ASX Release

16 November 2023 ASX:VUL | FSE:VUL

Fast Facts Issued Capital: 168,335,301 **Market Cap** (@$2.58): $434m

VULCAN ENERGY
ZERO CARBON LITHIUM™

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Positive Zero Carbon Lithium™ Project Bridging Study Results

Reduced CAPEX | Reduced risk | Low cost | Robust financials | Execution ready

First integrated renewable geothermal energy, and lithium hydroxide producer with net zero greenhouse gas emissions. **Securing Europe's lithium supply chain**

Vulcan Energy Resources Limited (Vulcan; ASX: VUL, FSE: VUL, the Company) is pleased to announce the results of its Bridging Engineering Study for Phase One of Vulcan's Zero Carbon Lithium™ Project.

Meeting EU's battery electric vehicle critical raw material needs

- Targeting approximately **24,000 tonnes lithium hydroxide** (LHM) production capacity[1][2] per annum from Phase One, enough for ca. 500,000[3] **Battery Electric Vehicles (BEVs)** per annum.
- **Fully aligned** with EU and German policy towards **greater vertical integration of battery supply chain**, and **onshoring of Critical Raw Materials**, including the Green Deal Industrial Plan and Critical Raw Materials Act.

Providing affordable, baseload renewable energy, and employment for local communities:

- Targeting co-production of up to 560 GWh/a[4] of **baseload renewable heat for local community district heating** and internal consumption.
- Targeting co-production of up to 275 GWh/a of **baseload renewable power**, to be sold to grid at Feed-in Tariff rates.
- **Thousands of direct and indirect jobs** created through construction into operation, linked to the energy transition, decarbonisation and electrification of transport.

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[1] See Production Target Material Assumptions and Parameters on page 130 and "Ore Reserves" section 1.5.3 for assumptions.
[2] These are targets which may not be achieved.

[3] Based on Vulcan internal estimated average EV battery size and chemistry in Europe.
[4] To be read in conjunction with Production Target Material Assumptions and Parameters on page 130.

5 KEY OUTCOMES

1. **REDUCED RISK:** Streamlining into **one core production area** that is **already commercially producing** brine, with increased lithium reserves.
2. **REDUCED CAPEX:** **~€100m reduction** down to est. €1,399m, combining assets, whilst moving to higher project definition.
3. **LOW COST:** **Further decline in OPEX** to est. €4,022/t LHM, one of the lowest on the industry cost curve, while maintaining green credentials.
4. **ROBUST FINANCIALS:** **Maintained est. NPV at €3.9Bn (A$6.5Bn) pre-tax**, **€2.6Bn (A$4.3Bn) post-tax**, €705m target annual revenues. 4y payback, despite lower lithium prices.[5]
5. **EXECUTION READY:**
   - **Class 2 cost estimate**, ready to award key **EPC(m) contracts.**
   - 10,000s of hours of **successful in-house A-DLE piloting** completed.
   - €50m **Optimisation Plants starting up**.
   - **Launching** project level debt and equity **financing with strong support.**

5 KEY OUTCOMES DETAILED

1. REDUCED RISK:

ONE CORE PRODUCTION AREA:

- **Improved** Field Development Plan (FDP), from two production areas down to **one core production area** that is already commercially producing brine.
- Reduction of two upstream lithium plants to one central plant.
- Simplified upstream design enabling **easier operation and maintenance, modular**.

INCREASE IN RESERVES:[6]

- State-of-the-art data acquisition results in **increase** of Phase One Lionheart Proved and Probable **Reserves** to 0.57 Mt Lithium Carbonate Equivalent (LCE) @ 181 mg/l Li in the core "Lionheart" area, centred around current production wells in core of the URVBF field.
- Resource of 4.16 Mt LCE @ 181mg/l Li in the Phase One Lionheart area, of which 2.11 Mt LCE is in the Measured category.
- **Largest lithium Resource in Europe**[7] of 27.7 Mt LCE @ 175 mg/l Li, shows significant scope for **pipeline of further phased development**, with a modular approach to further plant build.

[5] Please see "Economic Analysis" section (section 1.12) for full list of assumptions and targets.

[6] See Competent Person Statements on page 129.

[7] *According to public, JORC-compliant data. Refer Vulcan Zero Carbon Lithium™ Project Phase One DFS results and Resources-Reserves update <https://www.investi.com.au/api/announcements/vul/e617fca6-6d4.pdf 2022/02/13> (DFS Presentation).*

2. **REDUCED CAPEX:** **~€100m reduction** down to est. €1,399m, combining assets, whilst moving to higher project definition (Class 2 Estimate).

3. **LOW COST:**

IN A VOLATILE WORLD, LOW-COST PROJECT AND MORE STABLE PRICING:

- **Very low OPEX** estimated at **€4,022/t lithium hydroxide**, due to smart use of available heat to drive the process. Combined with offtake agreements with Tier One customers, **supports stability** during payback period, and protection from lithium price fluctuations.

PEERLESS ENVIRONMENTAL CREDENTIALS:

- Use of **integrated renewable energy** to enable **net zero carbon footprint** in process.
- Determined as a low environmental and social impact project due to small land requirements and being situated in industrial and agricultural areas.
- Vastly reduces transport distance of lithium supply chain and secures European supply for European automakers.
- Usage of modern adsorbent technology requires low reagents.
- Integration of water recycle streams to enable very low net water consumption.
- A world first of net energy positive operation, producing more renewable energy than it consumes.

4. **ROBUST FINANCIALS:** **Maintained estimated NPV[8] at €3.9Bn (A$6.5Bn) pre-tax** and **€2.6Bn (A$4.3Bn) post-tax**, and €705m target annual revenues. 4.2y payback despite a cyclical drop in lithium prices

	Base Case Financials Bridging Engineering
Revenues[9] €M/a	705
EBITDA €M/a	521
EBITDA margin %	74%
NPV pre-tax €M	**3,906**
NPV post-tax €M	**2,566**
IRR pre-tax %	**27.8%**
IRR post-tax %	**22.5%**

[8] Vulcan Energy's Phase One Bridging Engineering Study. These are targets and may not be achieved. Please refer to the Forward-Looking Statement disclaimer.

9 The average forecast realised price per tonne of LHM is taking into consideration Fastmarkets long term price forecast (min 57.5% LiOH)($/kg, EU & US) and combining it with Vulcan's pricing concluded in offtake agreements which includes price floors and ceilings, fix prices, and price indexed on indexes like Fastmarkets.

Payback in years	4
Total Capex €M	**1,399**
Avg Opex €/t LHM	**4,022**
Avg LHM price 10y forecast €/t	**€23,865**
Avg LHM price forecast[10] €/t	€32,050

Table 1 Bridging Study Phase One financials.

5. EXECUTION READY:

- **Class 2 cost estimate**, ready to award key **EPC(m) contracts.**
- 10,000s of hours of **successful in-house A-DLE piloting** completed.
- €50m **Optimisation Plants starting up**.
- **Launching** project level debt and equity **financing with strong support.**

HIGHER PROJECT DEFINITION:

- Reduced uncertainty **provides Class 2 cost estimate**, ready to award key contracts.
- **Key land parcels acquired** for initial execution phase. Preparatory works conducted on first site.
- **EPCM tender** process very advanced, contractor to be named in Q1/Q2.
- **Key permits are on track**, having been received or have been submitted.

PROVEN COMMERCIAL TECHNOLOGY | UNIQUE IN-HOUSE EXPERTISE:

- Adsorption-type Direct Lithium Extraction (**A-DLE**) used in process, which constitutes **10% of lithium production today**, and set to increase to 15% of market share in the next 10 years due to its cost, purity and sustainability advantages.
- Vulcan using its own proprietary in-house adsorbent, **VULSORB**®, which has shown a high performance relative to "off the shelf" products.
- **10,000s of hours of successful in-house pilot plant** performance conducted, showing >90% lithium recoveries, and 1000s of cycles of sorbent life with no loss of capacity, reducing est. OPEX.

PRODUCTION TEAM IN TRAINING:

- **Lithium Extraction Optimisation Plant (LEOP)** in final stages of commissioning, opening scheduled for next week; **Central Lithium Electrolysis Optimisation Plant (CLEOP)** progressing well.
- Together these represent a ca. **€50m investment** by the Company, towards optimisation, operational training and product qualification facilities to enable commercial operational readiness.

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10 Please see assumptions on page 135

- These will produce the **first tonnes of lithium chemicals ever fully domestically produced in Europe**.
- Optimisation plant built to start sending volume of product to off takers for pre-qualifications testing.

SIGNIFICANT PROGRESS ON FINANCING:

- Debt-financing market sounding successfully completed, led by BNP Paribas. Commercial and development banks under NDA expressed **strong interest**, awaiting formal start of process.
- **Substantial in-principle financing support** received from government-backed Export Credit Agencies (ECAs) for financing, from France, Italy, Canada and Australia.
- Financing process with strategic investors for equity at the **project level** commencing.
- Financing and project execution timeline adjusted and now **aligned to coincide** with **public grant funding** application processes.

Vulcan Managing Director and CEO, Cris Moreno, commented:

"The significant efforts by the Vulcan team to produce such a robust Bridging Study are commended.

"This Bridging phase has delivered significant value improvements including a reduction in CAPEX and OPEX, while also increasing and streamlining our project definition.

"Our financials are robust as we have maintained our low-cost position and along with our binding lithium offtake agreements, represent a compelling case in volatile times.

"The Zero Carbon Lithium™ Project is a significant energy and critical raw materials investment in Europe, for Europe.

"Our project secures a zero fossil fuels lithium supply chain for 500,000 EVs per year and also secures renewable heat and energy for thousands of German households.

"Next week, we will formally open our first Lithium Extraction Optimisation Plant, which once in production will represent the first tonnes of domestically produced lithium chemicals in Europe.

"We now move into debt and project-level equity financing, supported by BNP Paribas, after strong support from commercial banks, development banks and government-backed export credit agencies. Our financing and project timeline now aligns with public funding schemes which have just opened in Europe."

PHASE ONE ZERO CARBON LITHIUM ™ PROJECT BRIDGING STUDY SUMMARY STARTS PAGE 8

About Vulcan

Founded in 2018, Vulcan's unique Zero Carbon Lithium™ Project aims to decarbonise lithium production, through developing the world's first net carbon neutral lithium business, with the co-production of renewable geothermal energy on a mass scale. By adapting existing technologies to efficiently extract lithium from geothermal brine, Vulcan aims to deliver a local source of sustainable lithium for Europe, built around a net zero carbon strategy with exclusion of fossil fuels. Already an operational renewable energy producer, Vulcan will also provide renewable electricity and heat to local communities. Vulcan's combined geothermal energy and lithium resource is the largest in Europe[11], with licence areas focused on the Upper Rhine Valley, Germany. Strategically placed in the heart of the European electric vehicle market to decarbonise the supply chain, Vulcan is rapidly advancing the Zero Carbon Lithium™ Project to target timely market entry, with the ability to expand to meet the unprecedented demand that is building in the European markets. Guided by our Values of Climate Champion, Determined and Inspiring, and united by a passion for the environment and leveraging scientific solutions, Vulcan has a unique, world-leading scientific and commercial team in the fields of lithium chemicals and geothermal renewable energy. Vulcan is committed to partnering with organisations that share its decarbonisation ambitions and has binding lithium offtake agreements with some of the largest cathode, battery, and automakers in the world. As a motivated disruptor, Vulcan aims to leverage its multidisciplinary expert team, leading geothermal technology and position in the European EV supply chain to be a global leader in producing zero fossil fuel, net carbon neutral lithium while being nature positive. Vulcan aims to be the largest, most preferred, strategic supplier of lithium chemicals and renewable power and heating from Europe, for Europe; to empower a net zero carbon future.

[11] According to public, JORC-compliant data. See Upgrade of Zero Carbon Lithium™ Project Resources, 29 September 2023

Corporate Directory

Executive Chair	Dr. Francis Wedin
Managing Director and CEO	Cris Moreno
Deputy Chair	Gavin Rezos
Non-Executive Director	Ranya Alkadamani
Non-Executive Director	Annie Liu
Non-Executive Director	Dr. Heidi Grön
Non-Executive Director	Josephine Bush
Non-Executive Director	Dr. Günter Hilken
Non-Executive Director	Mark Skelton
Board Advisor	Dr. Horst Kreuter
Company Secretary	Daniel Tydde

For and on behalf of the Board

Daniel Tydde | Company Secretary

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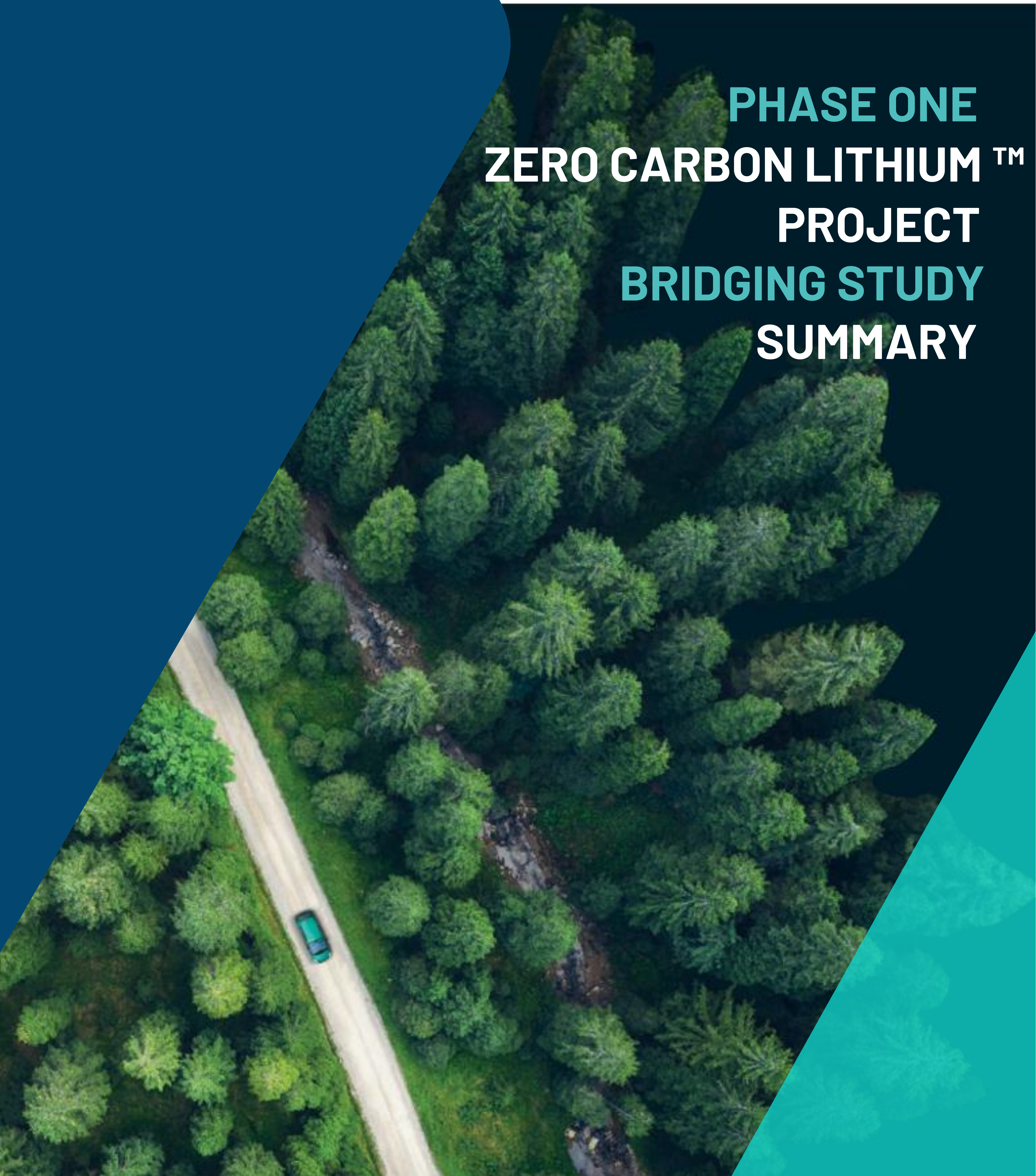
Please contact Vulcan's Legal Counsel Germany, Dr. Meinhard Grodde, for matters relating to the Frankfurt Stock Exchange listing on mgrodde@v-er.eu.

Reporting calendar

29 January 2024	December Quarterly
28 March 2024	Annual Report
27 April 2024	March Quarterly
12 September 2024	Half Year Report

VULCAN ENERGY
ZERO CARBON LITHIUM™

PHASE ONE
ZERO CARBON LITHIUM ™
PROJECT
BRIDGING STUDY
SUMMARY



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1 Summary

1.1 Vulcan: Our Mission and Vision

Founded in 2018, Vulcan Energy Resources Ltd. ("Vulcan", "the Company") unique Zero Carbon Lithium™ Project (**Project**) aims to decarbonise lithium production, through developing the world's first carbon neutral lithium business (Figure 1), with the co-production of renewable geothermal energy on a mass scale. By combining existing technologies to efficiently extract lithium from geothermal brine, Vulcan aims to deliver a local source of sustainable lithium for Europe, built around a net zero carbon strategy with exclusion of fossil fuels from the process. Already an operational renewable energy producer, Vulcan will also provide renewable electricity and heat to local communities. Vulcan's combined geothermal energy and lithium resource is the largest in Europe, with licence areas focused on the Upper Rhine Valley, Germany. Strategically placed in the heart of the European electric vehicle market to decarbonise the supply chain, Vulcan is rapidly advancing the Zero Carbon Lithium™ Project to target timely market entry, with the ability to expand to meet the unprecedented demand that is building in the European markets.

Figure 1 Vulcan's Purpose and Mission.

Guided by our Values of Climate Champion, Determined and Inspiring, and united by a passion for the environment and leveraging scientific solutions, Vulcan has a unique, world-leading scientific and commercial team in the fields of lithium chemicals and geothermal renewable energy. Vulcan is committed to partnering with organisations that share its decarbonisation ambitions and has binding lithium offtake agreements with some of the largest cathode, battery, and automakers in the world. As a motivated disruptor, Vulcan aims to leverage its multidisciplinary expert team, leading geothermal technology and position in the European EV supply chain to be a global leader in producing zero fossil fuel, net carbon neutral lithium while being nature positive. Vulcan aims to be the largest, most preferred, strategic supplier of lithium chemicals and renewable power and heating from Europe, for Europe; to empower a net zero carbon future.

1.2 Project Overview

Vulcan has conducted a Bridging Engineering Study ("Bridging Study") on the Phase One commercial development of the Project (Figure 2), which is a combined geothermal **renewable energy** (heat and power), **lithium production** and **lithium hydroxide conversion** project in the Upper Rhine Valley ("URV"). The URV, a hot, deep sub-surface brine field, is enriched in lithium, and Vulcan's Project is developing the dual production of renewable energy and lithium from the same deep brine source. Vulcan aims to produce approximately 24,000 tonnes per annum (tpa) lithium hydroxide from its Phase One development, along with over 270 GWh of power and up to 560 GWh per annum of renewable heat production.

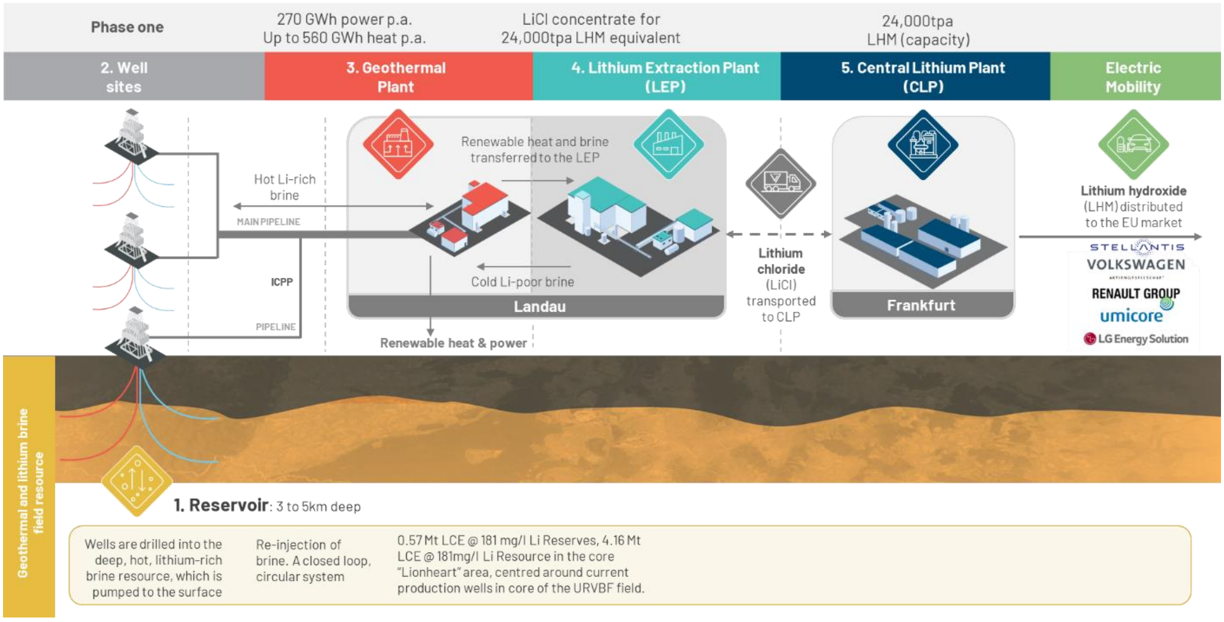

Figure 2 Representation of Vulcan's Phase One infrastructure and process plan.

The Bridging Study was conducted across the entire integrated Phase One development, seeing updates on the sub-surface geology, field development planning, Mineral Resource and Ore Reserve estimation, well site infrastructure (include well design), Interconnected Pipeline and Power network ("ICPP"), geothermal Organic Rankine Cycle ("ORC") plant, Lithium Extraction Plant ("LEP"), and Central Lithium (hydroxide) Plant ("CLP") engineering and design. Vulcan's in-house team of geologists and reservoir engineers led the sub-surface work, with review, audit and sign-off of Mineral Resources and Ore Reserves by energy industry specialists GLJ Ltd, and external review of Field Development Planning by PetroAus Pty Ltd. Vulcan's in-house engineering team led the work on the surface piping and geothermal plant design. Hatch Ltd. led the LEP and CLP design, guided by Vulcan's in-house lithium chemistry and chemical engineering team, and backed up by tens of thousands of hours of test-work from Vulcan's pilot plants, as well as laboratory test-work both internally and externally. The purpose of the Bridging Study was to bring the engineering definition of the Project to a Class 2 Estimate, sufficient to secure key major contracts, and to secure financing for the Project.

What has changed since the DFS: to reduce risk and increase value (Figure 3)

Improved Field Development Plan

- Phase One FDP now only focused on mainly Proved Reserves in the core, producing "brownfields" Lionheart development area, i.e., reduced risk.
- Improved Proved Ore Reserves outcome from Lionheart alone (196kt to 318kt LCE) compared to DFS, resulting from improved static and dynamic modelling, new 3D seismic and optimisation of well placement.[12]
- Improved production plateau results in higher estimated revenue.
- Case map implemented showing positive economic results across all outcomes, even under low case conditions.
- Hybrid injection model allows an optimised FDP and can manage risk during Lionheart execution.

Simpler execution and operation:

- Reducing the number of LEPs from two to one and geothermal ORC plants from two to one.
- Reducing overall distance for interconnecting pipelines & power (ICPP) system, and number of new well sites from seven to five.
- Reduced owner's team and more focused efforts on less sites during execution and production

Simpler permitting:

- Reduction of the number of assets means a simpler, and potentially a faster, permitting process.
- Infraserv, the chemical park operator, as well as the City of Landau and Insheim are already working closely with Vulcan to permit the Project.

CAPEX improvement:

- Bridging Study shows a material reduction in estimated CAPEX but keeping the same production capacity.
- Economies of scale achieved through larger LEP plant.

Schedule aligned with public funding:

- Improved robustness of schedule with key risks now better understood (land acquisition, permitting approach) and key opportunities captured.
- Alignment of Phase One execution schedule with Public Funding schemes to maximise chance to receive government funds.
- Clear plan to move from end of Bridging phase, through validation period to award of major (EPC, EPCM) contracts in Q1 2024.

What doesn't change?

- No change in the output: same LHM capacity targeted.
- Overall Project Execution & Contracting Strategy.

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[12] See Competent Person Statements on page 129.

