9	7.9	7.9	7.9
Retained Earnings	-15.4	-20.4	-29.3	-63.8	-116.7
Total Equity	129.0	321.1	312.2	752.7	699.7
Debt/Equity	0%	0%	0%	0%	0%
Net Debt/EBITDA	40.4x	61.2x	-37.0x	-20.3x	-50.1x
Net Interest Cover	nm	nm	nm	-0.1x	0.1x
ROE	-8%	-2%	-3%	-5%	-8%
Book Value/share	\$1.05	\$2.62	\$2.55	\$5.10	\$4.74
Net Debt	-114.7	-112.8	163.4	594.6	2,209.6

Vulcan update

Figure 4: VUL increased its tenement holdings by 50% through the granting of 6 additional leases for geothermal and lithium exploration



Source: Company Reports

Figure 5: Vulcan has acquired the Insheim geothermal plant in Germany. The plant has 4.8MW of capacity and was EBITDA positive in CY20



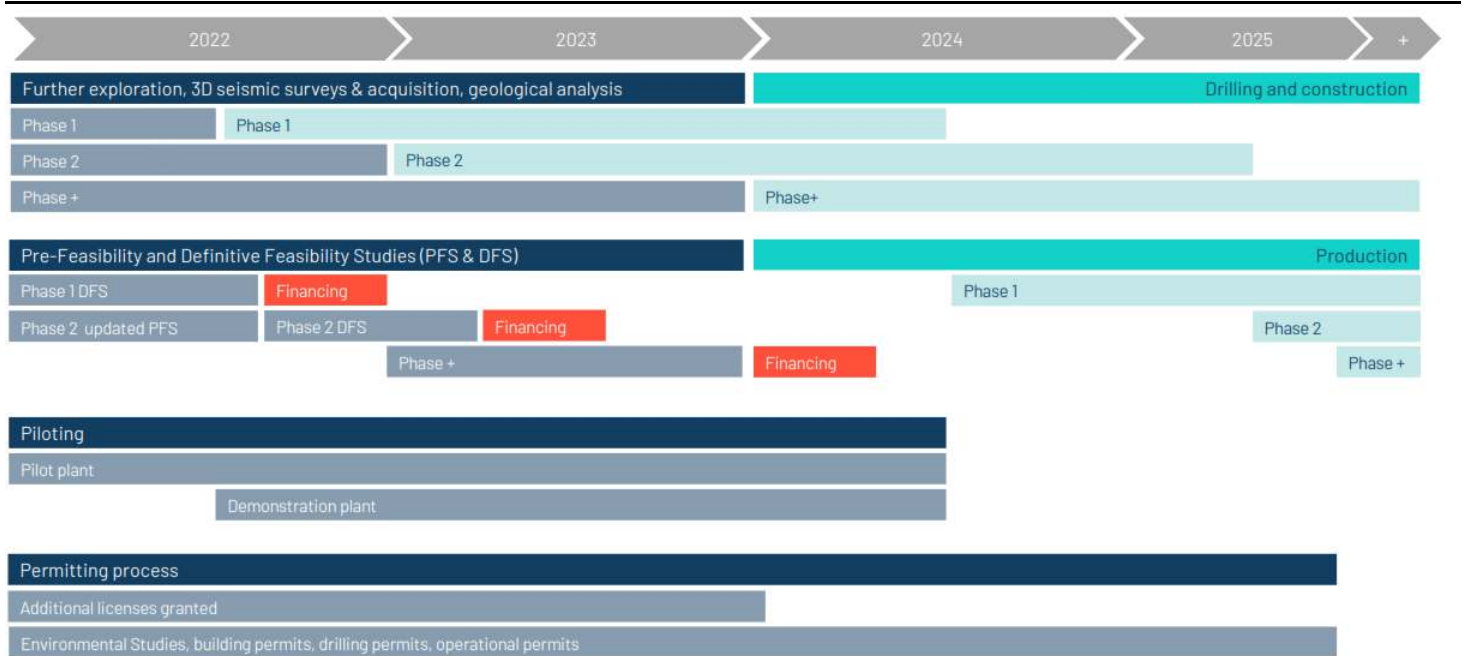
Source: Company Reports

Figure 6: VUL to assess the option of integrating brine from the Insheim plant with brine from the Landau where it has an offtake arrangement