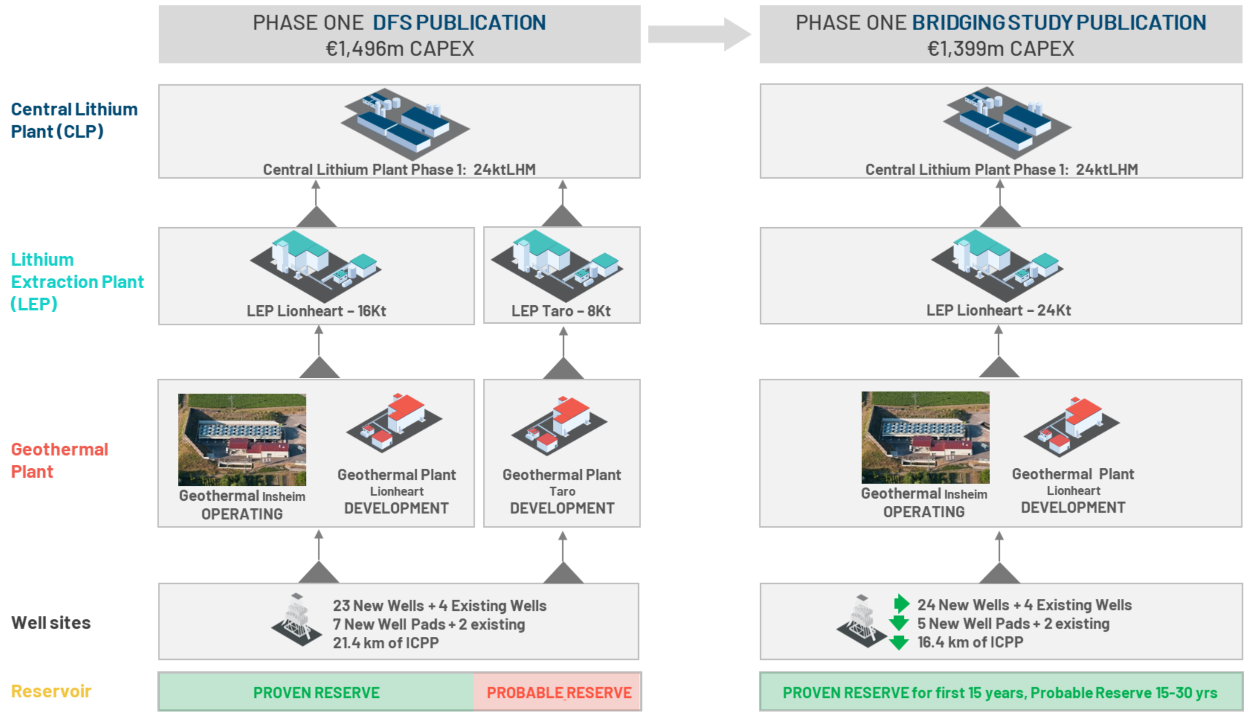

Figure 3 Simplification and de-risking of Phase One project structure.

1.3 Location, Property Description and Ownership

The upstream area for Phase One of the Zero Carbon Lithium™ Project comprises the "Lionheart" development area (Figure 4), consisting of three neighbouring licence areas in the state of Rheinland-Pfalz. Brine production from these licences will see lithium chloride (LiCl) extracted, concentrated and purified before being transported to the CLP, at Vulcan's downstream lithium chemicals production site at the Höchst Chemical Park near Frankfurt, to which Vulcan has secured exclusive access. Within the upstream Phase One development area, Vulcan holds a 100% interest in the operating Insheim licence, including the operational geothermal wells and plant. It has a brine offtake agreement in place to access brine from the geothermal wells and plant in the Landau-South permit, as well as a Joint Venture Agreement to develop another project area in Landau-South. It also has an agreement to develop the Rift North licence neighbouring Insheim, subject to a production compensation mechanism.

The Project area is in the Upper Rhine Valley Brine Field (URVBF) (Figure 5), a sub-surface geothermal-lithium brine reservoir on the border between Germany and France. The area is located centrally in Europe and is highly developed with many rural and urban centres which are interconnected via roadways, freeways, and railways. This proximity to urban and rural centres presents a significant opportunity to provide sustainable renewable energy and heat. The Rhine River dominates the region as a major shipping route, and access to both sides of the river is possible, with many bridges. There are well developed industrial areas for automotive manufacturing, chemical industry, and related service sectors, including the Opel manufacturing plants owned by one of Vulcan's lithium offtakers, Stellantis.

The URVBF is a graben system containing a consistent geothermal lithium reservoir which, within Vulcan's Phase One development area and based on Vulcan's data, has an average lithium grade of 181 mg/l Li (see Mineral Resources section). The deep sub-surface reservoirs targeted for lithium brine production are well explored in the region and have sufficiently high temperatures to support geothermal co-production with lithium recovery. There is a long history of deep well development in the URVBF, dating back to the 1980s, with many wells being developed for either hydrocarbon potential or geothermal potential (Figure 6). Many of the wells historically drilled in the URVBF have been shallower for the purpose of oil and gas production. Notable geothermal work includes R&D projects at Bruchsal, Germany and Soultz, France, which have tested various geothermal power generation technologies with deep geothermal source wells. Within the planned development area, Vulcan already has deep geothermal wells operating at the commercial geothermal energy plant at Insheim, and at neighbouring Landau South, where it has agreements with the licence owner to access the brine.

Figure 4 Overview of Vulcan's Zero Carbon Lithium TM Project area, showing Phase One.

Figure 5 Upper Rhine Valley Brine Field.

The Mineral Resource update includes discussion of the Vulcan licence areas that are planned for Phase One in the Lionheart development area. In addition to the Phase One group of licences, Vulcan also holds 13 other licences in the URVBF, for a total secured licence area of 1,790km^2. Vulcan has acquired the geothermal brine and lithium rights (licences) through direct application to the respective mining authorities of the German states of Rheinland-Pfalz, Baden-Württemberg, and Hessen. All exploration licences were granted pursuant to the German Federal Mining Act (Bundesberggesetz 'BBergG') for the purpose of commercial exploration of mining-free mineral resources: geothermal brine and lithium. Vulcan has acquired the lithium exploration and geothermal production licence at Insheim with 100% ownership.

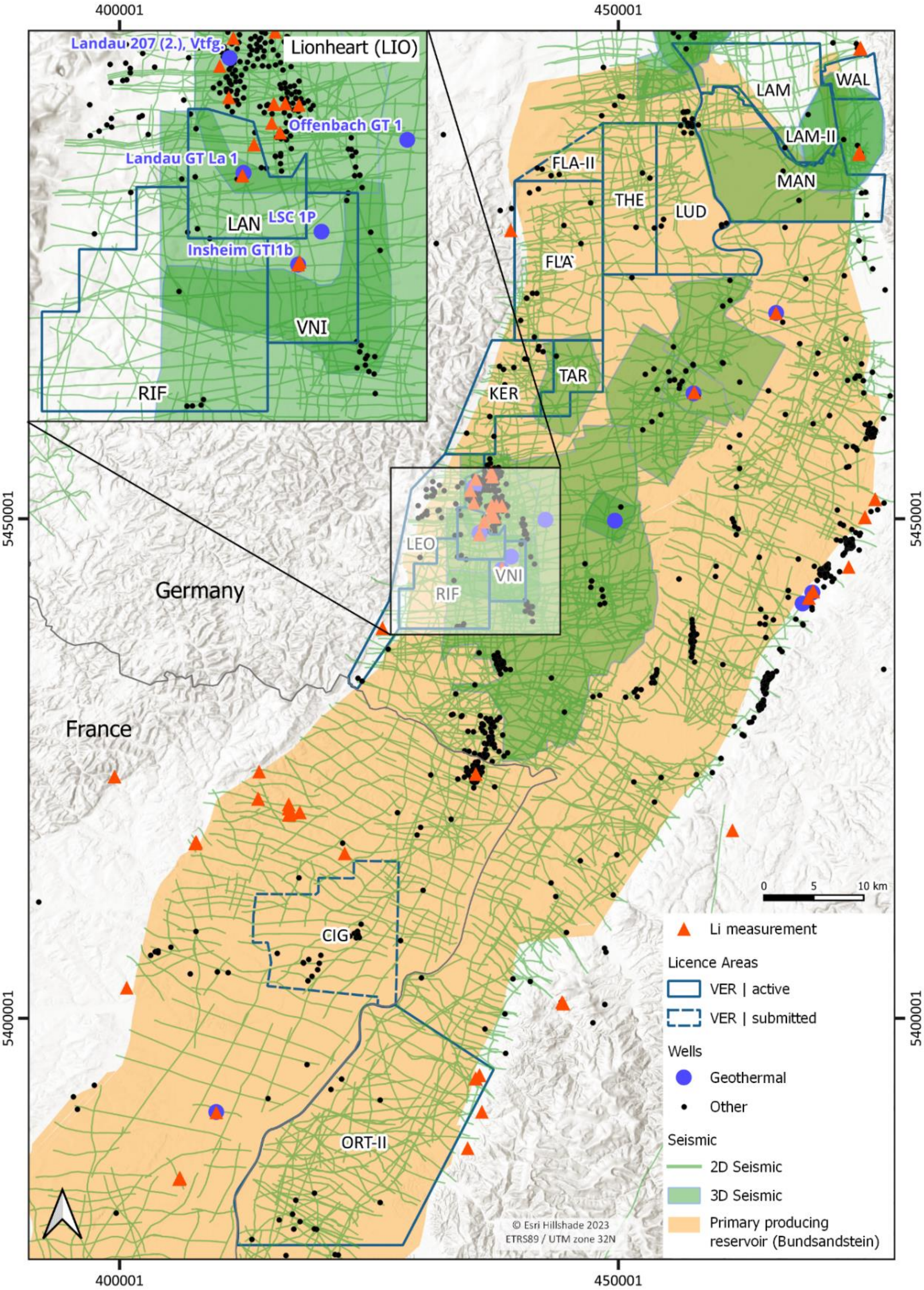

Figure 6 Map of Vulcan licenced areas in the central Upper Rhine Valley, showing well and seismic survey locations. Existing seismic data sets and well penetrations within the Upper Rhine Valley Brine Field, Germany. LAM: Lampertheim, MAN: Mannheim, LUD: Ludwig, THE: Therese, FLA: Flaggenturm, TAR: Taro, KER: Kerner, LEO: Löwenherz, VNI: Insheim, LAN: Landau-South, RIF: Rift North, CIG: Cigognes, ORT-II: Ortenau II. Other Vulcan licences and application to the north and south not shown.

Figure 7 Aerial photograph of Vulcan's Natürlich Insheim Geothermal Plant.

At Insheim (Figure 7), Vulcan operates the existing geothermal plant named Natürlich Insheim, which has the capacity to produce up to 4.8 MW of renewable power and has been operating for over 10 years. There are two operating wells located at this plant, one for production of the 163°C hot brine and one for reinjection of cooled brine. The wells were drilled between 2009 and 2010. The plant has been in operation since 2012. There is a second geothermal plant in the region at Landau-South for which Vulcan has secured an offtake agreement for brine production with Geox GmbH (the operating company); the plant and wells have been in operation since 2007. Vulcan has entered a 51:49 (in Vulcan's favour) Joint Venture agreement with the owners of the Landau-South licence to develop a new geothermal well project in the same Landau-South licence as the current Landau plant, which will also supply Vulcan's Phase One operations with brine for lithium extraction. Vulcan has an agreement to develop new geothermal-lithium projects in the Rift North exploration licence in return for a production royalty. Together, these licence areas comprise the "upstream", lithium chloride and geothermal renewable energy production area of Phase One, designated "Lionheart"**.** Vulcan is concluding negotiations to supply the local utility with renewable heat as part of Phase One.

Vulcan plans to develop the licence areas in a phased, modular approach. Phase One will be developed first, followed by future phases which will be further developments of similar size, in step out areas to the north and south. It should be noted that Vulcan's upcoming Bridging Study deals solely with Phase One. PFS data from Phase Two is now over two years old and should be treated with caution.[13] Subsequent Phases are planned to follow to fully leverage the large licence area that Vulcan has secured. The Phase One Project plans for a central surface facility for geothermal energy and lithium

[13] Refer to disclaimer on page 127.

extraction operations to be fed from multi-well pads. Lithium extraction will be conducted in two stages, starting at the upstream Lithium Extraction Plant (LEP) and proceeding to a facility at Frankfurt Höchst, the Central Lithium Plant (CLP). LHM product will be produced and sold from the CLP.

The Phase One area is well located, close to existing road infrastructure and within relatively flat valley terrain. The Phase One area is mixed land use with rural, urban, agricultural, industrial, and park land. As stated previously the proximity to urban and rural centres presents a significant opportunity to provide sustainable renewable energy and heat. Vulcan has been diligent in ongoing planning development with consideration of existing land uses in consultation with local communities and landowners.

1.4 Geology, Exploration and Drilling

The URVBF is part of the Upper Rhine Graben (URG). The roughly 020° orientated Cenozoic Upper Rhine URG in west-central Europe forms part of the European Cenozoic Rift System (ECRIS) that extends from the North Sea, the Netherlands, western Germany, northern Switzerland, eastern France and down to the Mediterranean Sea. The URG extends from Frankfurt (Main) in the north to Basel in the south as a seismically active, morphologically distinct graben structure with a roughly 300 km long, 30 to 40 km wide lowland plain that drops from 200 m a.s.l. in the south to below 90 m a.s.l. in the north. It is surrounded by morphologically well-defined hills and mountains including: the Black Forest, the Vosges Mountains, Odin's Forest, and the Palatinate Forest. The Rhine River flows through the valley formed by the URG and acts as a natural political and administrative boundary between Germany, France, and Switzerland.

The URG can be subdivided into southern (Basel – Strasbourg), central (Strasbourg – Speyer) and northern (Speyer – Frankfurt) segments, each approximately 100 km long. Vulcan's licences are located within the northern and western part of the central segment. Due to its long history of hydrocarbon exploration and exploitation, the subsurface of the URG has been intensively investigated. Active geothermal power plants (Soultz, Rittershoffen, Landau, Insheim, Bruchsal) are exclusively located in the central segment. A geothermal district heating project was also established in Riehen (Switzerland) at the southernmost termination of the URG.

The focus of the Project in the URG is on aquifers associated with the Permo-carboniferous Rotliegend Group sandstone, the Triassic Buntsandstein Group sandstone, and the Middle Triassic Muschelkalk Formation, which is composed of carbonate sediments, collectively the 'Permo-Triassic strata (Figure 8). The Permo-Triassic strata underly all Vulcan Property licences and are characterized as a laterally heterogeneous sandstone unit within a structurally complex rift basin. The Middle Triassic Muschelkalk succession, however, is only present from the Taro licence area towards the south in the URG.

The Rotliegend Group within the URG formed during the late stage of the Variscan Orogeny with local extension already happening. The Variscan Orogeny was accompanied by volcanism that led to the deposition of intrusive deposits into the basement, which is underlying the URG. Those intrusive deposits are believed to form an essential part of the lithium system. The actual rifting of the URG occurred during Cenozoic times. Hence, the fault system is comparably young.

The Lower Rotliegend is comprised of alluvial-fan/fan-delta to fluvial-dominated Carboniferous and Permian sedimentary rocks. The basin infill subsequently transitioned from fluvial dominated to alluvial and eolian depositional environments during Upper Buntsandstein times.

The Lower Triassic Buntsandstein Group is subdivided into the Lower, Middle and Upper Buntsandstein subgroups as defined by distinct progradational and retrogradational fluvial sedimentary cycles. The Buntsandstein Group aquifer domain is defined as a confined sandstone aquifer that occurs between the fine grained Upper Buntsandstein Group and the coarse-grained base of the Lower Buntsandstein.

The Middle Triassic Muschelkalk represents the marine sedimentation that succeeds the fluvial deposition of the Buntsandstein. It consists of argillaceous dolomites and limestones as it represents a marine transgression. Towards the top of the Muschelkalk, evaporitic sediments dominate.

The Upper Triassic Keuper is dominated by pelitic sediments and represents a marine regression which provides a top seal for the reservoirs of interest together with the pelitic dominated Tertiary overburden.

The Permo-Triassic strata that includes the Rotliegend, Buntsandstein, and Muschelkalk Groups as well as 100 m of the Variscan basement are the focus of the resource models for the Lionheart development area, and Ortenau. Only the Buntsandstein group strata have been considered for the Northern licence areas that include Mannheim, Ludwig, Therese, Flaggenturm/Fuchsmantel, and the western part of Kerner.

Brine aquifers within the Rotliegend Group and Buntsandstein Group are considered to have some degree of hydrogeological communication. This is particularly evident in zones with a high degree of faulting and fracturing in which fluid brine can flow throughout the Permo-Triassic strata and can also penetrate the underlying faulted, fractured and altered granitic basement and the overlying Muschelkalk zone. These fault/fracture zones generally contain hot brine and exhibit high fluid flow rates. Consequently, they are a prime target for geothermal development.

Historical and Vulcan-conducted recent geochemical analysis of the aquifer brine from the Permo-Triassic strata shows the brine is enriched with lithium, which is very consistent both temporally and spatially within the reservoir. In line with recent German Government policy emphasising decarbonisation and promoting the development of renewable sources, Vulcan is focused on extracting lithium from the deep-seated aquifers as a co-product of geothermal power production within the URG. That is, the geothermal wells represent potentially cost-effective access points to acquire deep, geothermally heated, lithium-enriched brine associated with the Permo-Triassic aquifers overlying the crystalline basement.

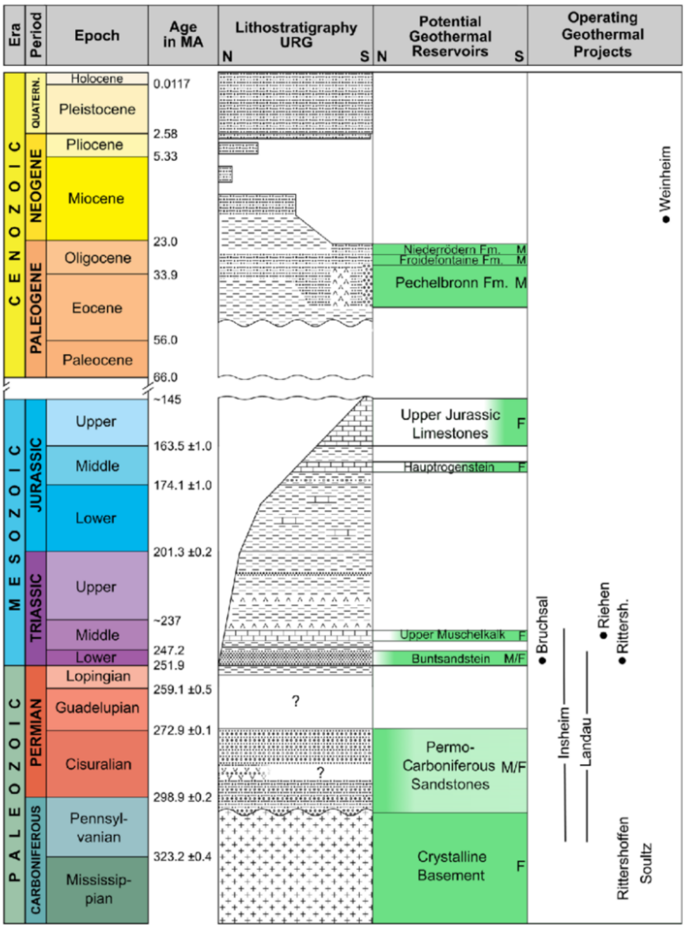

Figure 8 Stratigraphic chart for the Permo-Triassic strata in the URVBF.

Lithium is a silver-grey alkali metal that commonly occurs with other alkali metals (sodium, potassium, rubidium and caesium). The atomic number of lithium is three and the atomic weight is 6.94, making it the lightest metal and the least dense of all elements that are not gases at 20º C (it is solid at 20º C, with a density of 534 kg/m^3). Lithium has excellent electrical conductivity (i.e., a low electrical resistivity of 9.5 mΩ•cm), making it ideal for battery manufacturing where lithium ions move from the negative electrode to the positive electrode during discharge and back when charging. Lithium imparts high mechanical strength and thermal shock resistance in ceramics and glass.

The average crustal abundance of lithium is approximately 17-20 parts per million (ppm) with higher abundances in igneous (28-30 ppm) and sedimentary rocks (53-60 ppm). Resource estimates and production quantities of lithium are often expressed as Lithium Carbonate Equivalent (LCE). The deep lithium-enriched brines of the URVBF originate from geothermal water-rock interaction in the deep subsurface. The lithium enrichment process consists of the following components:

- Recharge of meteoric water with no lithium.
- Downward flow of recharge water, to depth in the URG.
- Water interaction with micaceous, lithium-bearing basement rocks below the pre-rift sediments in the URG (high lithium concentrations) basement rocks.
- Upward flow of enriched brine (through fractures) into Rotliegend and Buntsandstein reservoirs.

- Natural seismicity maintaining the fracture permeability (i.e., self-sealed fractures are frequently reopened).
- Prevention of significant upward loss of enriched fluid by a low permeability top seal.
- Ongoing replacement (via recharge on the URG flanks) of any reservoir fluid that may be lost due to leakage through the upper seal (i.e., reservoir remains charged with lithium-enriched brines from basement).
- Ongoing convection of radiogenic heat from the crust maintains high temperature in the Rotliegend/Buntsandstein reservoir.

Enrichment of the deep URG waters with lithium is consistent with deep basin waters elsewhere in the world. For example, this process is known to occur to varying extents worldwide, at locations that include: the Cambrian Siberian Platform (Russia), the Devonian Basin (Michigan), the Mississippian–Pennsylvanian reservoirs (Illinois Basin), Paradox Basin (Pennsylvania), Triassic strata of the Paris Basin (France), and Jurassic Smackover strata from the Gulf Coast (Arkansas and Texas).

In the case of the Buntsandstein Group and Permo-Triassic aquifers in the URG, the deep-seated, lithium-enriched brine can be cost effectively recovered from the confined aquifer via existing, in-production and newly developed geothermal wells. Adsorption-type Direct Lithium Extraction (A-DLE) technology will be used to recover the lithium. The brine will be returned to the aquifer via reinjection wells, as it is now from Vulcan's operations, with no interruption in the geothermal plant operational cycle.

The URG is one of the most intensively investigated continental rifts worldwide. Consequently, there exists a large amount of relevant data including borehole logs, extensive 2D seismic surveys and a steadily increasing body of 3D seismic surveys directly related to lithium and geothermal development. Additionally, there are many scientific publications and R&D projects throughout the URG which provide a comprehensive understanding of this basin. Vulcan has acquired extensive existing 2D and 3D seismic data, offset well data, and well data from its own wells, across its project areas.

Recently, Vulcan has also shot and acquired new 3D seismic data in the Lionheart, Mannheim and Lampertheim areas. Structural, geocellular and dynamic models were created from this data (tied to available well logs and production records from the Insheim and Landau geothermal wells), to determine the updated resource estimates for the Vulcan licences within the URVBF. The seismic data is important for resolving the presence and lateral continuity of the key zones of interest of the Rotliegend, Buntsandstein and Muschelkalk successions, as well as the granitic basement.

Geochemical data has been consistently acquired and verified throughout the URVBF to determine the presence and concentration of lithium within the brine. Samples have been verified independently and are consistent with averages used in the resource estimates. Vulcan's first comprehensive evaluation of brine chemistry was conducted in 2019 through a program that consisted of: 1) a geological compilation and subsurface review of the Permo-Triassic stratigraphy; 2) an assessment of the hydrogeological conditions underlying the Vulcan Property; and 3) collecting and analysing Permo-Triassic brine samples from the geothermal wells and plant operating at the Insheim resource area or property-neighbouring geothermal wells to verify the historical lithium brine geochemical results.

For the Phase One licences, the average lithium content from brine collected by Vulcan from six geothermal wells (including its 100%-owned Insheim geothermal plant) located throughout the URVBF and within or proximal to its licences was used as the representative grade for Resource Estimation. This grade was 181 mg/L Lithium (n=13 total metal analyses by ICP-OES). In addition, a detailed assessment of Permo-Triassic aquifer brine at the Insheim resource area production well yielded 181 mg/L Lithium (n=26 analyses). This grade was used as the regional lithium brine value for previous resource estimates and for the current update. These brine geochemical results demonstrate that the Permo-Triassic brine in the URG has a relatively homogeneous lithium chemical composition in the vicinity of the Phase One licences, both temporally and spatially.

In addition, independent brine sampling was conducted by former project Competent Persons (CPs) in September 2019 (Insheim), March 2022 (Landau), and November 2022 (Insheim and Landau). The former CPs sent the resulting samples directly to independent, certified laboratories. In all cases, analytical results were consistent with previous results from Landau and Insheim. Further confirmation of the consistent lithium content of brine recovered at Landau and Insheim is indicated by ongoing sampling and analysis conducted by Vulcan to support pilot lithium extraction operations at these facilities, which has been running consistently over 2.5 years, with hundreds of analyses returning similar results within analytical error margin of the average estimated grade.

The targets are permeable zones containing high temperature brine with lithium concentrations that can be extracted with minimal losses. The exploration programmes have evaluated public datasets, and proprietary data sets owned by Vulcan, utilising existing well data (sometimes on-property, sometimes off property) and seismic data. The recently completed seismic acquisition and processing campaign increased the confidence to extend the Mineral Resource estimation and enabled Vulcan to optimise well placement for improved field development, further de-risking the project. Models are planned to be regularly updated as Vulcan's development drilling and data acquisition continues across all its development areas.

1.5 Mineral Resources, Field Development Plan and Ore Reserves

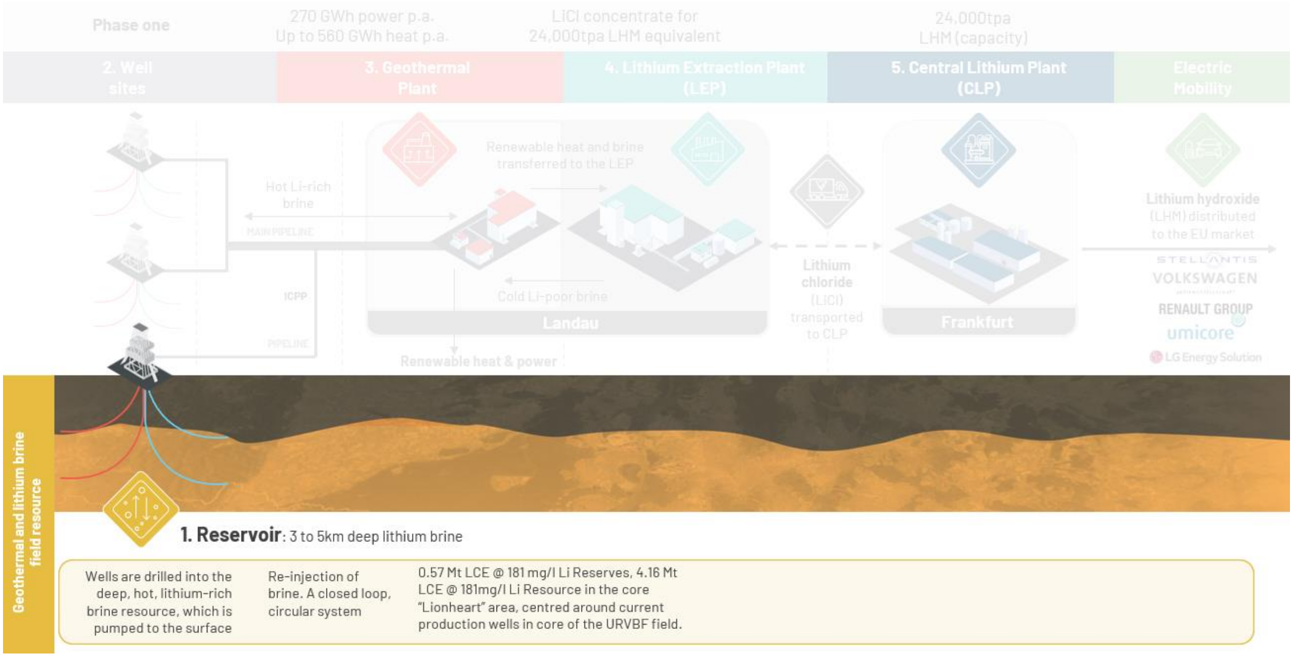

Figure 9 Resource access, pump and re injection of hot lithium brine.

1.5.1 Mineral Resources

Overview of URVBF

- Vulcan's Upper Rhine Valley Brine Field (URVBF), consisting of 16 licences (Figure 10) for a total area of 1,790 km^2, represents **Europe's largest lithium resource[14], with 27.7Mt contained LCE from 10 of its 16 German licences.**
- Large, **300km-long** graben system containing consistent sedimentary-hosted geothermal-lithium reservoir.
- There are currently **36 geothermal plants** operating in Germany and **42 active projects[15]**. The Federal Government targets to reach 100 plants by 2030.[16]
- URVBF area is a **mature, producing field**, with **>1,000 oil & gas and 24 deep geothermal wells** already drilled in the URV.

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[14] According to public, JORC-compliant data. Refer Vulcan Zero Carbon Lithium™ Project Phase One DFS results and Resources-Reserves update <https://www.investi.com.au/api/announcements/vul/e617fca6-6d4.pdf 2022/02/13> (DFS Presentation).
[15] Bundesverband Geothermie.
[16] Geothermie_Eckpunktepapier_ressortabgestimmt (bmwk.de).

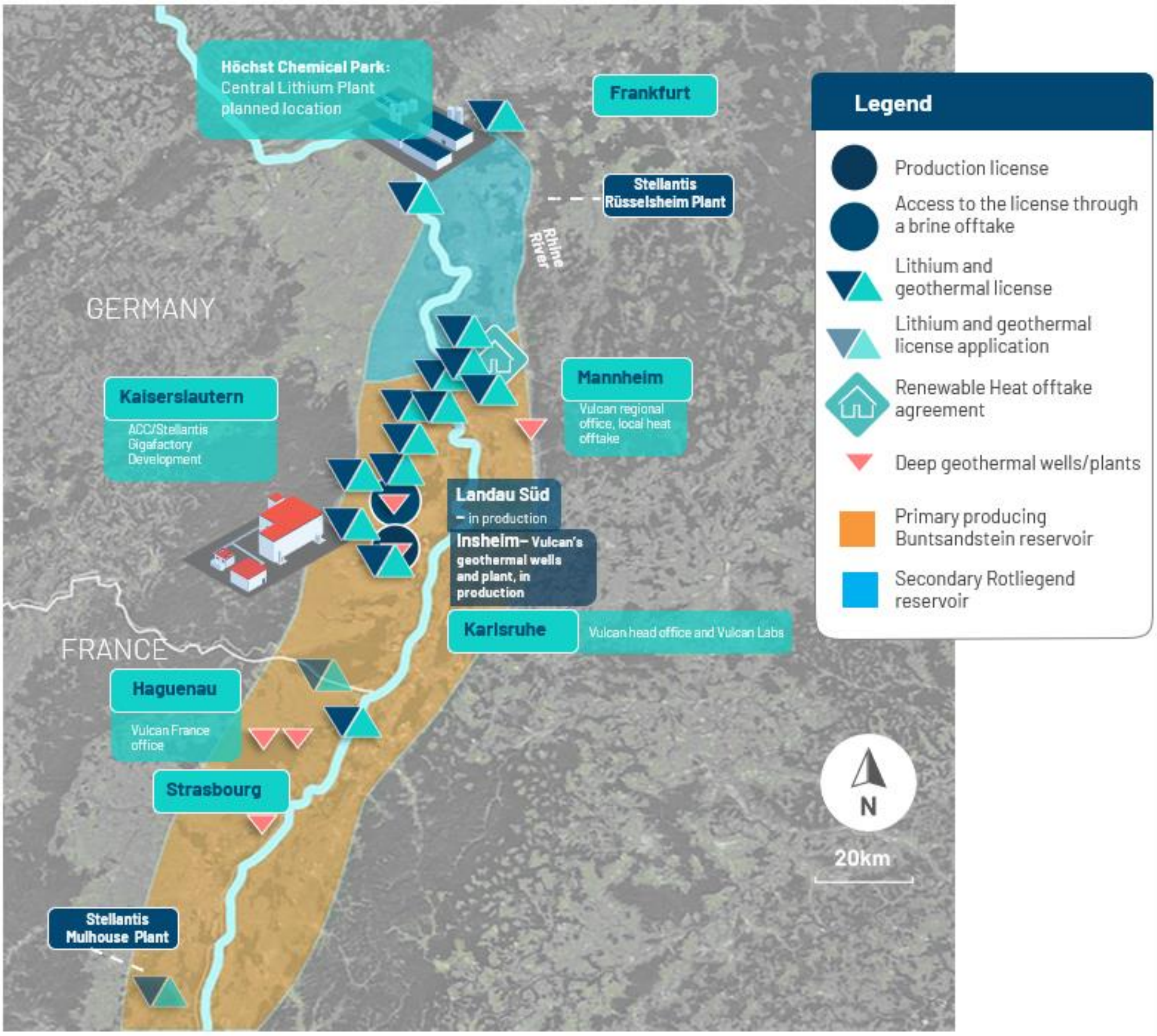


Figure 10 Overview of Vulcan's Zero Carbon Lithium™ Project area, showing Phase One.

Phase One focus: key parameters

- Phase One (Figure 11) is **focused on Vulcan's proven, producing Lionheart** (LIO) development area.
- Lionheart Field Development Plan (FDP) (Figure 12) aims to produce and re-inject a target rate of approximately 950 l/s of lithium-rich brine over 30 years.
- Expected lithium production at well head is **647kt LHM (570kt LCE) over 30 years**[17] from Proved and Probable Reserves**.**
- Phased growth approach, starting from core of field where Vulcan already owns production/re-injection wells in operation.
- Large resources allow for further modular expansion.
- Brownfields development area around existing production only.

[17] See Production Target Material Assumptions and Parameters on page 130 and "Ore Reserves" section 1.5.3 for assumptions.

- Integrated renewable energy and lithium battery chemicals operation, close to lithium offtake customers and renewable heat customers.

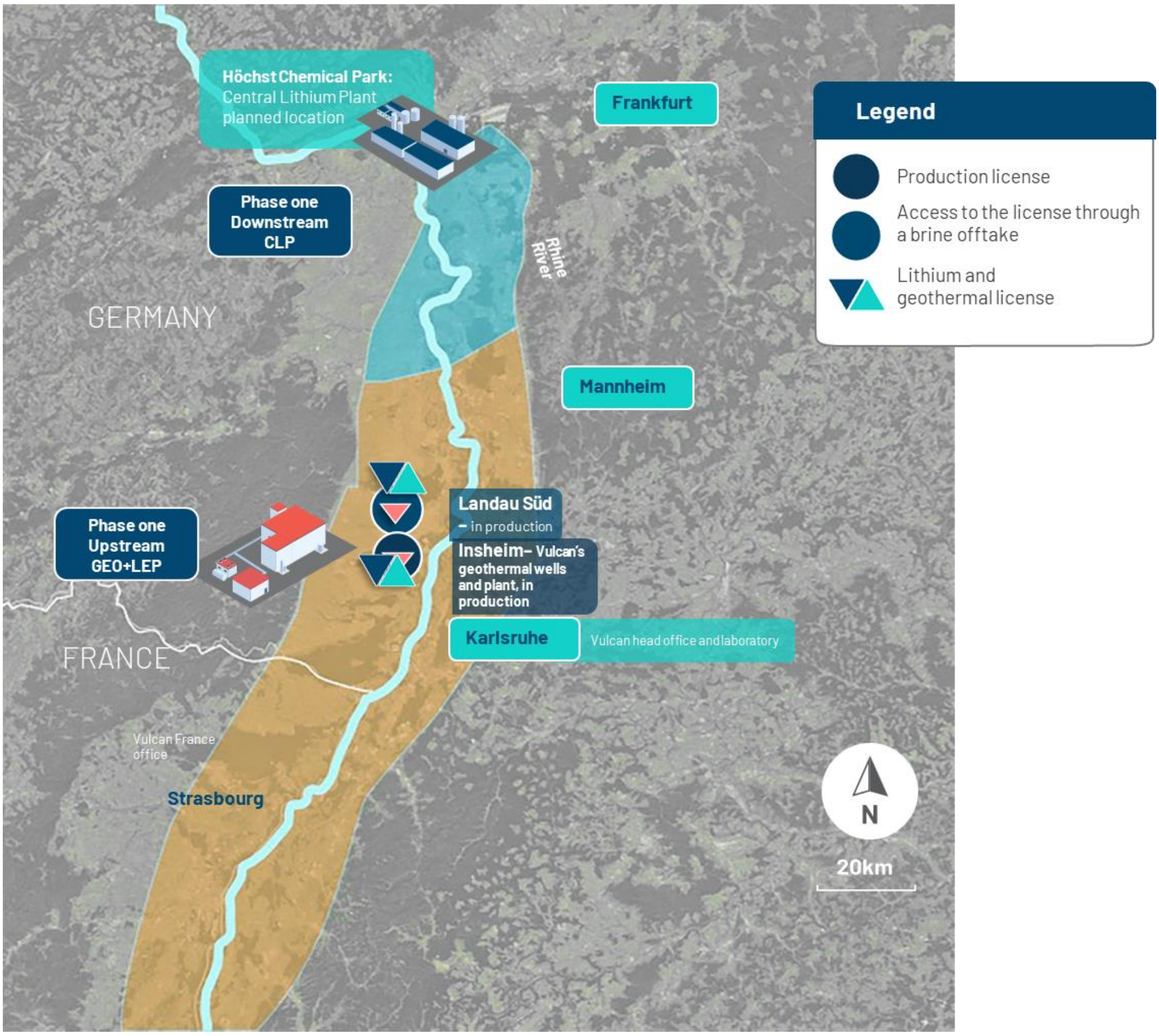


Figure 11 Phase One overview.

Key Strengths

- Excellent **10+ years' track record** from Vulcan's existing production/re-injection well doublets, producing and re-injecting continuously at flowrates of 65-70 l/s per well with well tests in the area showing ability to produce >100 l/s.
- Hundreds of measurements of lithium concentration over the area of interest, very consistent over space and time, pilot plants successfully operated at multiple locations to prove lithium extraction.
- Field development plan provides flexibility to cater for different risks and opportunities as they become apparent as part of the FDP execution.
- Case map implemented showing results across all geological outcomes.

- Positive economic results even under low case conditions.
- Significant upside from formations adjacent to primary target (Buntsandstein Formation).

Key Uncertainties and Risks

- Reservoir matrix properties mitigation in place (Figure 12): agile field development plan in place to manage this risk.
- Dilution management (mitigation in place: agile field development plan).

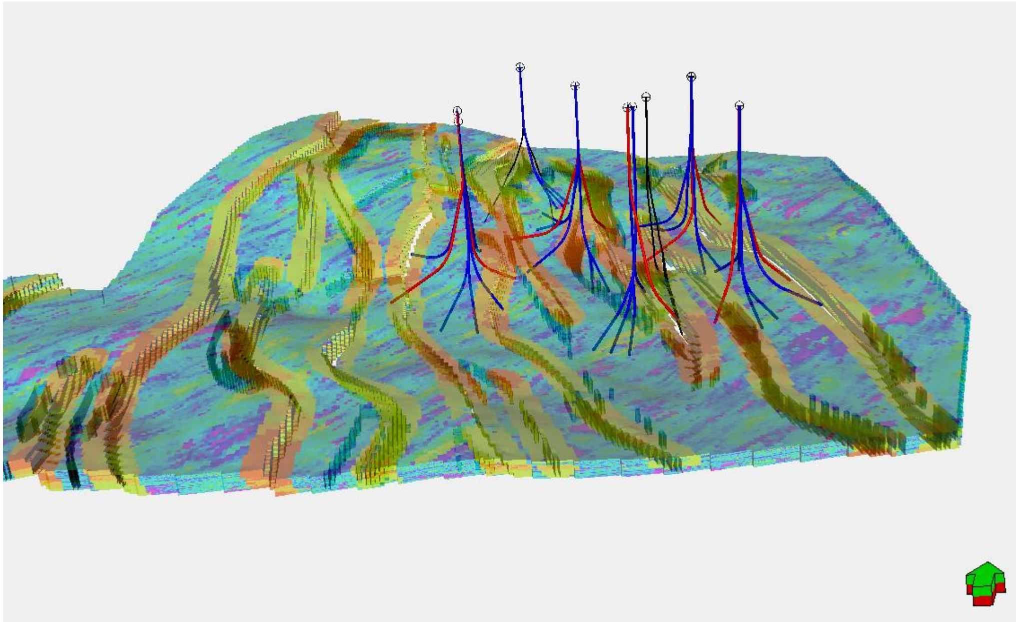


Figure 12 Lionheart integrated reservoir model and well placement.

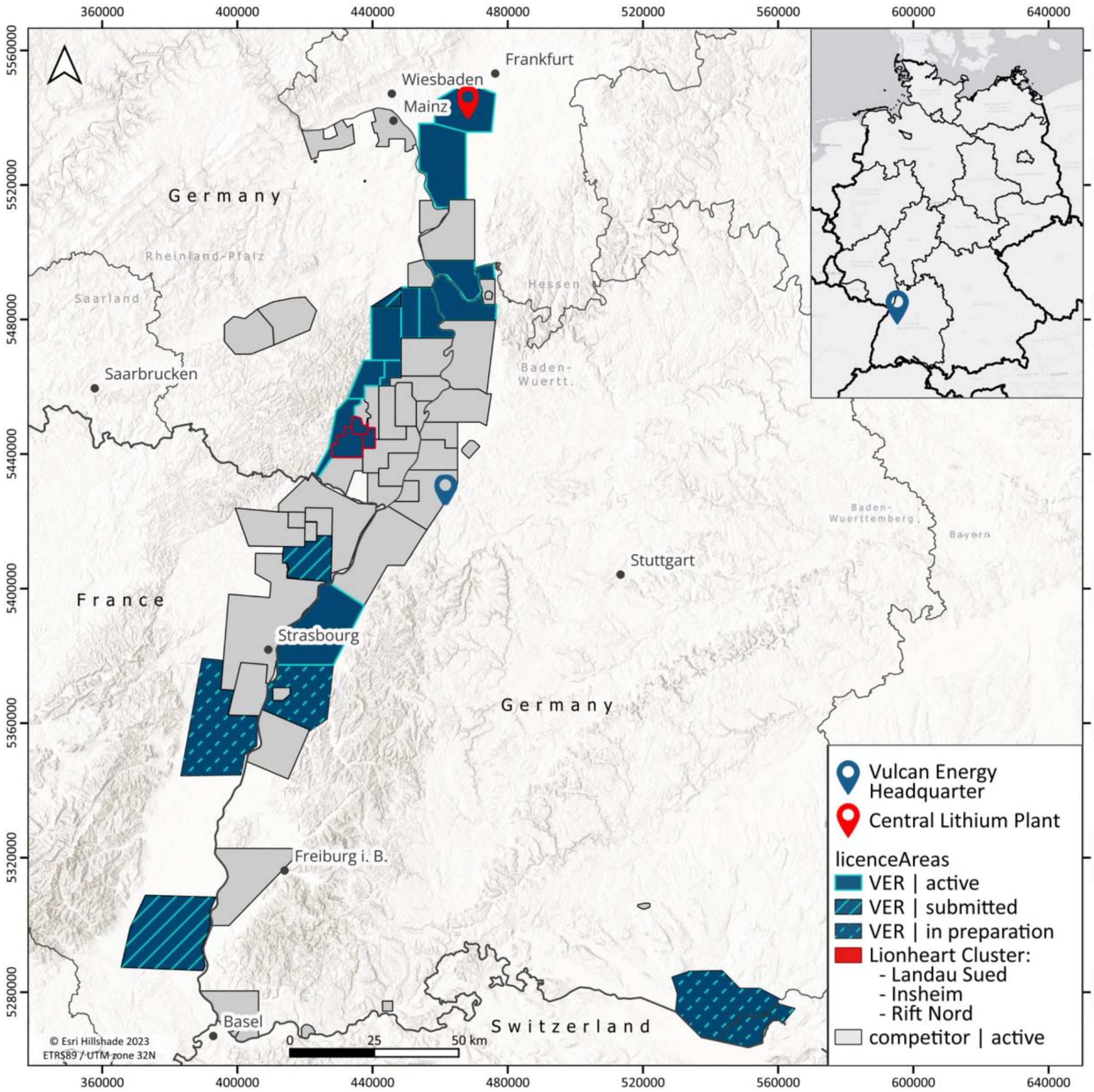


Figure 13 Upper Rhine Valley Brine Field: Europe's largest, and a globally significant, lithium resource and reserve.

Mineral Resources were estimated for Vulcan's licences within the URVBF (Figure 13). Geologically, the resource area includes the fault damage zones and host rock matrix of the Permo-Triassic sediments which includes the Rotliegend, Buntsandstein, Muschelkalk groups and 100m of Variscan basement. The fault damage zones were modelled to include 200 m on either side of the fault. The host rock matrix makes up much of the bulk volume within the licences. Petrel, an SLB geomodelling software package, was used to model the three geological units representing the permeable reservoirs for lithium-enriched brine: Rotliegend, Buntsandstein, Muschelkalk and 100m Variscan basement. This modelling approach (Figure 14) is based on a comprehensive information package that includes 3D seismic data, 2D seismic data, geological well data (including core samples, outcrop data, depositional environment interpretations), and production data from currently producing wells at the Insheim and Landau licences within the core of the Phase One area. Dynamic modelling for the Lionheart zone in Phase One was also used to define the drainage areas and resource footprints for those licences.

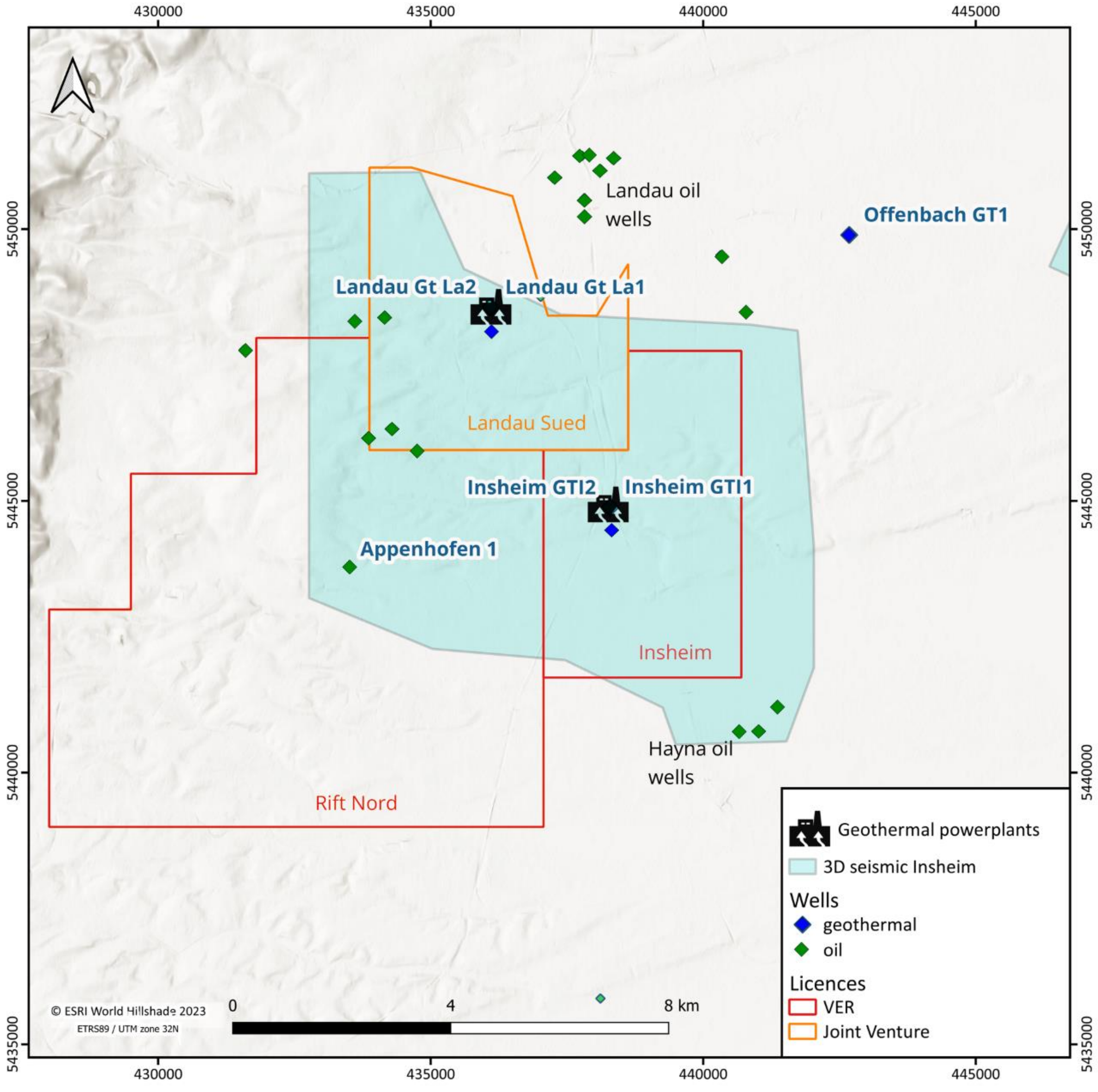


Figure 14 Phase One within Upper Rhine Brine Field, showing well and 3D seismic location.

The workflow implemented for the calculation of the Vulcan lithium brine resource estimates for each licence is as follows:

- Definition of the geology, geometry and volume of the Permo-Triassic strata within the fault damage zones and host rock matrix using all the available subsurface and surface data.
- Hydrogeological characterisation and an historical compilation and assessment of effective porosity (Figure 15) within the URVBF to estimate an average value for each geological unit.
- Determination of a representative lithium-in-brine concentration for each licence, based on Vulcan's brine sampling programs across the URVBF as well as independent testing of samples at Insheim and Landau.
- Numerical calculation (estimation) of the *lithium-initially-in-place (LIIP)* using the relation:

LIIP = Gross Rock Volume (GRV) X Average Net-to-Gross Ratio (Avg NTG) X Average Effective Porosity (Avg Phie) X Average Concentration of Lithium in the Brine (Avg LC)

Where;

GRV (km^3): gross rock volume - extracted from the geomodels after the verification and validation of the continuity of the stratigraphic horizons and fault interpretations.