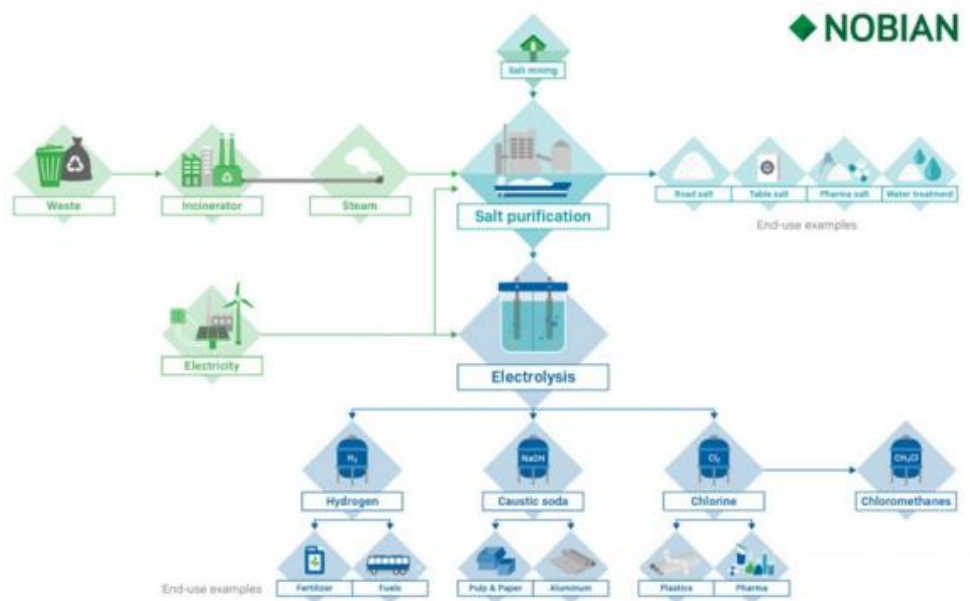
Source: Company Reports

Figure 7: In 2022 VUL will deliver the Phase 1 DFS and updated Phase 2 PFS. It also expects to commission its demonstration plant which will provide a scaled-up plant to test operating parameters for the DLE stage



Source: Company Reports

Figure 8: VUL's MOU with Nobian aims to leverage off Nobian's experience and expertise in the chlor-alkali and chemicals business



Source: Company Reports

Figure 9: Vulcan screens as an advanced DLE project vs development peers with several advantages such as geothermal source (lower energy requirements), large scale resource, and well known offtake partners which we believe will aid in driving the project forward