Avg NTG (decimal): net thickness to gross thickness ratio - gross thickness is determined from average thicknesses of the zones of interest identified in well log data and seismic data. The average net thickness is determined using an effective porosity cut-off of 5% within the gross interval. This is based on producing and previously producing geothermal and oil and gas wells within the URVBF (Appenhofen 1, Landau 207 and 211, Römerberg oil wells A-E – see reference list of studies below), within and proximal to Vulcan's Phase One area, that showed significant fluid flow from the target reservoirs. On the porosity versus permeability cross plot (010) of all the available core and sidewall core plug data in the URG for the Buntsandstein (Figure 11), 5 % effective porosity is equivalent to 0.02 mD permeability. Because permeability cannot be measured directly using wireline logs, this correlation of porosity with permeability helps to establish the effective flow of fluids within a reservoir where core data are not available. This is based on The Canadian Oil and Gas Evaluation Handbook (2005) for the evaluation of subsurface reservoirs (also see Nelson, 1994 for theoretical explanation).

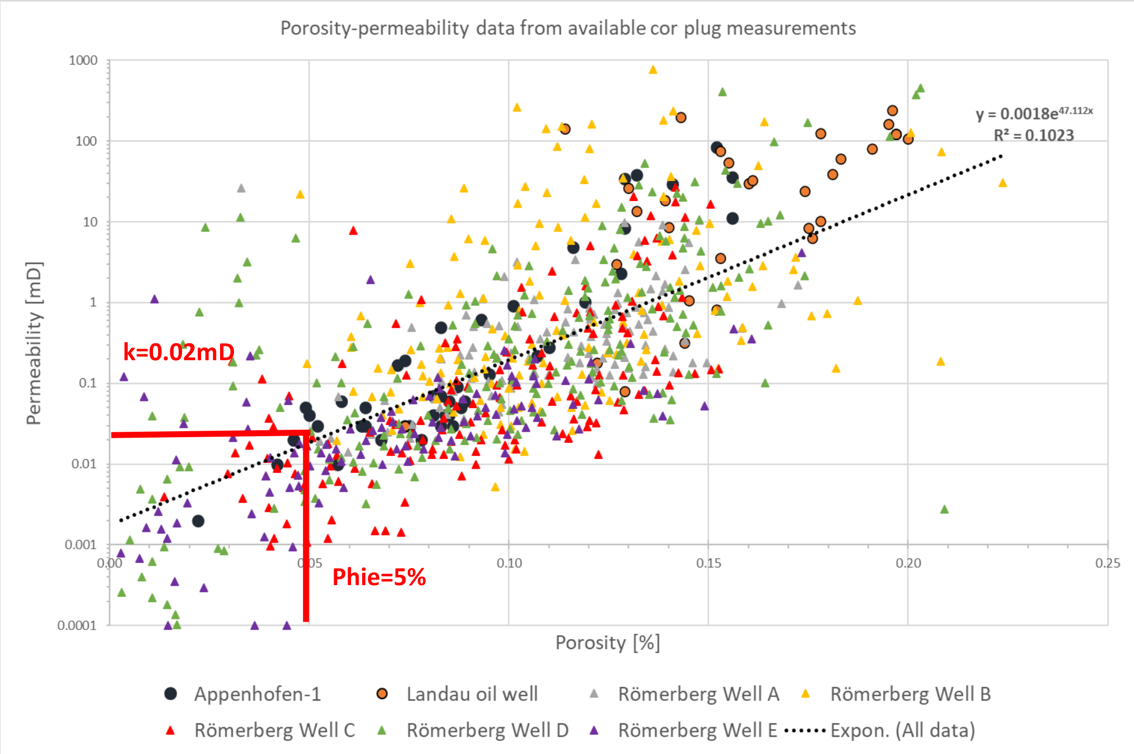


Figure 15 Porosity versus permeability cross plot of Buntsandstein core data for seven wells in the URVBF.

Studies defining the porosity and permeability relationships using core plug measurements of producing geothermal and oil and gas wells (Figure 15)*:*

GeORG Project, 2013 – Upper Rhine Graben regional study

Bossennec, 2019 – Römerberg oil field

Bush et al., 2021 – Landau geothermal wells

Heap et al., 2019 also provides core plug measurements of the Buntsandstein Group in the Soultz ESP-1 well in the URG in France.

Avg Phie (decimal): effective porosity - that portion of the total void space of a porous material that can transmit fluid. Determined from the petrophysical evaluation of density, neutron, and/or sonic well logs covering the zones of interest, supplemented with core and plug data where available.

Avg LC (mg/L): average lithium concentration determined from sampled wells in the URG.

- Assessment and confirmation of "reasonable prospects for eventual economic extraction" for the estimated Mineral Resources on each licence, as per the JORC (2012) definition of Resources.

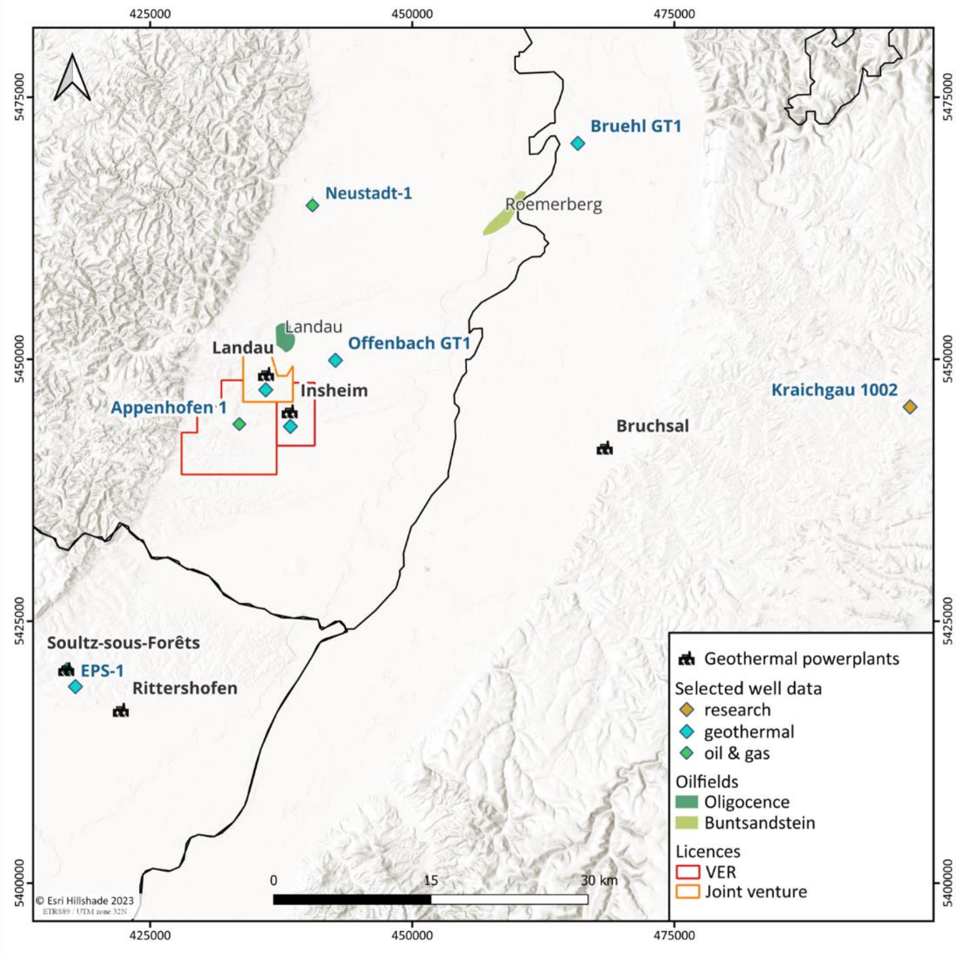


Figure 16 Map showing locations of wells with data incorporated into Phase One study, including on-property wells at Insheim-Landau geothermal plants, Appenhofen-1, wells within Landau field, and Römerberg field near to Taro. Green shows larger oil fields containing multiple wells.

Derivation of NTG and Phie inputs to the Mineral Resource calculations was supported by a compilation of publicly available porosity and permeability data for the Rotliegend, Buntsandstein, and Muschelkalk units (fault damage zones and host rock matrix) including:

- Over 300 effective porosity measurements from Buntsandstein core and outcrop analysis and total porosity from wireline well log data, located throughout the URG (Sokol, Nitsch and GeORG-Projektteam, 2013; Soyk, 2015; Egert et al., 2018).
- Over 250 Buntsandstein Group permeability measurements and/or interpretations (Sokol, Nitsch and GeORG-Projektteam, 2013; Stober and Bucher, 2015), including inferences on fracture permeability (Vidal et al., 2015; Baujard et al., 2017a).
- Over 1,500 Rotliegend outcrop and 62 Rotliegend core plug porosity measurements (Bär, 2012; Aretz et al. 2016).
- Over 550 Rotliegend Group permeability measurements from well core plugs (Bär, 2012; Aretz et al. 2016).

Lithium-brine analytical data used in the resource estimates (Table 2) were discussed in the previous section. As noted, an average grade of 181 mg/L lithium was used for the Phase One licences.

To validate the continuity of the stratigraphic horizons of interest and to validate the fault interpretations, an independent audit of the modelled surfaces and faults was conducted based on; 1) raw seismic profiles, 2) downhole drill logs and e-logs associated with geothermal, and oil and gas wells drilled within the URG, 3) the regional 2D geological model cross-sections, and 4) the 3D geomodel (Figure 16). A cut-off grade / resource quantity analysis was not strictly applicable to resource, due to the use of average grade in the static resource estimate. However, it is noted that a grade for economic extraction of 100 mg/L has been established on a provisional basis for the lithium extraction process and that all resources are currently estimated to exceed that grade. A cut-off of 100 mg/L lithium is considered reasonable for the current stage of assessment. It is noted that lower values have been used to define other confined aquifer brine deposits (e.g., Dworzanowski et al., 2019), which tend to have lower grades in comparison to many salar-based lithium brine deposits.

The resource classification criteria used for the URVBF are based on the quality of the data available and the CP confidence level in the integration of all the data by Vulcan's multi-disciplinary team. This team includes geophysicists, geologists, reservoir engineers with experience from the oil and gas industry, hydrogeologists, geothermal specialists, and chemical engineers with relevant experience in the Permo-Triassic brine geology, hydrogeology, and lithium brine processing. The Mineral Resource classifications are shown on (table 1) for Vulcan's licences in the URVBF that were part of the Resource Estimate. Some important points to support the assigned mineral resource classifications include: 1) a greater level of confidence in the subsurface geological modelling because of Vulcan's acquisition of 2D and 3D seismic data, as well as static and dynamic modelling of the Permo-Triassic strata calibrated to available well data, 2) ongoing production data from two producing geothermal wells at Insheim (in production since 2012) and Landau (in production since 2007), and the acquisition of new well test data during a recent production well workover, and 3) knowledge of Vulcan's commissioned A-DLE mineral processing test work and results from its pilot plants at the operating wells.

Vulcan has completed multiple phases of test work, sampling and interpretation that are adequate to support the disclosure of Mineral Resource estimates (Table 2). In the opinion of the CPs, the Vulcan URVBF licences for lithium and renewable energy projects have reasonable prospects for future economic extraction based on aquifer geometry, delineation of fault zones using new 3D seismic data, brine volume, brine composition, hydrogeological characterization, porosity, fluid flow, optimization of field development plan, and advancement of the Company's A-DLE technology. The CPs, Gabriella Carrelli, M.Sc., P. Geol. and Kim Mohler, P.Eng. take responsibility for this statement. Per JORC, Mineral Resources are not Ore Reserves and do not have demonstrated economic viability. Inferred Mineral Resources have a lower level of confidence associated with their estimation than Indicated Mineral Resources, but it is reasonably expected that with further exploration the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources. Indicated Mineral Resources are sufficiently well defined to allow application of Modifying Factors to support well planning and economic evaluations of the deposit. Measured Mineral Resources are sufficiently well defined to allow application of Modifying Factors to support detailed well planning and final evaluation of the economic evaluations of the deposit.

Licence/ Area	Reservoir	Classification	GRV km^3	Avg. NTG %	Avg. Phie %	Avg. Li mg/L	Elemental Li t	LCE kt
Insheim	*MUS, BST, ROT, BM	Measured	13	69	9	181	151,823	808
Rift-North	*MUS, BST, ROT, BM	Measured	9.5	70	9	181	110,181	586
	*MUS, BST, ROT, BM	Indicated	29	71	9	181	355,443	1892
Landau South	*MUS, BST, ROT; BM	Measured	12	68	9	181	134,677	717
	*MUS, BST, ROT; BM	Indicated	2.7	69	9	181	29,620	158
Flaggenturm	BST	Indicated	7	90	10	181	115,215	613
	BST	Inferred	37	65	9	181	391,201	2,082
Kerner	BST	Indicated	5	90	10	181	76,242	406
	BST	Inferred	13	65	9	181	132,558	705
Kerner Ost	*MUS, BST, ROT	Indicated	4.3	73	8	181	66,708	355
Taro	*MUS, BST, ROT	Indicated	14.5	73	8	181	237,362	1,263
Ortenau	*MUS, BST, ROT	Indicated	57	73	8	181	659,013	3,507
	BST	Inferred	105	73	8	181	1,883,212	10,024
Mannheim	BST	Indicated	4	90	10	153	54,111	288
	BST	Inferred	32	65	9	153	290,312	1,545
Ludwig	BST	Indicated	7	90	10	153	93,220	496
	BST	Inferred	22	65	9	153	199,226	1,060
Therese	BST	Indicated	2	90	10	153	29,907	159
	BST	Inferred	22	65	9	153	200,708	1,068
						mg/L		**kt**
Total LCE		**Measured**				**181**		**2,112**
		Indicated				**178**		**9,137**
		Inferred				**172**		**16,484**

Table 2 Vulcan's combined Zero Carbon Lithium™ Project lithium (Li) brine Measured, Indicated and Inferred Mineral Resource estimates. Phase One licences indicated in orange. See Competent Person Statement at the end of this document.

Note 1: Mineral Resources are not Ore Reserves and do not have demonstrated economic viability. Note 2: The weights are reported in metric tonnes (1,000 kg or 2,204.6 lbs). Numbers may not add up due to rounding of the resource value percentages. Note 3: Reservoir abbreviations: MUS – Muschelkalk Formation, BST – Buntsandstein Group; ROT Rotliegend Group; BM - Variscan Basement. Note 4: To describe the resource in terms of industry standard, a conversion factor of 5.323 is used to convert elemental Li to Li_2CO_3, or Lithium Carbonate Equivalent (LCE). Note 5: NTG and Phie averages have been weighted to the thickness of the reservoir. Note 6: GRV refers to gross rock volume, also known as the aquifer volume. Note 7: Mineral Resources are considered to have reasonable prospects for eventual economic extraction under current and forecast lithium market pricing with application of Vulcan's A-DLE processing.

1.5.2 Field Development Plan

The field development plan (FDP) is the overall well plan which defines the brine production and injection forecast for the Phase One project area at Lionheart. The development plan for Lionheart (Figure 17) includes the addition of new wells, plus the continued operation of existing wells at Insheim and Landau. The placement of the new wells has been optimised using the newly acquired 3D seismic and improved static and dynamic models. The FDP takes into consideration the drilling plan for the wells and the timeline for construction of surface facilities and infrastructure for the project. All activities associated with the FDP and overall project execution take into consideration safety and environmental protection and plan to follow all regulatory requirements.

Field development plan update

The FDP provides flexibility to cater for different risks and opportunities as they become apparent as part of the drilling campaign which could see improved CAPEX, recovery and injectivity management.

- Focusing on Lionheart provides "higher confidence" and increased "Proved" Reserves.
- Can optimise the FDP during execution and mitigate subsurface risk.

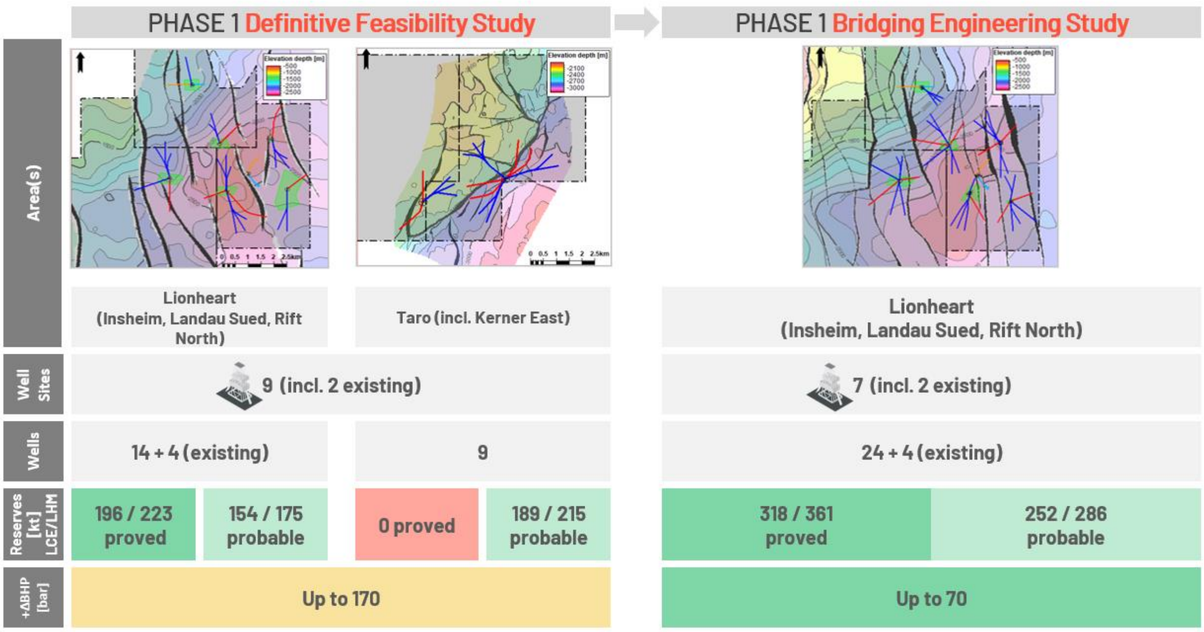


Figure 17 Updated FDP and comparison from DFS to Bridging Engineering Study.

The aim of the revised FDP is to produce a combined 950l/s of geothermal-lithium brine from the upstream Lionheart area of Phase One, from multiple new and existing well sites, with a gradual ramp up process whilst construction of the geothermal plant, LEP and CLP are ongoing. The producer wells are planned to be connected to open faults which are within a high conductivity area, in order to minimise the drawdown. The injector wells are planned for drilling mostly away from the faults to optimise the sweep of lithium-rich brine toward the faults and the producers, while some injectors are planned to be drilled to the fault zones to increase the water injection capacity where deemed optimal. The injectors drilled in matrix permeability dominated areas are mostly multilateral so that the connection to the reservoir is maximised. This hybrid development concept of reinjecting brine where geology is most favourable, allows for maximised recovery which serves to manage subsurface uncertainties, and reduces risk.

The typical well trajectory will start from vertical, at surface down to a depth of 1,000m, and will then deviate to reach the bottomhole target location in the Buntsandstein. Vulcan plans out each well individually but uses a generic model as a base case. The wells are planned to be drilled with water-based mud systems and include extensive formation evaluation methods such as mud logging, wireline logging, coring and geochemical analysis of cuttings and downhole fluid samples. The wells are planned to be large sized boreholes to accommodate the large fluid rates expected, with 20" surface casing down to 7" liner across the production or injection intervals.

The dynamic reservoir modelling (Figure 18) assumes dilution of lithium concentration over time at the reservoir level near the producer wells due to sweep effects of the lithium diluted brine reinjection. The cut-off assumed for economic production is 100 mg/L lithium, where the starting concentration is 181 mg/L lithium.

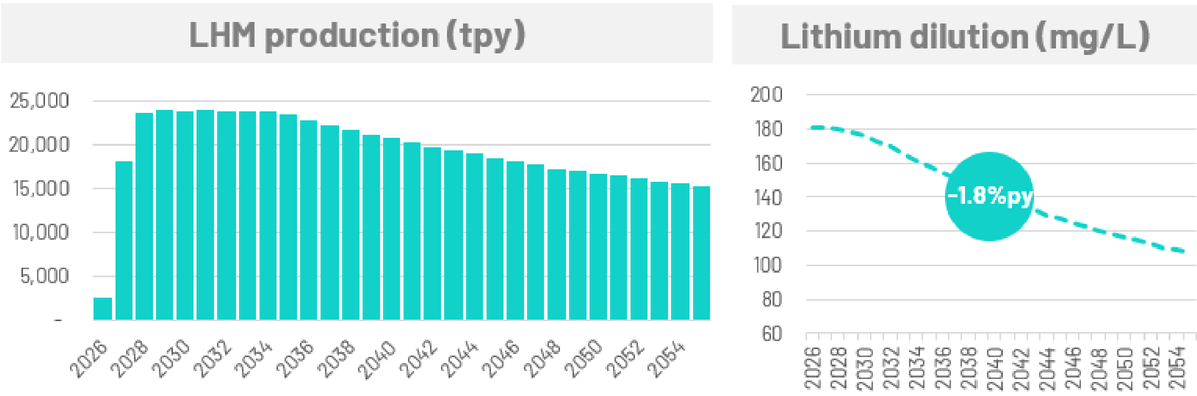


Figure 18 Base Case Lithium production forecast in LHM referenced to the CLP-outlet/sales point economic evaluation.

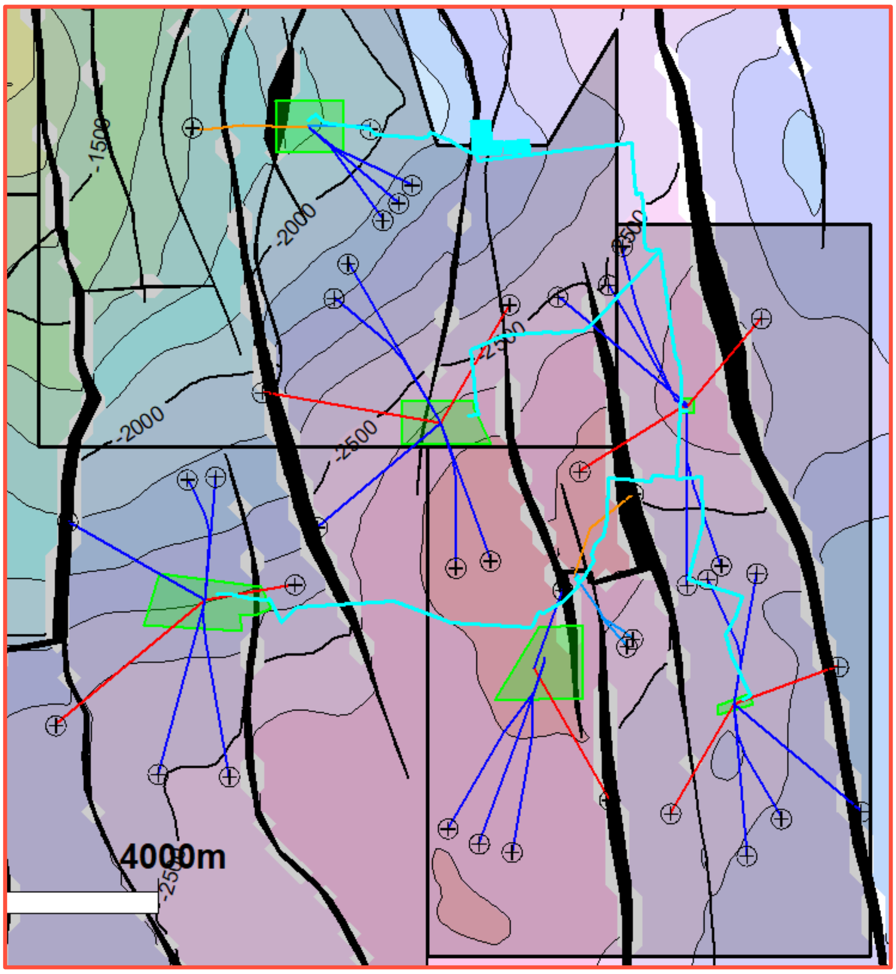


Figure 19 Revised FDP. Producers in red, injectors in blue. Includes existing production/re-injection wells.

Revised FDP summary

- **950 l/s** production target
- 24 new wells, 4 existing
- 11 producers (86l/s per producer)
- **Hybrid re-injection**
- Up to 70 bar pressure
- **20,000 tpy LHM production average**
- 7-year plateau at 23,900 tpy LHM
- 595kt[18] LHM production over project life

[18] *CLP-outlet as reference point*

The expected flow rate from each well is determined by geological characterisation and the dynamic flow modelling (Figure 18 and Figure 20), with maximum drawdown for producers and maximum injection pressures taken into consideration, and then optimised for lithium sweep. A 1:1 ratio of produced to injected fluid is assumed, as there is no water storage planned for the sites. This replacement of brine back to the reservoir allows for pressure maintenance and sweep effects.

There are a total of 11 production wells planned for Lionheart, which includes two existing operational production wells. A total of 17 injectors are planned including the 2 existing operational wells, and an addition of 12 side-tracks (Figure 21). The location and number of wells may vary as this plan is subject to change as the drilling progresses and more reservoir and fluid information becomes available.

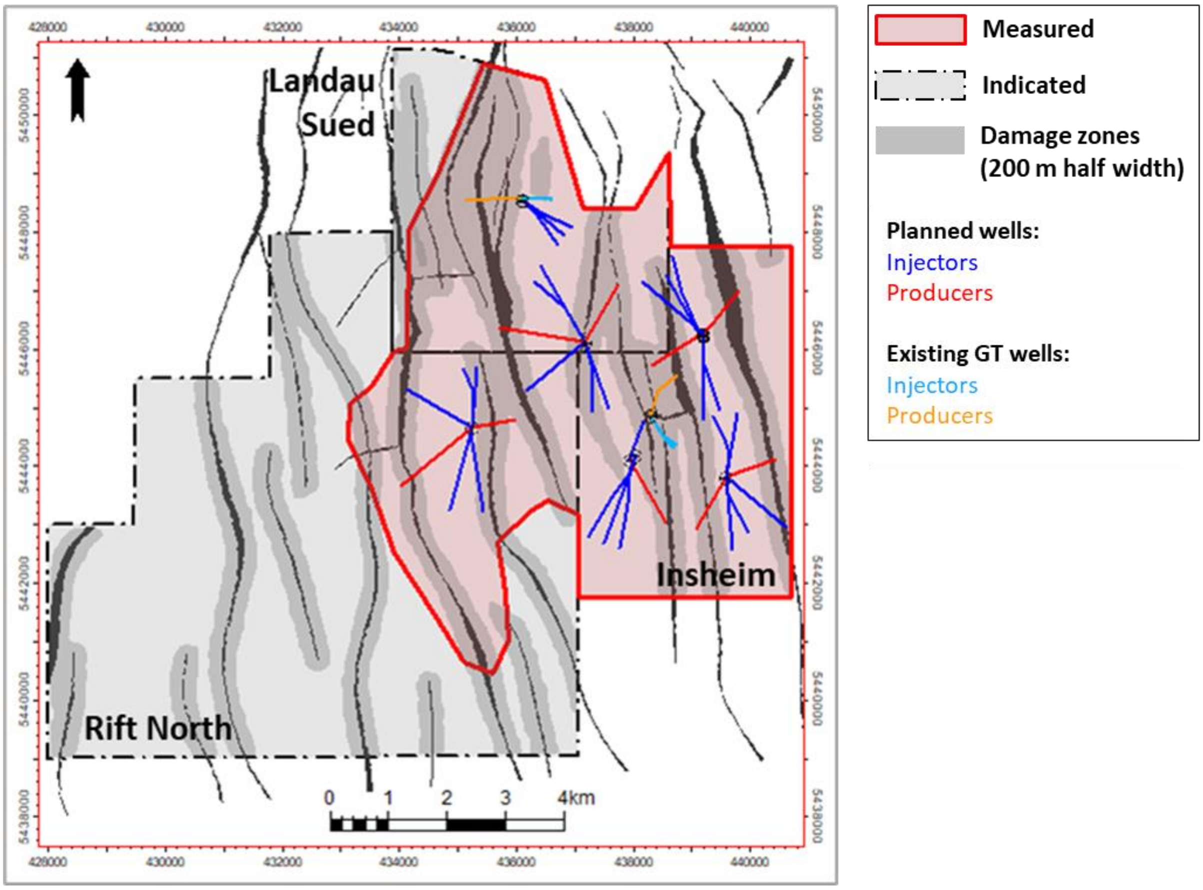


Figure 20 Lionheart Reservoir framework and planned well placement. Vulcan plans to use existing production wells and add new wells with the aim to achieve production/reinjection capacity of 950l/s – approx. 24,000tpa LHM equivalent at start of full production.

1.5.3 Ore Reserves

The Ore Reserves are reported on an area basis and comprise such quantities that are accountable to several licences. Phase One is Lionheart (Table 3Table 3) which comprises Ore Reserves from the Insheim, Landau-South, and Rift-North licences. The reference point for ore reserve booking is the wellhead or production manifold. As such it does not include the extraction recovery factor of the LEP which is 94% for a concentration of 181 mg/L production fluid and declines to 90% when reaching a concentration of 100 mg/L production fluid. A weighted average yield 93% for the 15-30 years production. As such, the CLP outlet lithium mass flow is about 93% of the lithium inflow into the LEP inlet.

The reference point is chosen to enable stakeholders to compare Ore Reserves with the respective Mineral Resources and to calculate the subsurface recovery factor and meets the requirements of the reference point definition of Ore Reserves in accordance with the JORC 2012 Code.

For Lionheart, the production forecast peaks at 24 kt/year LHM in 2028 and reaches a cumulative production of 318 kt LCE after 15 years and of 570 kt LCE after 30 years referenced to the well-head. The technical lithium recovery factor after 15 years of production is 17% and 30% after 30 years, which is estimated from the Measured Resource quantity of 2,112 kt LCE. For the estimation of Mineral Ore Reserves, at Lionheart where there are existing production wells, the cumulative production after 15 years of production is used to represent Proved Ore Reserves. For the estimation of Probable Ore Reserves, the cumulative production from Year 16 to Year 30 is used.28F[19]

The confidence in the Phase One Ore Reserve estimate has increased as compared to that reported for the DFS. The basis for the revision is due to multiple factors. The Phase One FDP has been optimised to one central location at Lionheart and now excludes Taro, which is planned for development in a future phase. The development at Lionheart has more wells with optimised placement, as de-risked by the 3D seismic and dynamic modelling, mentioned in previous sections of this report. Additionally, contribution from the Upper Buntsandstein and Basement have been considered, which were not included in the DFS Ore Reserves estimate.

INSHEIM, LANDAU SOUTH, AND RIFT NORTH		
Reserves Classification	**Lithium grade**	**Economic Reserves Quantity at Wellhead Reference Point**
	mg/l Li	kt LCE
Proved	181	318
Probable	181	252

Table 3 Phase One Ore Reserves. Note: see Competent Person Statement at the end of this document.

It is the opinion of the CP that methods utilised to estimate the Ore Reserves followed accepted industry practices and utilised a thorough approach. The geologic modelling that established the basis for the dynamic flow modelling was of high quality and utilised data from existing wells and 3D seismic data. The integration of the production behaviour from the existing geothermal wells helped to confirm the model assumptions.[20] Additionally, Vulcan deployed a fully probabilistic approach to the dynamic flow simulation and production forecasting. This iterative approach included testing of various reservoir geometries, well placements, dilution uncertainties and flow rates, and established a range of possible outcomes with the base case representing a reasonable expectation for lithium production for the Phase One project. The mining method utilised is widely accepted and proven for geothermal and hydrocarbon production with the utilisation of wells for lithium brine production to

[19] Phase 2 Reserves currently not updated since 2021 PFS, to be updated during Phase 2 feasibility studies.

[20] To be read in conjunction with Production Target Material Assumptions and Parameters on page 133.

surface. The drill spacing is defined by the dynamic flow models and has been optimised for efficient brine recovery.

The Ore Reserve estimation method established and used for the Vulcan Zero Carbon Lithium™ Project took into consideration the nature of this type of lithium brine recovery from geothermal wells. Consideration was given to reserve estimation methods used for the oil and gas industry from similar reservoirs. Due to the reservoir being an open and active recharging system, there are differences that were accounted for in the decision to define the Ore Reserves based on the number of years of cumulative lithium production. This represents a probabilistic approach where a high level of certainty is associated with the likelihood of producing the Proved Ore Reserves quantity economically near existing production wells, per JORC requirements. The estimation of Probable Ore Reserves followed a similar test of uncertainty, and the cumulative lithium production after 30 years is believed to be a reasonable representation of what is economically recoverable with applied modifying factors. The modifying factors include the well network design, pilot testing of metallurgical processes, surface facility and infrastructure design, marketing contracts and pricing study, regulatory permitting process, and economic analysis that shows the project is viable.

1.6 Well Sites and Interconnecting Pipeline & Power (ICPP)

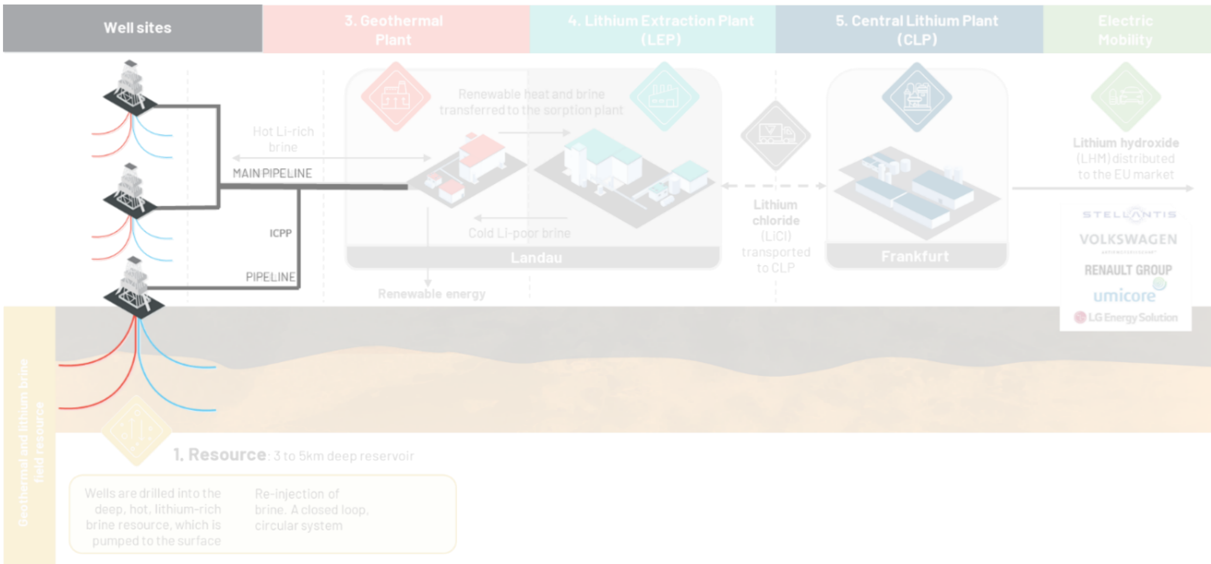


Figure 21 Step 2 well site and piping system to Geothermal infrastructure.

1.6.1 Well Sites

1.6.1.1 Scope

The well sites are handled internally according to the self-delivery model. More specifically, the well sites are the responsibility of the Vulcan entities. The scope of work for the well sites includes all five sites to be newly developed as well as the existing well sites in Insheim and Landau. The well sites to be newly developed are basically identical in terms of process technology. They only differ in the number of production and injection wells and the different parameters.

1.6.1.2 Process

The brine is extracted with one Line Shaft Pump (LSP) per production well. The pump drive and all electrical components are located at the surface. Compared to Electrical Submersible Pumps (ESP), in which the motor is located in the well, LSPs are a more cost-effective variant with significant maintenance advantages. The brine is pumped upwards by the centrifugal forces developed through rotating impellers connected in series, which are driven by the motor above the borehole. The multi-stage design of the impellers provides the necessary pressure to overcome the flow resistances and the geostatic height. The pipeline pump station increases the pressure to the extent necessary to transport the brine to the lithium extraction plant. The individual well sites differ primarily in terms of the mass flows produced and the temperature of the brine.

Inhibitors are added to the brine before the brine stream enters the interconnecting pipelines system. Corrosion and scaling inhibitors are used to inhibit corrosion and to minimise mineral deposits. Scaling describes the binding of mineral deposits in pipelines or on other components of a geothermal system. The deposits are primarily dependent on the chemical composition of the brine, whereby these properties are very Project-specific and can vary from site to site. Scaling affects almost all geothermal Projects, but to varying degrees and at different points within the system.

At a constant temperature, the brine is fed as a common mass flow through the thermally insulated above-ground piping system to the prefilter station. There, particles are filtered out of the brine that could hinder the process and damage the components. During the first hours of operation, an increased load of particles to be filtered is expected, this decreases during operation. Like the other main components, the filter station has a redundant implementation. All redundancies of the plant are designed for 100 %, i.e., the mass flows can be diverted not only proportionally, but completely through an identical parallel train. This significantly increases the system availability. The higher investment costs are compensated for by the low operating costs and increased availability. The redundant design of the filters is, for example, necessary for a filter change so that the brine can be pumped without interruption and the system availability is guaranteed continuously. Whether the filter needs to be changed is determined by measuring the differential pressure upstream and downstream of the filter installation. At the prefilter station there is also a nitrogen supply line, which is necessary for the batch process of a filter change, as well as a drain required for this. The brine that runs off during a filter change is fed into the brine pond.

After filtration, the brine is routed to the industrial water cycle heat exchanger. There are shell and tube heat exchangers installed at each well site which are responsible for the heat transfer between brine and industrial water. Due to their design, shell and tube heat exchangers require less maintenance than plate heat exchangers and are particularly suitable for large mass flows with acceptable pressure loss. The disadvantage is a somewhat more inefficient heat transfer. In the industrial water cycle heat exchanger, the energy transfer between the brine (primary circuit) and the industrial water (secondary circuit) takes place via the shell and tube heat exchanger. After the heat transfer, the brine, which is significantly cooled at that point, is sent to the pump station. A centrifugal pump ensures the necessary pressure in the pumping station so that the brine can cover the distance to the LEP at the desired pressure. From the ORC, the cool industrial water arrives at the heat exchanger. After energy transfer, the reheated industrial water is routed via a pipeline pump station and its centrifugal pump to the steam generation plant at LEP. A bypass is installed around the industrial water cycle heat exchanger, which allows all brine to bypass the heat conductor in the event of maintenance work in this area. Like all bypasses, it optimises the flexibility of the plant and therefore increases operational reliability.

A central bypass is located on the brine pipe, between the heat exchanger and the brine pump station. This bypass leads via a separator into a brine pond and is mainly needed during start-up operation of the plant. Besides that, the bypass can also be used to avoid a shutdown of the LSPs in case of a (partial) system failure in other parts of the system (e.g., brine pipeline). In this case, the brine is routed past the heat exchanger via the separator and the brine basin, as in the case of plant start-up. Alternatively, the brine can also be routed through the heat exchanger. Due to the resulting cooling, routing via the pond is not necessary. In this case, the bypass of the separator is used directly for the injection pipe. During regular operation of the entire system, the bypass is offline.

Both during regular operation and during diversion via the bypass, the brine is routed through an injection filter station (redundantly designed). Compared to the filter stations already explained, this differs only in the modified mesh size of the filter inserts, as the serial connection of the production and injection filters also allows smaller particles to be removed from the brine. This filter system is also intended to prevent particle deposits to avoid pressure losses on the one hand and to protect the injection wells from clogging on the other.

After filtration, the redundant injection pumps increase the pressure as needed to return the brine to the reservoir. The power consumption of the injection pump depends primarily on the performance of the injection well and can vary for each well site.

1.6.1.3 Layout & Civil

The sites to be newly developed are identically structured. There are only very minor deviations between the well sites, such as a specific access and exit to the well site that is adapted to the respective local conditions. The only significant difference is the number of production and injection wells. Thus, in the following, a standardized well site layout (Figure 22) is presented and explained. The remarks can be transferred to all sites with the limitations described above.

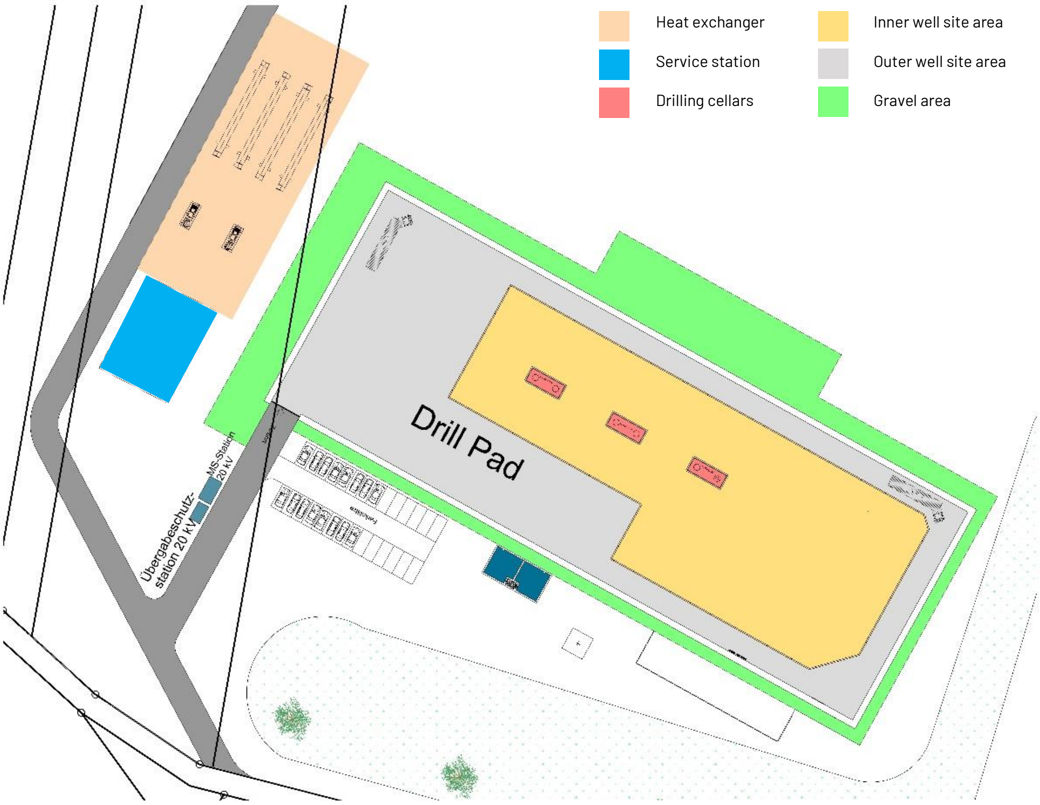


Figure 22 Standardised north aligned layout overview of a well site.

The well sites will be developed according to the stability of the subsoil and in accordance with the guideline "Design of the well site 08/06" of the German Federal Association for Natural Gas, Petroleum and Geoenergy (Bundesverband Erdgas, Erdöl und Geoenergie: BVEG). Each well site is divided into an inner and an outer well site area and surrounded by a gravel area. When designing the well site, it must be ensured that, in addition to the access/exit, every point on the drilling site is accessible through escape and rescue routes.

The inner well site area contains the drilling rig, the tank farm, and the blending plant as well as all units belonging to the solids control and drilling mud system (mud tanks, centrifuges, desanders, desilters, etc.). In addition, mud pumps, a closing system, emergency generators, a diesel tank for emergency supply, a storage area for mud materials, cement silos and a storage area for lubricants are in the inner well site area. For reasons of environmental protection and in particular water pollution control, this area will be designed in such a way that no liquids hazardous to water can penetrate the ground. The entire inner area will be designed as an asphalted surface. Construction with liquid-proof asphalt is planned.

The inner drilling site area will be 10 cm deeper than the bypass (outer area). At the transition to the outer area, the surface is sloped inwards to ensure access. This ensures that no liquids and water can flow from the inner area into the outer area. This prevents substances and liquids from penetrating into the soil below. The inner area also has a separate drainage system. All rainwater is drained off via street inlets and collected in a retention or buffer tank.

The outer well site area contains the test water tanks, retention basin for the drainage of the inner area, containers for the service companies as well as workshop, storage, magazine, and office containers. Furthermore, sanitary, changing and tool pusher containers will be placed there.

In the outer area, consumables are stored in other storage areas. Water-polluting substances are not stored in the outer area. The drilling cellars will be constructed in waterproof concrete. Here, the respective sites differ regarding the planned number of boreholes. With the construction of the well site, the standpipes will be set to a depth of approx. 60 m, dependent on the geological conditions and cemented to the surface. Sufficient lighting of the well site will be provided for night operations. At the top of the mast, the drilling rig will be equipped with an air traffic control light. Every site will also house one technical building as well as a transformer station.

1.6.1.4 Electrical

The high voltage power received from the grid is transformed to lower voltage levels using transformers. The different parts of the facility are supplied with power, including the use of redundant design and individual fuse protection for each component. Additionally, the facility can be disconnected from the grid at different points in the distribution system using circuit breakers.

In Insheim and Landau, a medium-voltage line leads to the geothermal plant site. Since the plant is already in operation, the focus is on supplying power to the components responsible for transporting the brine. The plant's power needs are met by transforming the voltage to lower levels and distributing it to various components. Safety measures such as circuit breakers and back-up fuses are in place.

1.6.2 Interconnecting Pipeline and Power network (ICPP)

The Lionheart Project development is characterised by the fact that brine is produced at geologically optimised drilling and extraction sites and the lithium extraction process is efficiently centralised in one plant. This decentralised Project structure results in special requirements for the transport logistics from the well sites to the Lithium Extraction Plant (LEP), from raw material suppliers to the LEP. Vulcan has decided to solve the logistics between the well sites and the LEP by means of an Interconnecting Pipeline & Power (ICPP) system.

1.6.2.1 General Brine Transportation Consideration

As described above Vulcan has decided to use a pipeline system to transport the lithium-rich brine from the well sites to the central LEP and to transport it back to the well sites for re-injection of the lithium-poor brine.

Additionally, Vulcan has decided to transfer the geothermal heat energy at the well sites from the brine to an industrial water circuit to minimise the risks relating to transporting hot brine. Design and material selection of the pipelines must be such that meets all pipeline regulatory standards.

Industrial water is water that has been desalinated and de-ionized to minimise corrosion issues with the related pipelines. The industrial water circuit is used to supply the centralized plants with heat energy. For this purpose, part of the thermal energy is transferred from brine to the industrial water circuit at the well sites using heat exchangers. The warm industrial water is then transported and used for steam, heat, and electrical power generation. With these processes the heat is being removed from industrial water, which is returned to the well sites in a second return pipeline. The result is a closed cycle.

Besides using a pipeline system for brine and heat transportation the pipeline ditch will also be used to establish a power and data distribution network. Above the pipeline cover and within the pipeline ditch itself will be run 20kV and data network wiring from the centralized LEP plant to the individual well sites. The idea is to provide self-generated electricity to the well sites and to tie in the well sites into the overall production control system.

1.6.2.2 Pipeline Route

The Lionheart ICPP system consists of 7 pipeline Sections and the main hub back at the combined LEP & ORC (known as GLEP) site.

The entire Pipeline system and its diameters of the industrial heating and the brine pipeline are normalized into two sizes to reduce complexity and therefore simplify the project execution and to reduce the number of pigging stations.

1.6.2.3 Technical Description

Besides the pipelines themselves the main elements are the merging, input, and output civil structures, which control the flow of brine and industrial water circuit in the pipeline system.

Per pipeline Section there are gate valves dependent on the pigging and maintenance concept of each section. This means that corresponding underground structures are created at the pipeline's joining points. These shaft structures are built according to the site specific structural and operational requirements of the individual Sections. They are used for ventilation, draining, control and cleaning, adaptation to changes in direction, cross-Section, and gradient. They are also used as crossing, inlet & outlet, joining and gate valve structures. The manholes consist of prefabricated concrete elements in various diameters or cross-Sections and construction heights. They are additionally equipped with access aids. Each merging point contains the gate valves for each inlet and outlet and the associated fittings. This also includes the electric actuators including their position monitoring. In addition, pressure, temperature, and flow sensors are integrated for monitoring and control, as well as a control cabinet with the Section control. Each Section is equipped with a wired leakage monitoring system, which is also integrated in the downstream connection point of the respective Section. A fibre optic cables network connects all Section controls with the main control room in the G-LEP operating building. All Sections are centrally monitored and controlled from the respective main control room.

1.6.2.4 Industrial Water Cycle

The transport of geothermal energy requires that the planned industrial water pipeline is filled with water of sufficient quality. For this purpose, a well for the use of fresh groundwater is planned on the site of the geothermal power plant. Since the industrial water is cycled between well sites and the geothermal plant, there is no need to continuously extract ground water to produce industrial water. Rather, the amount needed is defined by the volume of the two pipelines plus all auxiliary components. Based on the pipeline system planned, Vulcan expects a minor amount of ground water during production to make up for losses in the system. To achieve the required industrial water quality, the groundwater needs to be desalinated and/or softened by means of a mobile water treatment unit.

1.7 Lithium Extraction

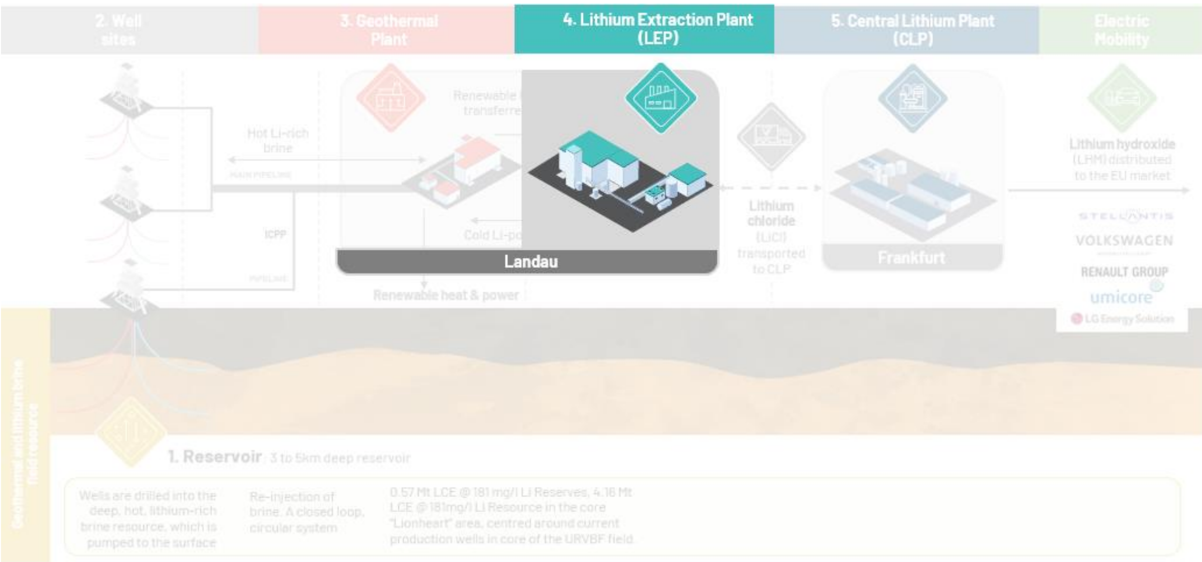


Figure 23 Phase One Lithium Extraction Plant.