Company	Livent	Lanke Lithium	Zangge Lithium	Jintai Lithium	Eramet/ Tsingshan	Standard Lithium	Vulcan Energy	Rio Tinto	CTR	Energy Source Minerals	Berkshire Hathaway	Lake Resources/ Lilac	Compass Minerals	E3 Metals
Asset name	Hombre Muerto	Qinghai	Qinghai	Qinghai	Centenario-Ratones	Smackover	Zero Carbon Lithium™	Rincon	Hell's Kitchen	ATLIS	Salton Sea	Kachi	Great Salt Lake	Clearwater Lithium
Country														
DLE technology	Sorption	Sorption	Sorption	Sorption	Sorption	IX	Sorption	Sorption	IX	Sorption	IX	IX	IX	Ion Exchange
DLE provider	Proprietary	Undisclosed	Undisclosed	Undisclosed	Proprietary	Proprietary LiSTR	Undisclosed	Axion	Lilac	Proprietary ILiAD	Proprietary	Lilac	Undisclosed	Proprietary
Stage	Production	Production	Production	Production	Construction	Demo	Pilot	Pilot	Offsite pilot	Pilot	Pilot	Offsite pilot	Pilot	Pilot
Resource (Mt LCE)	Undisclosed	Undisclosed	Undisclosed	Undisclosed	10	3	16	12	3	Undisclosed	Undisclosed	4	2	7
Geothermal	✗	✗	✗	✗	✗	✗	✓	✗	✓	✓	✓	✗	✗	✗
Start date	1998	2017	2018	2019	2024	tbc	2024	2025	2024	2024	tbc	2024	tbc	2025
Capacity (ktpa LCE)	20	20	20	7	24	21	40	50	20	20	90	25	20-25	20
Ownership	Public	-	-	-	Public	Public	Public	Public	Private	Private	Public	Public	Public	Public
Significant Investments					Tsingshan \$375M 11/2021	Koch \$100M 11/2021	Institutional Investors \$230M 2021	Rio Tinto \$825M 12/2021	GM \$?M 07/2021			Lilac Up to \$50M 09/2021		
Offtakes (announced publicly)	 	✗	✗	✗	✗	✗	 	✗		✗	✗	✗	✗	✗

Source: Company Reports

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Date and time of first dissemination: January 12, 2022, 14:01 ET

Date and time of production: January 12, 2022, 11:47 ET

Target Price / Valuation Methodology:

Vulcan Energy Resources Limited - VUL

Our price target is set in line with our NAV with a 60% risk weighting. We use US\$15,000/t LiOH prices, 1.58 EUR/AUD exchange rates and discount rates of 8% for the lithium business and 5% for the energy business.

Risks to achieving Target Price / Valuation:

Vulcan Energy Resources Limited - VUL

Risks include pricing, delivery, resource size and grades, capex and opex estimates and production schedules.

Distribution of Ratings:

Global Stock Ratings (as of 01/12/22)

Rating	Coverage Universe		IB Clients
	#	%	%
Buy	670	69.94%	44.48%
Hold	128	13.36%	28.91%
Sell	8	0.84%	37.50%
Speculative Buy	150	15.66%	58.67%
	958*	100.0%	

*Total includes stocks that are Under Review

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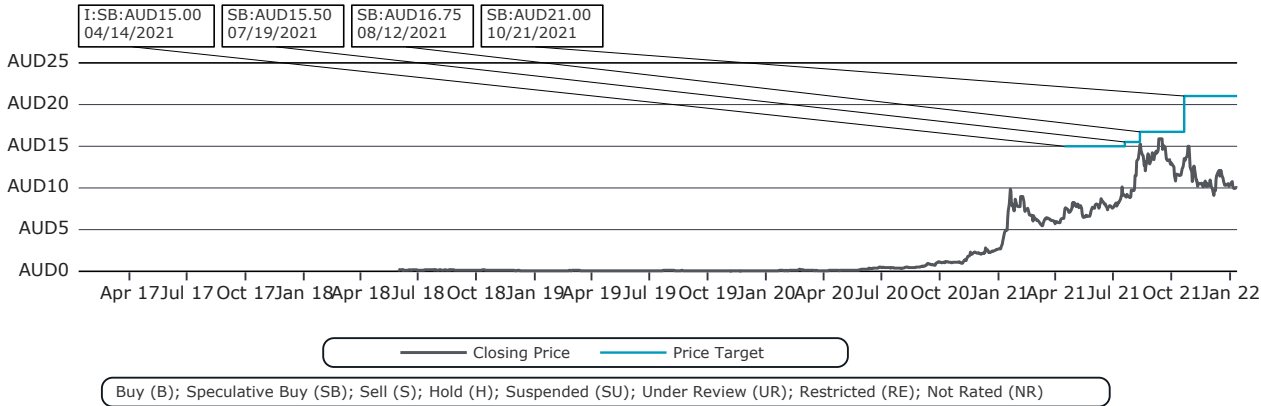
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Vulcan Energy Resources Limited Rating History as of 01/11/2022



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