Vulcan is building a Lithium Extraction Plant (LEP) (Figure 23) for Phase One, with capacity for production of 24,000 tonnes per annum LHM-equivalent of lithium chloride concentrate. This LEP will be located on the same site as the geothermal heat and power plant. Combined, these two plants are referred to as the G-LEP.

The cooled brine from the ICPP is received at the LEP where it is sent to the Adsorption-type Direct Lithium Extraction (A-DLE) system. Lithium chloride (LiCl) is recovered from the brine on a selective alumina-based sorbent and then purified and concentrated. The concentrated LiCl is then transferred to the Central Lithium Plant (CLP) for conversion to lithium hydroxide monohydrate (LHM). Vulcan has conducted extensive mineral processing and metallurgical testing to support the Zero Carbon Lithium™ Project, including internal operation of multiple pilot plants. The lithium extraction technology planned for use in the Project, A-DLE, is already commercially proven, and makes up 10% of global lithium production today.

State of the industry – current A-DLE production and supply growth

Around 60% of lithium production today comes from hard rock sources, and 40% from brines. Of the brines, around a quarter comes from Adsorption-type Direct Lithium Extraction (A-DLE) projects, which represents 10% of total global production[21] (Figure 24 and Figure 25). This share of the global

[21] Fastmarkets 2023-2033 DLE Forecast and Goldman Sachs https://www.goldmansachs.com/intelligence/pages/gs-research/direct-lithium-extraction/report.pdf

lithium supply chain is set to grow to 15% according to Fastmarkets, due to its sustainability, cost, speed, and quality advantages over legacy methods[22].

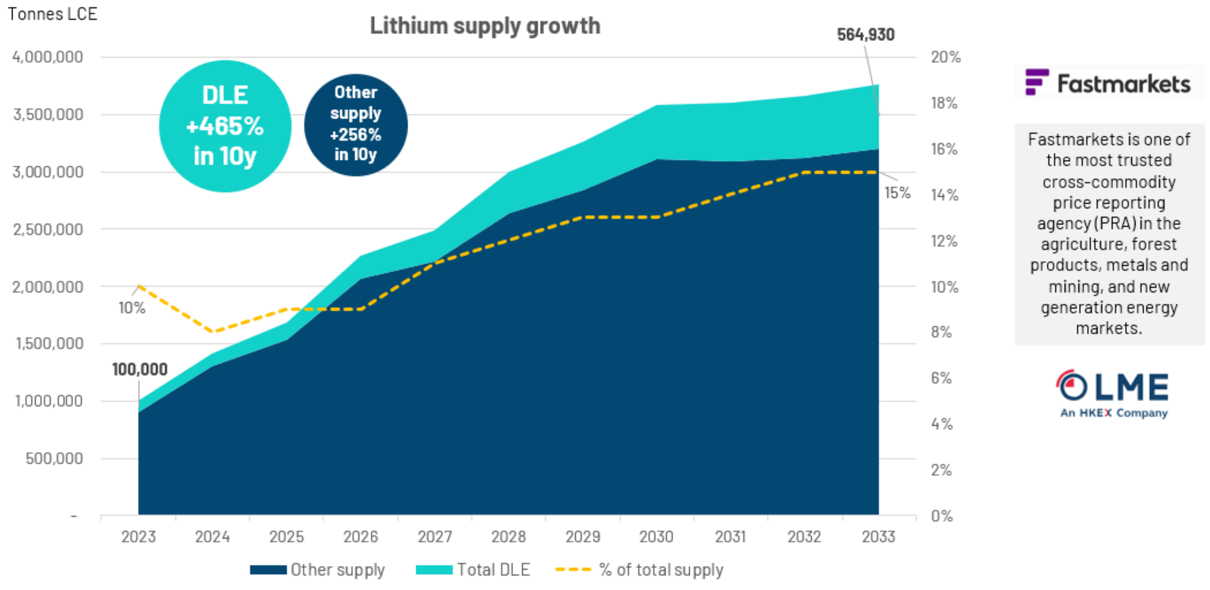


Figure 24 Lithium supply growth with DLE projection.

Advantages of Adsorption-type Direct Lithium extraction (A-DLE)

Track record

- Global, multi-decade commercial precedent in the lithium industry.

Low operating cost

- Water is used to recover the lithium from the sorbent – no acid requirement means lower operating cost and less waste.
- Requires heat to work, so lowers operating cost and saves energy when applied to naturally heated sub-surface brines.

Reduces environmental impact

- Highly selective for Li with >90% extraction efficiency, reduces or removes the need for legacy-method large scale evaporation ponds.
- Salinity/heat and water driven process, reduces/removes the need for large quantities of chemical reagents used in legacy lithium production methods.

Product quality

- Produces very pure product relative to hard rock and evaporative lithium, an advantage in the battery electric vehicle industry, which has very high product quality standards.

[22] Fastmarkets 2023-2033 DLE Forecast

A-DLE used commercially to produce lithium since 1996, rapidly increasing production[23]

- Livent, formerly FMC, and a global Top 3 lithium producer, has used A-DLE in its commercial lithium operations in Argentina for >25 years. Now increasing production by over 400% in the second half of this decade.
- Growth of five new Chinese producers in late 2010s, when lithium market started to grow linked to EVs: **Lanke Lithium, Zangge Mining, Jintai Lithium, Minmetals Salt Lake, Jwell New Materials**.

New players entering the market in '24-'26, including from the mining industry

- French company **Eramet** (market capitalisation ~ EUR 2.5 billion) is commissioning an adsorption-type DLE project in Argentina for a 24,000 tpa LCE capacity, using a proprietary alumina-based adsorbent. The first tonnes of production are slated for 2024.
- In Europe, dual Australian and Frankfurt-listed **Vulcan Energy** has been developing its Zero Carbon Lithium™ Project since 2018 and is now ready to move into the execution phase, using its own, proprietary alumina-based adsorbent, with 24,000 tpa LCE capacity for Phase One.
- Australian company **Rio Tinto** (market capitalisation ~ A$167 billion) moving into the construction phase of a lithium adsorption project in Argentina, Rincon, using a proprietary adsorbent, having conducted pilot testwork since acquiring the project in 2022 for US$825m.
- **SQM** announced that it plans to spend $1.5 billion on desalination and DLE to improve lithium production in Chile. The project would help increase lithium production capacity by more than 60% from 2021 levels, the company says.

- **Albemarle** has also announced that it is entering the DLE space, starting in Arkansas from existing bromine operations.

- **Exxon Mobil** has recently announced it will start its first DLE plant, building a first phase 10,000 metric tonnes per year of lithium in Arkansas by 2026 with partner Tetra Technologies in what has been labeled "Project Evergreen".

[23] *[https://livent.com/wp-content/uploads/2023/07/Livent_2022_SustainabilityReport_English.pdf] Market capitalization is calculated as ~4.1B US$ at 09/08/2023*

[https://www.eramet.com/en/eramine-world-class-lithium-production-project] Market capitalization is calculated as ~2.2B € at 09/08/2023
[https://www.investi.com.au/api/announcements/vul/e617fca6-6d4.pdf] Market capitalization is calculated as ~660m A$ at 09/08/2023
[https://www.compassminerals.com/what-we-do/lithium] Market capitalization is calculated as ~ 1.59B US$ at 09/08/2023
[https://www.riotinto.com/news/releases/2022/Rio-Tinto-completes-acquisition-of-Rincon-lithium-project] Market capitalization is calculated as ~162.36B A$ at 09/08/2023
[https://cen.acs.org/energy/energy-storage-/Lithium-firms-hope-direct-extraction/100/web/2022/12] Market capitalization is calculated as ~ 18.9B US$ $ at 09/08/2023
[https://www.reuters.com/markets/commodities/albemarle-jumps-into-global-race-reinvent-lithium-production-2023-08-03/] Market capitalization is calculated as ~ 22.96B US$ $ at 09/08/2023

Examples of Commercial A-DLE Plants

Figure 25 Examples of commercial A-DLE Plants.

In-house A-DLE intellectual property

During project development, Vulcan has tested a series of commercially available sorbents in its pilot plants. Based on test results achieved, the development team decided to use a sorbent with lithium aluminate intercalate structure for Vulcan's A-DLE process. Vulcan also developed its own proprietary sorbent, VULSORB® (Figure 26), which is synthesised via a scalable 3–step process.

VULSORB® belongs to a lithium extraction adsorbent family that has been used by different companies in multiple production assets over the past 25 years. Based on Vulcan's test work on its Upper Rhine Valley brine, VULSORB® offers higher lithium extraction capacity than other sorbents. VULSORB® can be used with other brines, both in Europe and globally. In addition, Vulcan has built up extensive application and analytical know-how for the use of VULSORB® in the A-DLE process.

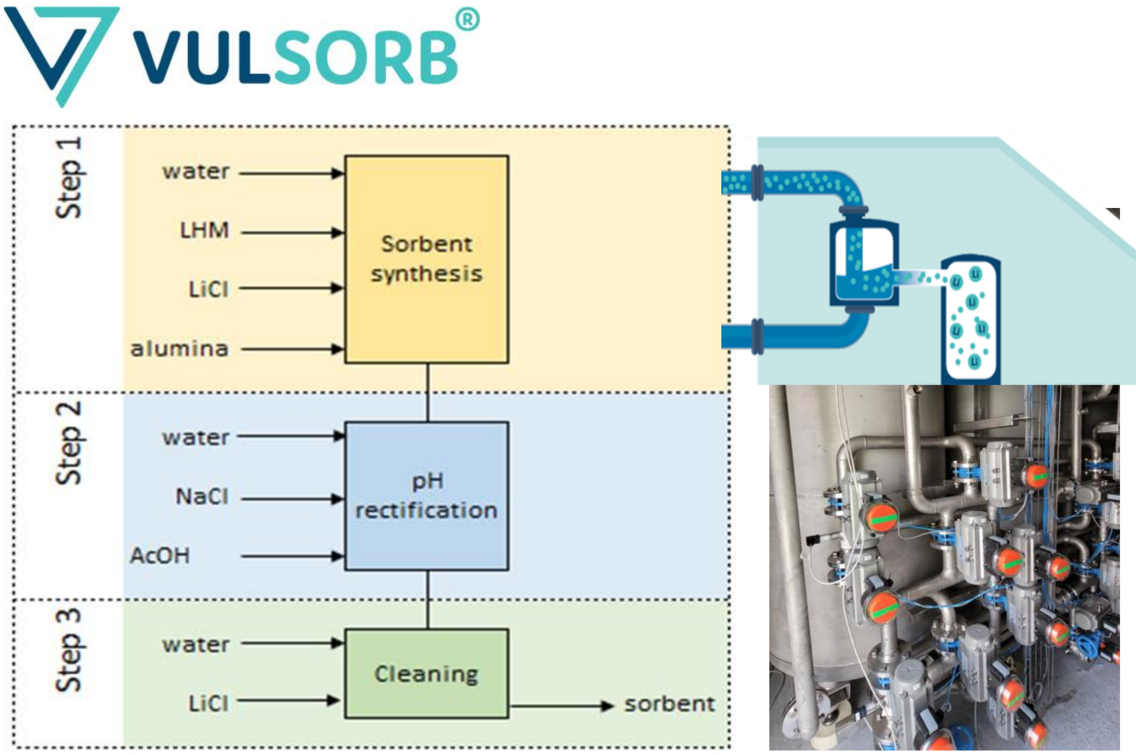


Figure 26 Vulcan's proprietary sorbent for A-DLE operation.

The technology was initially selected in scoping work during 2018-2020. There followed three years of in-house laboratory testwork (Figure 27) successfully completed during 2021-2023 at Vulcan's in-house laboratories. In doing so, the technology was de-risked on Vulcan's brine chemistry (i.e., salinity, Li content, chemical composition, temperature) at multiple well sites, in a "live" operating environment.

Pilot Plant "PP1" has been operational since spring '21. Lithium hydroxide "better than battery grade" was already produced as early as Q4 2021 from this work. Since then, 5000+ cycles in 2½ years of stable, non-stop operation have been produced, which crucially show that these types of sorbents do not meaningfully degrade over a long period. A second, larger Pilot Plant "P1A" has also been in operation since fall '22, with a total of 2000+ cycles of operation. This plant has demonstrated improvements in the process, including pressurising the system and removing the pre- and post-treatment steps.

Data from pilot plants has been used to optimise and complete the engineering design for the Definitive Feasibility Study and latterly the Bridging Engineering Study.

VULSORB® performance was stable for more than >2000 A-DLE cycles with geothermal brine at 60 to 75 °C and 18 barg, as well as at atmospheric pressure, with a lithium extraction efficiency of >90%. Further recent optimisations have included modification of flow distributor in the column, reduction of dead volume of liquid, optimised activation of VULSORB®, among others. This has resulted in increased sorbent capacity of ~2400 mg Li/l of sorbent, and improved eluate quality. Vulcan is now ready to move into execution, construction, and operation of the commercial plant, designated the LEP.

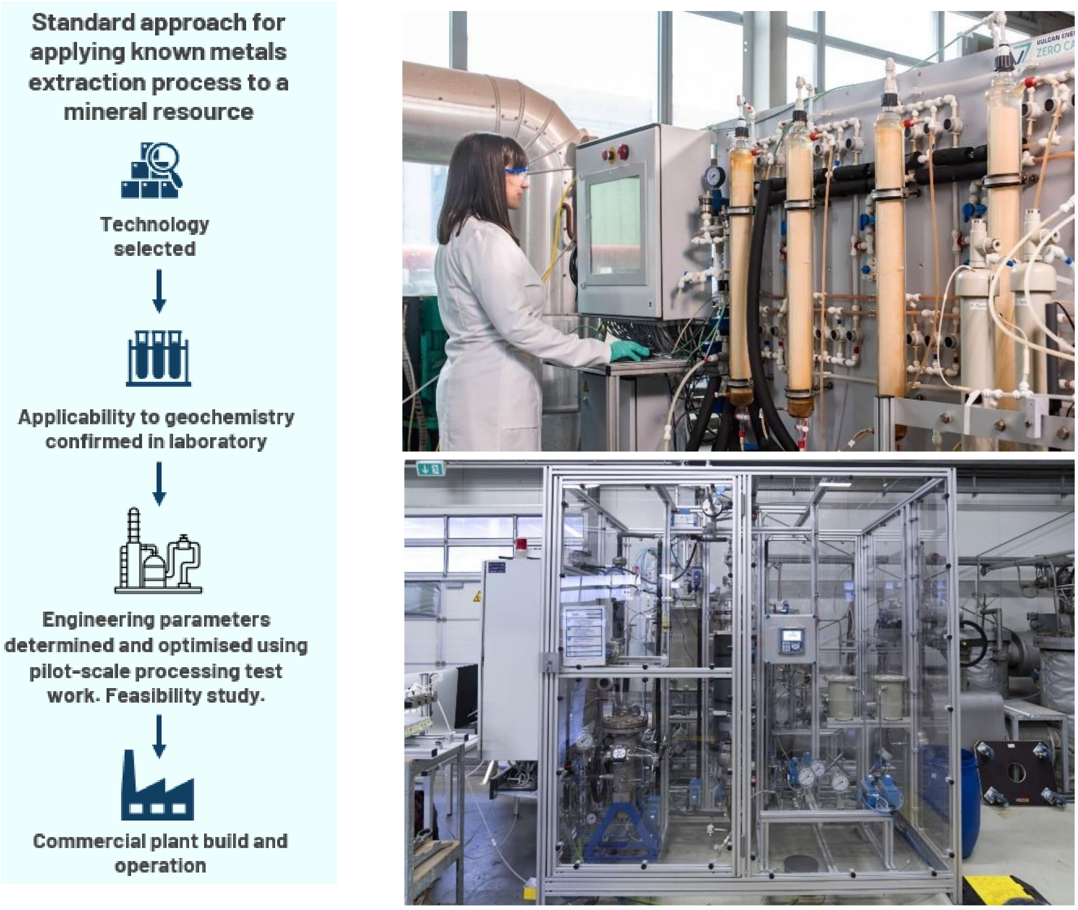


Figure 27 Our activities to de-risk A-DLE on Upper Rhine Valley brine.

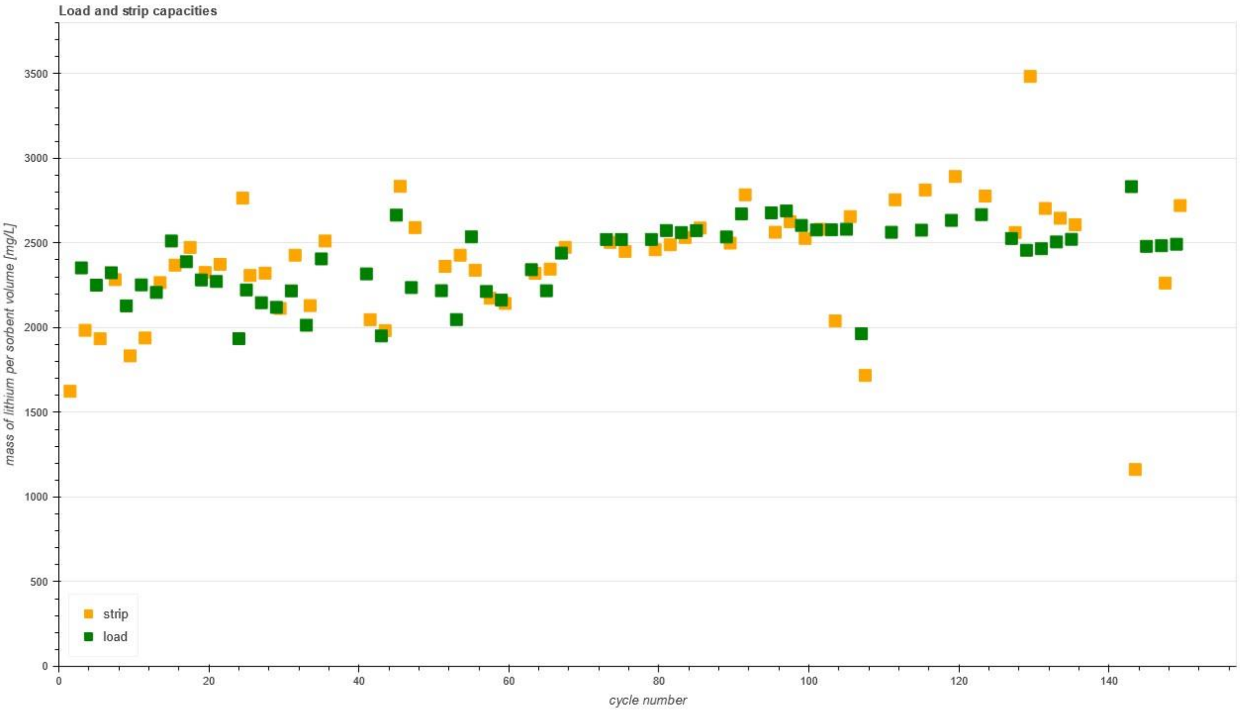


Figure 28 Load (sorption, green) and strip (desorption, yellow) capacities of current VULSORB® campaign at P1A (geothermal plant pressure, no pre-treatment) with improved parameters and set-up.

Stable performance in both pilot plants, continuous optimisation and improvements

Lithium Extraction Optimisation plant (LEOP) in Landau provides lithium chloride solution to make battery grade LHM at CLEOP.

- In-house designed **Lithium Extraction Optimisation Plant (LEOP) (Figure 29) in final stages of commissioning**. Combined with CLEOP, this represents a ca. €50m investment by the Company**: an optimisation, operational training and product qualification facility to enable commercial operational readiness.**
- LEOP built to start sending significant volume of product (i.e., LiCl solution) to Central Lithium Electrolysis Optimisation Plant (CLEOP) to make Battery Grade LHM.
- Once operational, this plant is anticipated to produce the first tonnes of domestically produced lithium chemicals in Europe.

Figure 29 Vulcan's Lithium Extraction Optimisation Plant (LEOP).

Phase One: Commercial Lithium Extraction Plant (LEP) ready to move into execution

The Phase One Commercial scale LEP will be constructed next to the new Phase One Geothermal Plant in Landau at the G-LEP site. The main function of the LEP is receive lithium rich brine from the wells and extract lithium via Adsorption-type Direct Lithium Extraction which creates a rich LiCl eluate product which continues to be processed and purified to remove key impurities such as calcium, magnesium, boron and silica, before being concentrated via evaporators / crystallizers to a final 36 wt% LiCl product which will be transported to the CLP at Industrial Park Höchst in Frankfurt for further conversion to LHM, as shown in the figure below. The depleted brine that exits the A-DLE will then be pumped back to the well sites where it will be re-injected into the reservoirs like a standard geothermal operation.

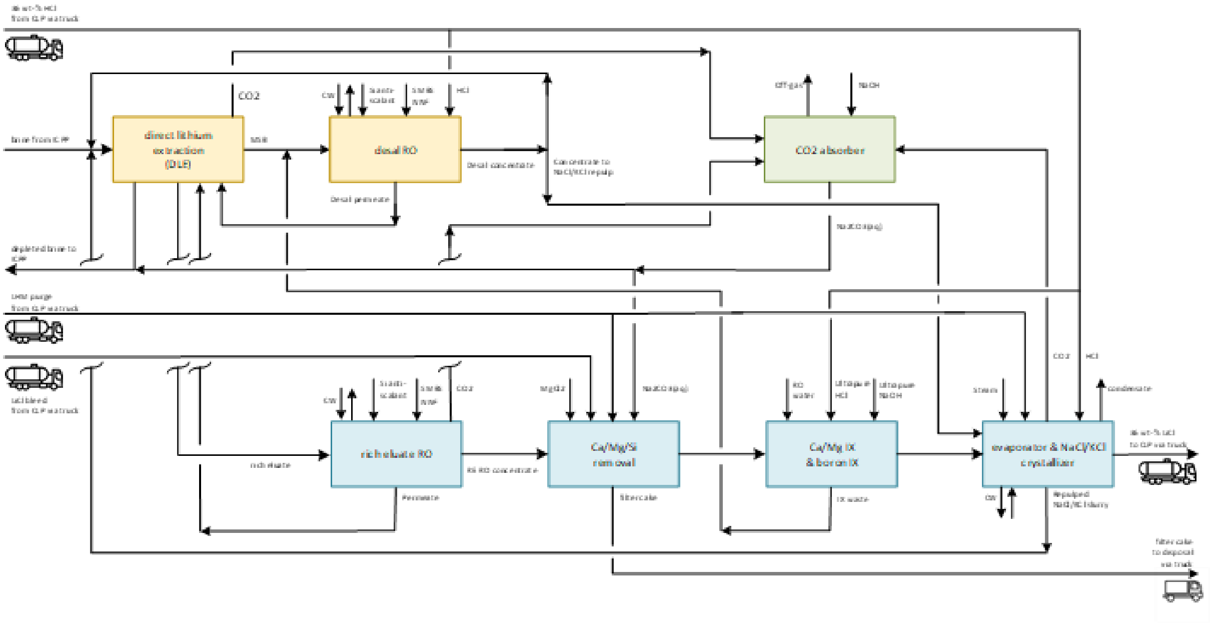


Figure 30 Block process Vulcan's Commercial Lithium Extraction Plant (LEP).

Major units: A-DLE system, RO systems, IX systems, evaporator/crystallizer, BOP

The overall LEP process (Figure 30) (which includes all balance of plant items) is highly integrated with closed loop, minimal energy demand and small waste streams. The LEP also acts as the heart of the upstream Lionheart development and the central control room is situated at the LEP, which will control the integrated upstream process from well to LEP & ORC and return.

The Bridging Study has realised a number of value improvements and simplifications from the DFS phase, mainly moving from two different size LEPs (8 ktpa plant at Taro development area and 16 ktpa plant at Lionheart development area) to one larger LEP at Lionheart which targets capacity of 24,000tpa LHM equivalent in LiCl form. This change has not seen any change to scaling of equipment and has only seen more multiplication of key equipment, while realising major economies of scale benefits.

There have also been other value improvements relating to the number of buildings at the site, seeing more equipment moved externally and providing simpler construction methods and ultimately simpler operation and maintenance.

These improvements, especially the economies of scale-related changes, have seen the LEP reduce in CAPEX by nearly €150m, and overall de-risked and simplified the construction and operational phases.

The project definition has progressed significantly during the Bridging phase and meets Class 2 AACE cost estimate accuracy, which has been used to finalise selection of EPCM contractors ready for award in Q1 2024.

Most if not all equipment and packages have now been engineered and sent to the market through request for proposal (RFP) and all package costs have been included as part of the update Bridging phase estimate. Some opportunities remain in the procurement of key packages as Vulcan looks to bundle key packages and award frame agreements to key suppliers to support the integrated Phase One project.

The building permit for the LEP has already been submitted to the authorities in November 2023, in line with Vulcan's timeline.

Vulcan is targeting start of production of the Phase One LEP (Figure 31) in H2 '26. The financing timeline and therefore execution timeline has been adjusted to align with public funding schemes which Vulcan is applying for.

Figure 31 Vulcan's Commercial Lithium Extraction Plant (LEP).

1.8 Lithium Conversion

The final step in the Vulcan Zero Carbon Lithium™ process is the conversion of lithium chloride concentrate to a battery grade lithium hydroxide monohydrate (LHM). This step will occur at Vulcan's Central Lithium Plant (CLP) (Figure 32 and Figure 33), which will be built at Industrial Park Höchst near Frankfurt for sale to market. This process utilizes electrolysis and crystallization for the conversion. These are proven technologies for other chemical products and have been tested for Vulcan using its own pilot plant lithium chloride product, and by Vulcan's technology partner NESI using commercial scale cells. In 2022, samples of LiCl concentrate were tested and converted by Electrosynthesis Co.

Inc through further concentration, purification and then conversion into lithium hydroxide monohydrate via electrolysis and crystallization.

Similarly, to LEOP, an Optimisation Plant for the CLP (designated CLEOP) is anticipated to be operational from Q1 ’24 for the LiCl to LHM process named CLEOP is anticipated to also be operational in early 2024 for the same purpose: **an optimisation, operational training, and product qualification facility to enable commercial operational readiness.**

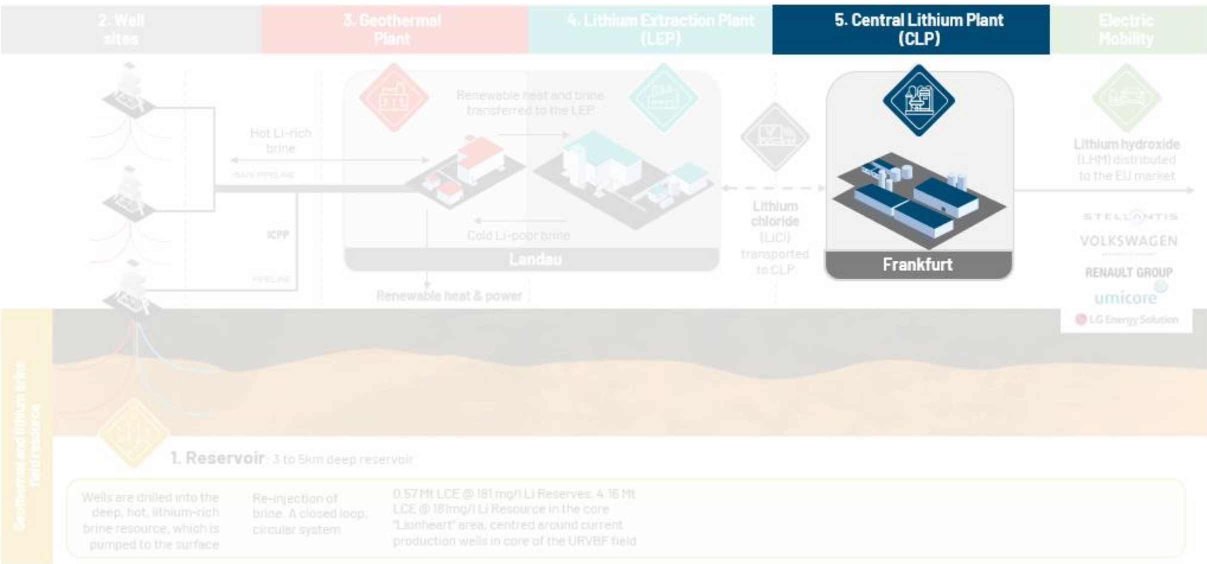


Figure 32 Phase One project Central Lithium Plant.

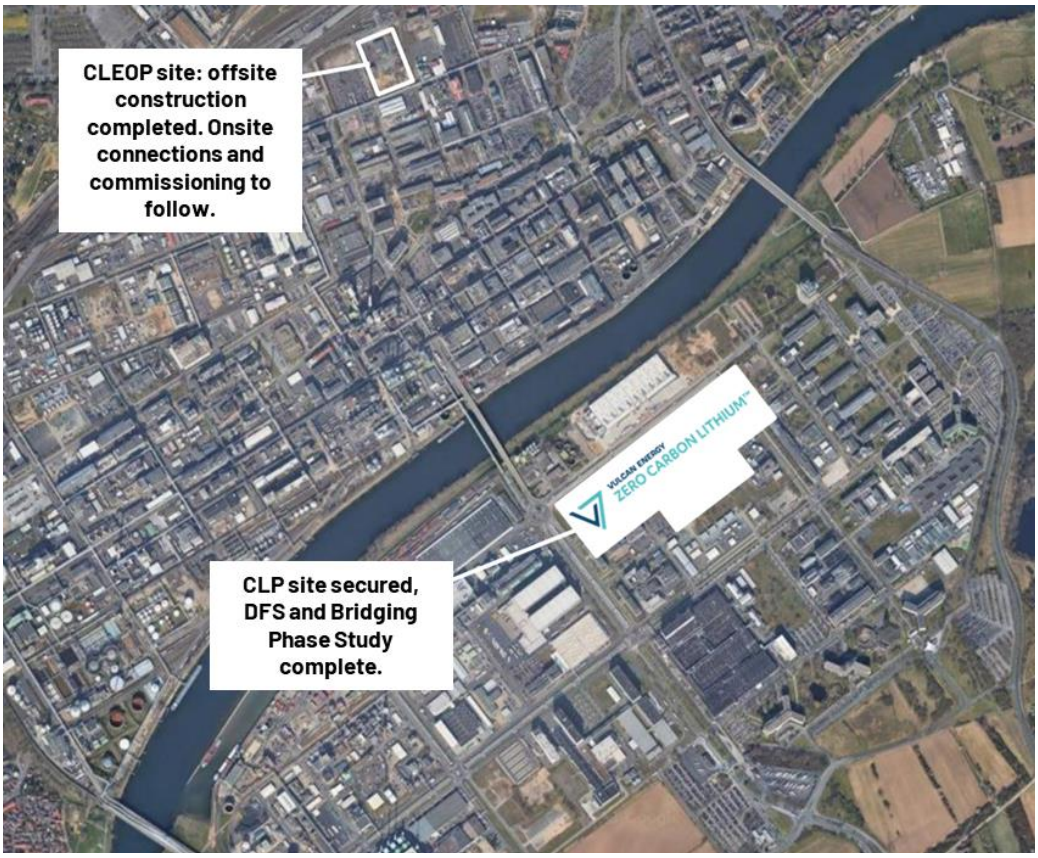


Figure 33 Hoechst Industrial Park, CLEOP and CLP sites.

Lithium conversion: proven, sustainable methods, strong partners

Proven chlor-alkali type process, sustainable inputs, no fossil fuels

- Vulcan will use the electrolysis process (Figure 34) to convert lithium chloride into lithium hydroxide. Electrolysis produces a very pure lithium hydroxide product, important for battery EV industry. The main input is green power, in contrast to legacy methods which use large quantities of reagents and fossil fuels.
- This is similar to the **well-known chlor-alkali process used for >100 years** to produce caustic soda (sodium hydroxide) from sodium chloride, since the cells for lithium chloride electrolysis are the same.
- Chlor-alkali electrolysis process: there are **36 active plants in Germany**, c. 5.4Mt chlorine production capacity, of which 3.4Mt is using the exact same membrane technology as Vulcan.
- Vulcan is working closely with NORAM, lithium chloride electrolysis experts in charge of detailed engineering.
- NORAM brings their extensive experience of testing production of lithium hydroxide from lithium chloride through electrolysis.
- **Testwork** with Electrosynthesis (partly owned by NORAM) **completed,** better than battery grade specification LHM **successfully** produced from Vulcan's LiCl.

Electrolysis – great benefits, low risk

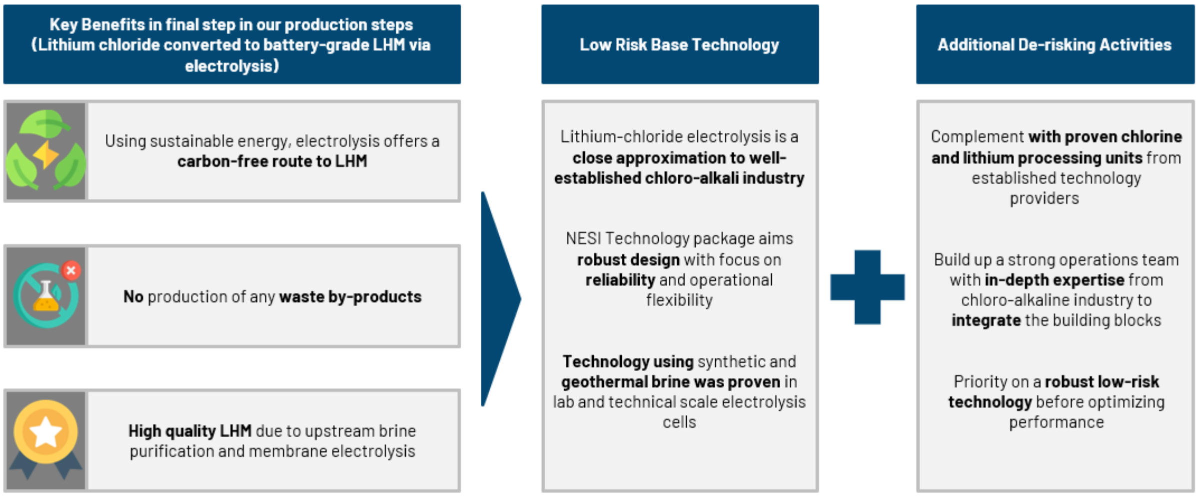


Figure 34 Electrolysis benefits and de risking activities.

LiOH Electrolysis Process – very similar to chloro-alkali

- Traditionally $LiOH·H_2O$ (LHM) has been produced from inorganic precursors by re-crystallization of inorganic precursors, e.g.:

$$Li_2CO_3 + Ca(OH)_2 \rightarrow 2\ Li(OH)\cdot H_2O + CaCO_3$$

- The traditional process results in large consumption of chemicals and large by-production of inorganic waste
- Electrolysis (Figure 35) is an efficient way to convert LiCl to LiOH without consumption of chemicals and production of solid wastes. By using sustainable electrical power, the process can be de-carbonized.
- The technology is similar to the chlor-alkali process, the well-established 'work-horse' of the ~ 100 M t chlor-alkali industry – only the *sodium ions Na^+ are replaced by lithium ions Li^+*

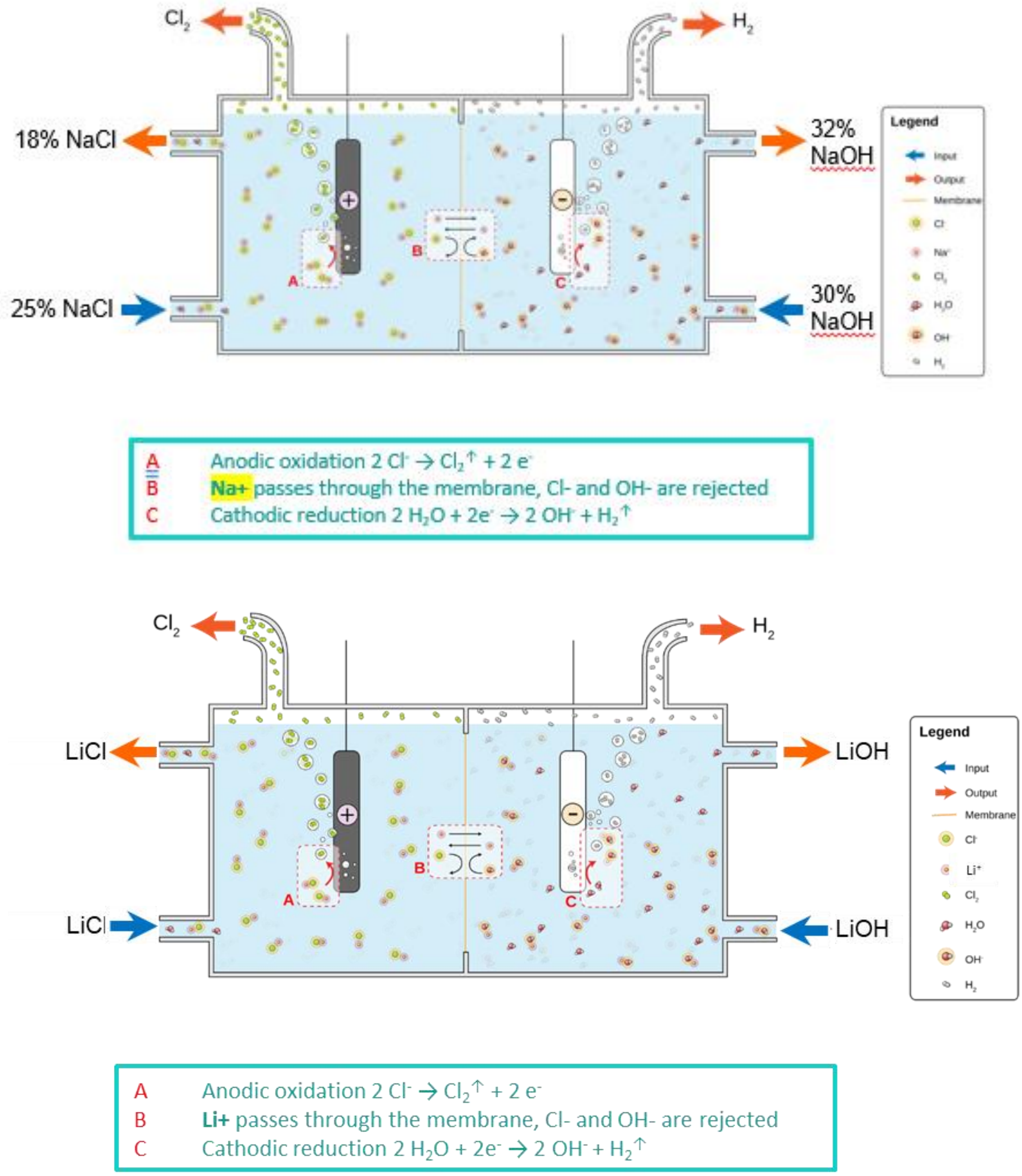


Figure 35 LiOH Electrolysis Process detailing close similarities to chloro-alkali.

NESI's Three-Stage Approach to Electrolysis Process Development (completed):

- **Stage 1:** Short and long duration brine testing on NESI cell
  - Aim: Replicate commercial NORSCAND® Cell
  - Cell: NESI's NS-01 cell with an electrode area of 0.015m2. **Completed.**
- **Stage 2:** Full electrode height NORSCAND ® Cell

- Aim: Confirm cell performance scale-up
- Cell: NESI's Full Electrode height cell with a total electrode area of 0.175m2. **Completed.**

- **Stage 3:** Full commercial cell testing
  - Aim: Confirm cell performance at the full commercial scale
  - Cell: Commercial full-scale NORSCAND® cell with an electrode area of 1.5m2 (Like Vulcan's CLP plant). **Completed.**

NESI (NORAM Electrolysis Systems) (Figure 36) Electrochemical Demonstration Plant

- Objective: To electrolyze lithium chloride and produce lithium hydroxide
- Equipment: Proven full-scale 1.5 m^2 two-compartment electrolysis cell
- Results: Matched performance to prior tests on a full electrode height cell
- Significance: Confirmed the cell's suitability for designing the Vulcan optimisation plant and commercial plant. **Completed.**

Designing the LEP Process based on NESI's specifications:

- Dilution levels of LiCl and LiOH
- Maintain low impurity levels (e.g., Ca, Mg, Sr, Ba, Si and P) at ppb or low ppm concentrations

Figure 36 NORSCAND© Cell Test setup at NESI's BC Research electrochemical demonstration plant facility in Vancouver.

NORSCAND© Cell Test setup at NESI's BC Research electrochemical demonstration plant facility in Vancouver (Figure 36).

- Full commercial scale tests of the NORSCAND© Cell. **Completed.**
- Used to demonstrate that the expected performance of the commercial scale NORSCAND® cell fully matches the results of the test results of the NESI NS-01 test cell.
- **Reliable Process with potential Long-Term Optimisation**.

Demonstrating Battery-Grade LHM Production with our Central Lithium Electrolysis Optimisation Plant (CLEOP)

- Both optimisation and commercial plants will be located at the Höchst Chemical Park.
- Optimisation plant under construction (Figure 37), planned to start operation in Q1 '24, training staff in pre-commercial operational setting (Figure 38 and Figure 39) of (i) the electrolysis from LiCl to LHM solution; (ii) LHM crude and pure crystallisation; and (iii) LHM drying.
- Optimisation plant built to start sending volume of product to offtakers for pre-qualifications testing.

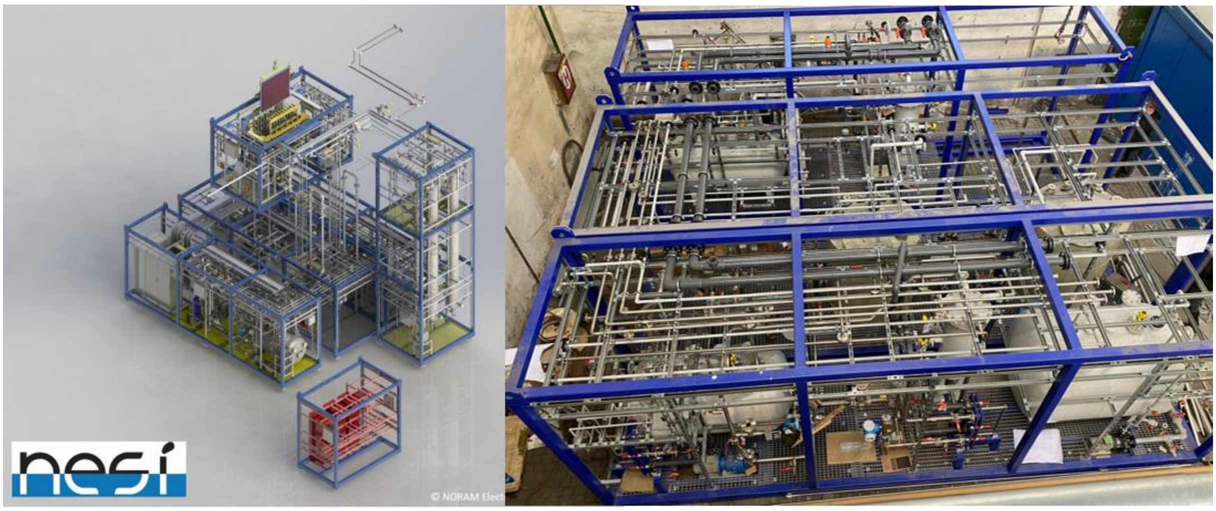


Figure 37 Vulcan's Battery-Grade LHM Production with our Central Lithium Electrolysis Optimisation Plant (CLEOP).

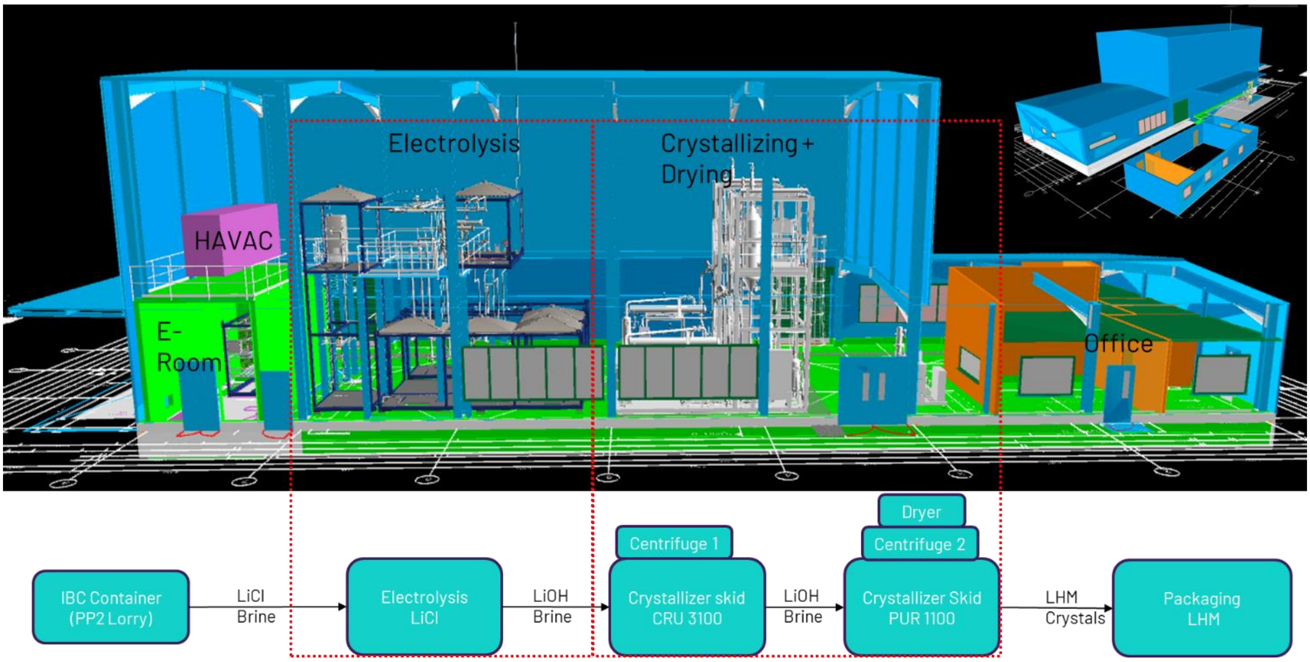


Figure 38 Vulcan Central Lithium Electrolysis Optimisation Plant. Research and Training centre.

Figure 39 Central Lithium Electrolysis Optimisation Plant (CLEOP) and soil turning.

Phase One: Central Lithium Plant ready for execution

The Phase One Commercial scale CLP will be constructed at Industrial Park Höchst near Frankfurt (Figure 33). The main function of the CLP is to convert the lithium chloride coming from the LEP into battery grade lithium hydroxide monohydrate (LHM). This process utilises electrolysis and crystallisation for the conversion (Figure 40). These are proven technologies for other chemical products and have been selected as part of maintaining the overall net zero carbon footprint for the operation.

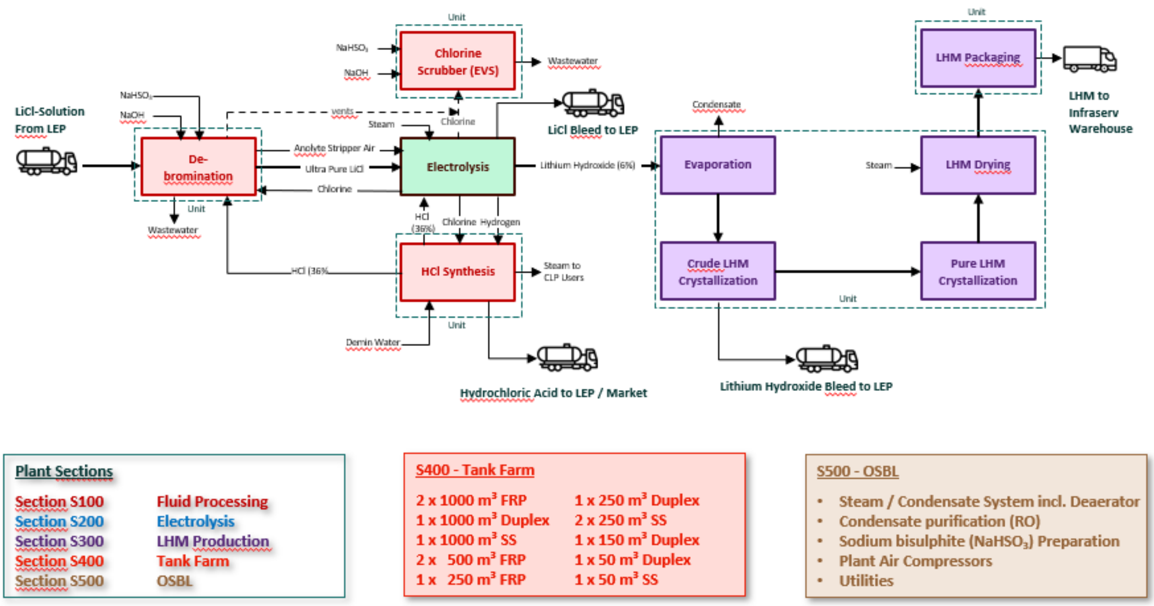


Figure 40 Commercial Central Lithium Plant, detailing simplistic design advantage.

- **<u>Technology Package:</u>** Electrolysis (NESI)
- **<u>Major Units:</u>** Crystallization & Drying, HCl Synthesis, EVS, Debromination, LHM Packaging and Loading, NaHSO3-Preparation System, Air Compressors

The bridging phase has realised a number of value improvements and simplifications from the DFS phase, mainly in having better layout of the site with increased modularisation and shop fabricated equipment and ensuring to maximise utilities provided from Infraserv to reduce overall scope for EPCM.

There have also been other value improvements relating to the number of buildings at the site and seeing more equipment moved externally and providing simpler construction methods and ultimately simpler operation and maintenance.

CAPEX at the CLP remained relatively neutral during Bridging phase, however, has been de-risked with a number of key technology package suppliers now ready be awarded and simplified the overall construction and operational phases.

The project definition has progressed significantly during the Bridging phase and meets Class 2 AACE cost estimate accuracy, which has been used to finalise selection of EPCM contractors ready for award in Q1 2024.

Most if not all equipment and packages have now been engineered and sent to the market through request for proposal (RFP) and all package costs have been included as part of the update Bridging phase estimate. Some opportunities remain in the procurement of key packages as we look to bundle key packages and award frame agreements to key suppliers to support the integrated Phase One project.

The building permit for CLP is planned to be submitted to the authorities at end of November 2023, in line with Vulcan's timeline.

Vulcan is targeting start of production of the Phase One CLP in H2 '26. The financing timeline and therefore execution timeline has been adjusted to align with public funding schemes which Vulcan is applying for.

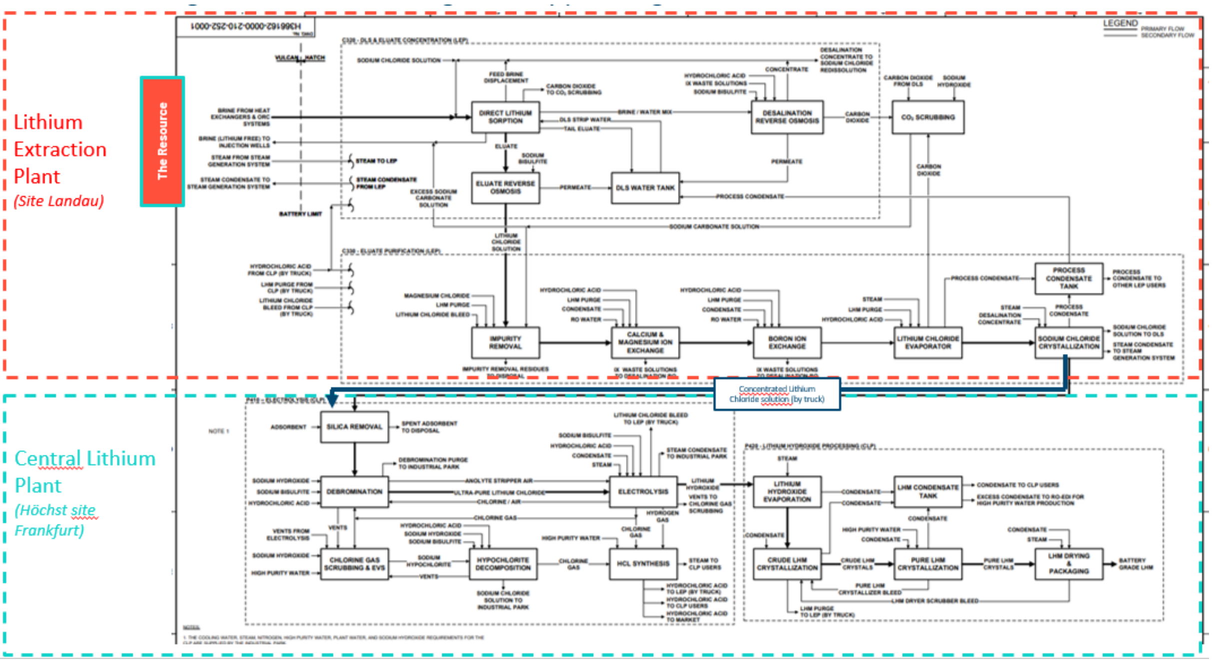


Figure 41 Lithium extraction and conversion into lithium hydroxide: Lithium extraction and conversion into LHM – designed as one plant. Proven technologies combined in an integrated way providing a sustainable flow sheet.

1.9 Market Studies and Contracts

Vulcan commissioned a detailed lithium market study and price forecast from Fastmarkets at the end of 2022 to be used in the DFS published in early 2023. This summary of the study is available in the DFS announcement from February 2023. Following changing market conditions during 2023 and a significant drop in lithium prices, Vulcan commissioned another price forecast from Fastmarkets in September 2023.

Fastmarkets is a leading Price Reporting Agency (PRA) and intelligence firm that provides reliable and transparent pricing data for the agriculture, forestry, energy markets, metals and mining. In addition to its extensive price assessments, the company also offers market analysis and forecasts to help businesses navigate complex, volatile markets. Fastmarkets follows a thorough and transparent methodology for its lithium pricing assessments. The company sources pricing data from a wide range of industry participants, including producers, traders, and analysts. This data is then verified by Fastmarkets team of experts, who use their in-depth knowledge of the lithium market to ensure the accuracy and reliability of the pricing assessments.

Vulcan used the latest Fastmarkets Lithium Hydroxide in its financial model, combined with pricing secured with offtakers, as discussed in section 1.12.

Vulcan has concluded five long term lithium supply agreements, also referred to as offtakes, with five key players in the European lithium-ion battery supply chain:

- Lithium Supply Agreement with **Umicore**: In October 2021, Vulcan entered into a binding offtake agreement with Umicore N.V. ("Umicore"). Umicore is a Tier 1 cathode manufacturer and the first and currently only cathode maker in Europe, operating a production site in Nysa, Poland, inaugurated in September 2022. The company is also producing cathodes in SK and China. Umicore supplies some of the largest battery makers in the world such as Samsung or LG and have agreements with some of the largest OEMs in the world like including a joint-venture with Volkswagen. Vulcan is to sell to Umicore between 28,000 metric tonnes and 42,000 metric tonnes of battery-grade lithium hydroxide for an initial five-year term. Pricing will be on a take-or-pay basis. Conditions precedent to the start of commercial delivery include but are not limited to successful start of commercial operation and full product qualification.
- Lithium Supply Agreement with **Renault**: In November 2021, Vulcan entered into a binding offtake agreement with Renault Group ("Renault"). Renault is a French automaker who for a long time was the leader of EV sales in Europe, until 2020. Renault is also part of an alliance with Nissan and Mitsubishi, which represents the third largest automaker globally. The group stated its plans to secure 220 gigawatt hours of battery production capacity by 2030. Vulcan is to sell to Renault between 29,000 metric tonnes and 49,000 metric tonnes of battery-grade lithium hydroxide over an initial six-year term. Pricing will be on a take-or-pay basis. Conditions precedent to the start of commercial delivery include commencement of commercial production and the lithium product being qualified for use in accordance with customary industry standards.
- Lithium Supply Agreement with **LG Energy Solution**: In January 2022, the Company entered into a binding offtake agreement with LG Energy Solution ("LGES"). South Korean based LGES is the second largest lithium-ion battery producer in the world behind Chinese maker CATL. The company has between 20 to 25 % market share of the global lithium-ion battery market and 44 % market share in Europe, making it a very relevant industrial partner for Vulcan. Vulcan is to sell to LG Energy between 41,000 metric tonnes and 50,000 metric tonnes of battery-grade lithium with an initial term of five years, which can be extended by five years. Conditions precedent to start of commercial delivery include securing of Project finance, construction and commissioning of the plants, and the lithium product meeting agreed specifications by the agreed timeline. Pricing will be on a take-or-pay basis.
- Lithium Supply Agreement with **Volkswagen**: In December 2021, the Company entered into a binding offtake agreement with Volkswagen AG ("Volkswagen"). Volkswagen is the largest car maker in the world by revenues and the largest company in Germany. Vulcan is to sell to

Volkswagen between 34,000 to 42,000 metric tonnes of battery-grade lithium hydroxide over an initial five-year term. Pricing will be on a take-or-pay basis. Volkswagen and the Company have also agreed to a first right of refusal to invest in additional capacity in the Zero Carbon Lithium™ Project. Conditions precedent to the start of commercial delivery include commencement of commercial operation and the lithium product achieving full product qualification.
- Lithium Supply Agreement with **Stellantis**: In November 2021, the Company entered into a binding offtake agreement with Stellantis ("Stellantis") which was subsequently modified on 24 June 2022 following a €50 M equity investment by Stellantis in Vulcan. Vulcan is to sell to Stellantis between 222,000 metric tonnes and 272,000 metric tonnes of battery-grade lithium hydroxide over a ten-year term. Pricing will on a take-or-pay basis. Conditions precedent to the start of commercial delivery include commencement of commercial operation and the lithium product achieving full product qualification.

Together, the volumes of lithium hydroxide to be delivered under these five offtake agreements will exceed Vulcan's Phase One capacity of 24,000 tpa of LHM but some of the offtake volume will be allocated to upcoming phases including Phase 2, expected to be another 24,000 tpa of product.

1.10 Permitting, Environmental Studies, and Social and Community Impact

Global sustainability consulting group, ERM are finalising a bankable Environmental and Social Impact Assessment (ESIA) for the Zero Carbon Lithium™ Phase One Project as part of financing efforts. The preliminary study has determined:

- The Project will have low environmental and social impacts to the surrounding areas.
- All construction work and infrastructure associated with the Project near Landau and Insheim will be located within areas of modified habitat (industrial land and farmland) and, according to LANIS (state database of the RLP nature conservation administration).
- There are no legally protected habitats according to § 30 BNatSchG in the planned infrastructure development area and its immediate surroundings.
- The Project does not have any aquatic ecosystems associated with surface water features such as rivers, streams, wetlands or freshwater lakes or man-made reservoirs. The nearest large river system being the Rhine River, located roughly 14 km east of the Project.
- As part of the Environmental and Social Impact Assessment, Vulcan has built a Stakeholder Engagement Plan that remains active and aligned with international best practices and standards, especially International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability and Equator Principle IV (EP4).

The main regulatory requirements for the Project development approvals are set under the German Federal Mining Act (*Bundesberggesetz: BBergG),* since the Project is intended to recover a mineral regulated under this act. Many other major Acts, codes and regulations are followed in order to acquire permits and set operating standards. Vulcan is engaged in direct communication with the regulating authorities to ensure transparency with regards to its Project plans and operations. Vulcan has engaged in the environmental assessment activities early in the Project planning process to accommodate stakeholder consultation and regulatory approval timelines.

Vulcan has an extensive communication strategy which has been able to achieve broad media coverage across many levels of stakeholders Internationally and within Europe, Germany, and local regions, utilising social media, websites, and other forms. A notable measure of engagement is the information truck (Figure 42) and information centres. These operate independently of projects and on an on-going basis, used to share information and answer questions about company mission, values and on-going and future projects. There is a visitors' centre at the Insheim Geothermal Plant in which local stakeholders are encouraged to come visit the plant and learn about carbon neutral lithium production. Although some public sentiment was previously neutral or partially negative towards geothermal projects in the Palatinate area, Vulcan's stakeholder engagement efforts have resulted in mostly positive perceptions of the Project, in particular the emphasis on the value-added results from the Project for local stakeholders, such as renewable heat. In 2023, the Landau City Council voted in favour of geothermal development to supply the City with renewable heat, and in favour of entering into negotiations with Vulcan to develop the geothermal and Lithium Extraction Plant (G-LEP) at an industrial site in Landau.

Figure 42 Info truck in the Landau local community.

All Phase One permits (Figure 43) are currently progressing on track, or with mitigations in place to prevent delay, as shown on the next page.

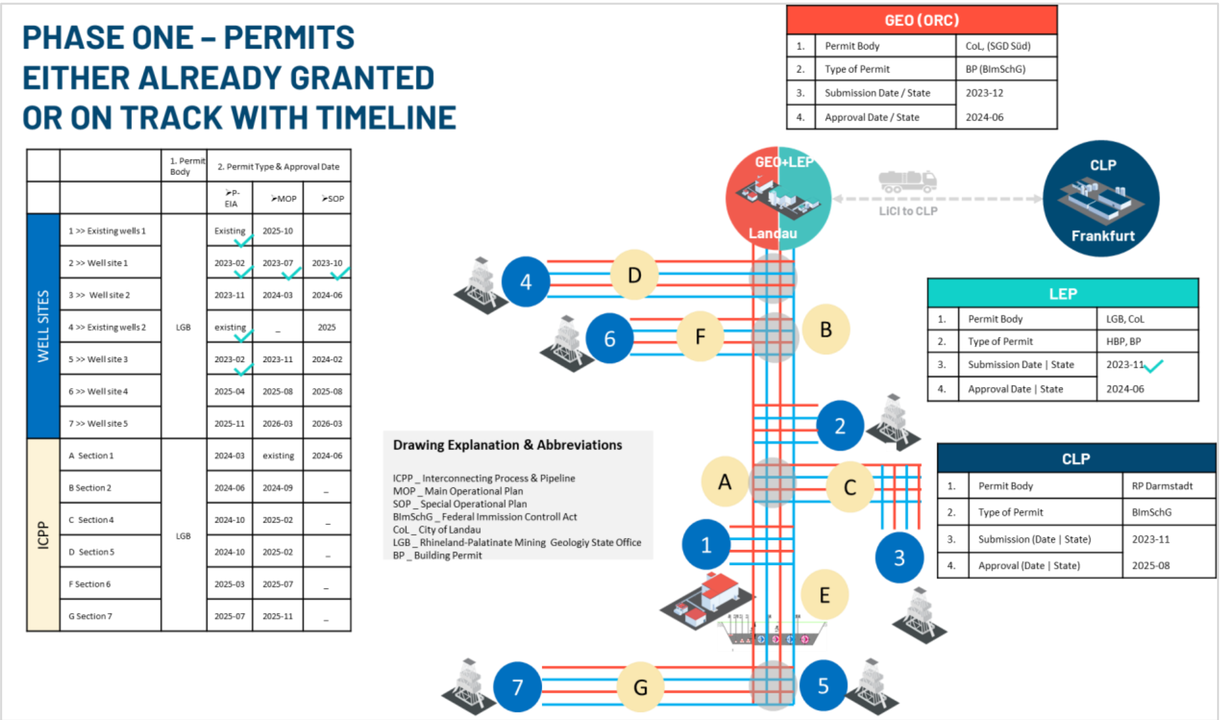


Figure 43 All Phase One permit.

1.11 Schedule

Vulcan has created re-baselined, integrated, deterministic schedule (Figure 44). A summary is as follows:

- Start of renewable heat production in H2 2025 to augment current renewable power production and provide additional revenue
- Start of lithium chloride production from LEP: H2 2026 (July in deterministic schedule).
- Start of lithium hydroxide production from CLP: H2 2026 (August in deterministic schedule).
- Schedule adjusted by 7 months relative to DFS, to align with public funding application timelines in H1 2024, to be able to potentially integrate public funding into financing.
- Vulcan is preparing and doing further pre-execution works in the interim to reduce risk even further, prepare all key contracts for award and have full financing in place so to be able to deliver the project on time and budget as per the Bridging Phase outcomes.

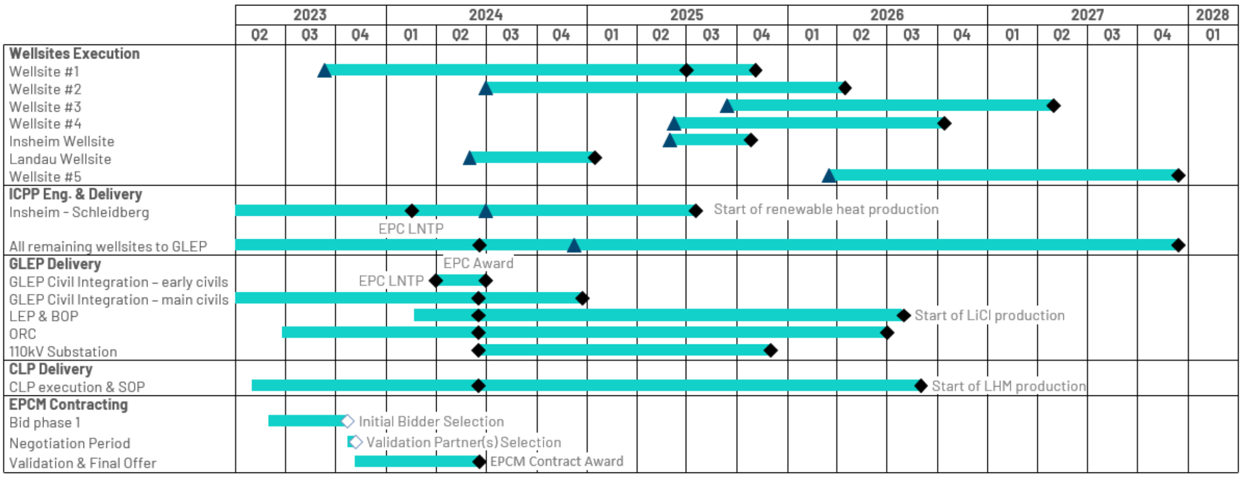


Figure 44 Re-baselined, deterministic schedule, showing start of production for new heat delivery, LiCl production, LHM production.

1.12 Economic Analysis

Vulcan has completed a Bridging Engineering Study (BES) level economic model for Phase One. Our economic modelling approach is assessing a fully integrated Phase One project comprising all different steps of the production process. Investment will be injected at a project level (**VER GEO LIO GmbH**) and not split into two SPVs as initially planned. In practice, two separate Special Purpose Vehicles were still created to cover key matters such as trade tax and mining law:

- SPV1: Natürlich Südpfalz GmbH & Co KG
- SPV2: Vulcan Projektgesellschaft 2 GmbH

SPV1 includes the equipment and processes associated with land, wells, ICPP, ORCs, LEP. SPV1's outputs include energy in the form of electricity, steam, and heat. Part of the heat is consumed internally and heat offtakes agreements with local municipalities are in advanced negotiations. The electricity produced from the ORC is sold to the grid under the German feed in tariff. SPV1's outputs also include Lithium Chloride (LiCl) solution (40%) which is sold to SPV2. LiCl is always assumed in the form of LHM equivalent across this Section.

SPV2 includes CLP. SPV2's outputs include LHM and HCl. The LHM is sold to VER. HCl is sold directly to the market.

VER GEO LIO GmbH includes both SPVs (Figure 45). **VER GEO LIO GmbH** is part of **VER** which also includes internal services such as VES, Vercana, VEE, etc. providing services mostly in the form of engineering and drilling services to VER GEO LIO GmbH. VER will hold the long-term lithium supply agreements (offtakes) concluded with Stellantis, Volkswagen, Umicore, LGES and Renault. VER buys LHM from VER GEO LIO GmbH and sells it to its offtakes and to the market.

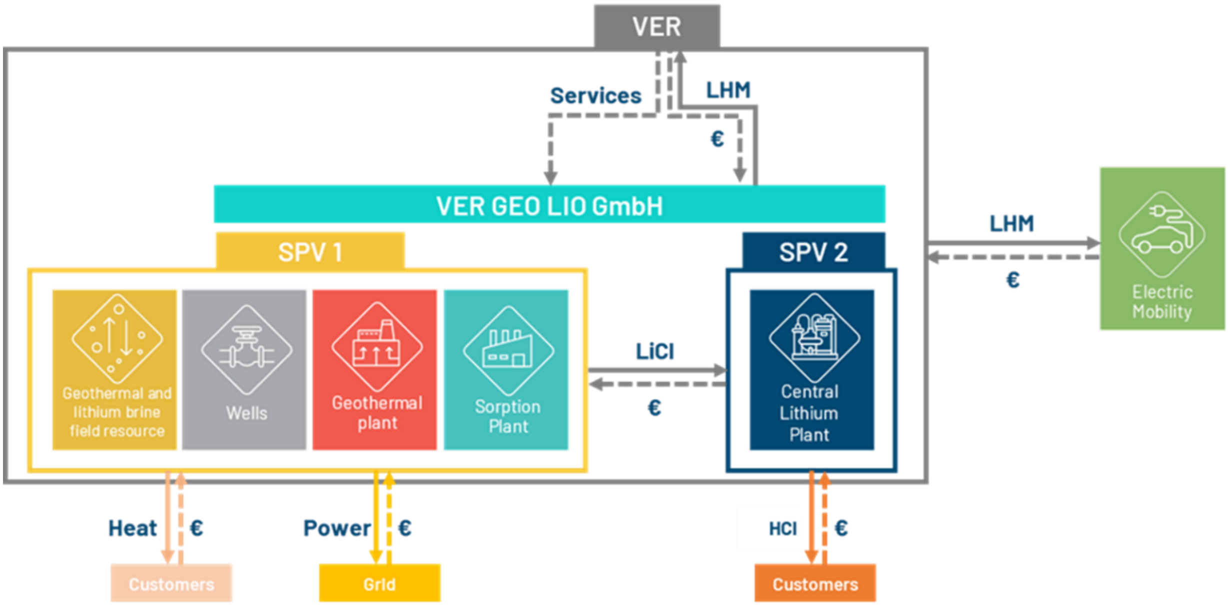


Figure 45 Value flow of target operating model.

1.12.1 Expected Commodity Prices

1.12.1.1 LHM

The average forecast realised price per tonne of LHM is taking into consideration Fastmarkets' long term price forecast (min 57.5% LiOH $/kg, EU & US) and combining it with Vulcan's pricing concluded in offtake agreements which includes price floors and ceilings, fixed prices, and prices indexed on indexes like Fastmarkets. The price forecast is then converted into Euros using a EUR/USD 1.05 rate.

The new LHM price forecast provided by Fastmarkets (January 2023 DFS forecast vs November 2023 BES forecast) impacts revenues negatively as the overall price forecast is slightly lower but the larger impact comes from the first couple of years of production where prices have dropped more abruptly as described below:

- Larger price drops during the first two years of Vulcan's production, down 38% compared to the DFS price forecast
- New average 10-year €23,865/t LHM price forecast, down 9% compared to previous forecast
- New average 20-year €29,551/t LHM price forecast, down 3% compared to previous forecast
- New long term price forecast, from 2032 at €32,050/t LHM, down 2%

However, the overall impact on project economics, due to improved CAPEX and production profile, is limited.

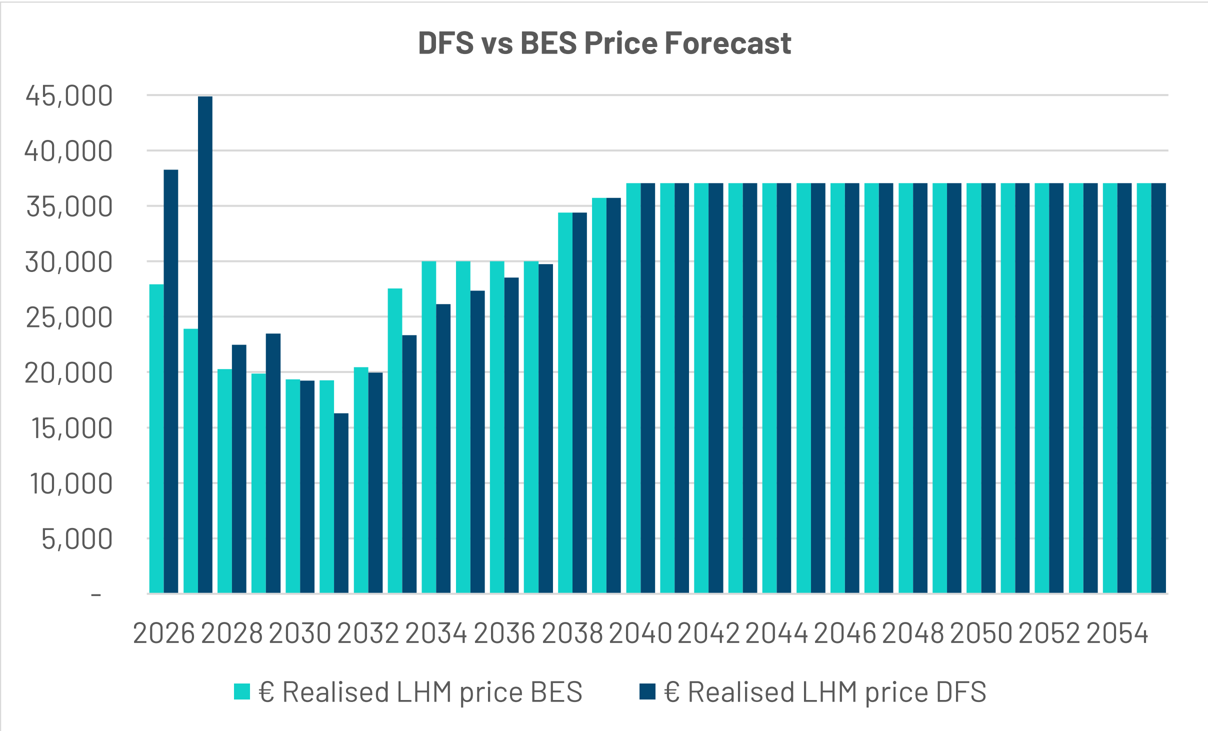


Figure 46 Lithium hydroxide price forecasts - €/t.

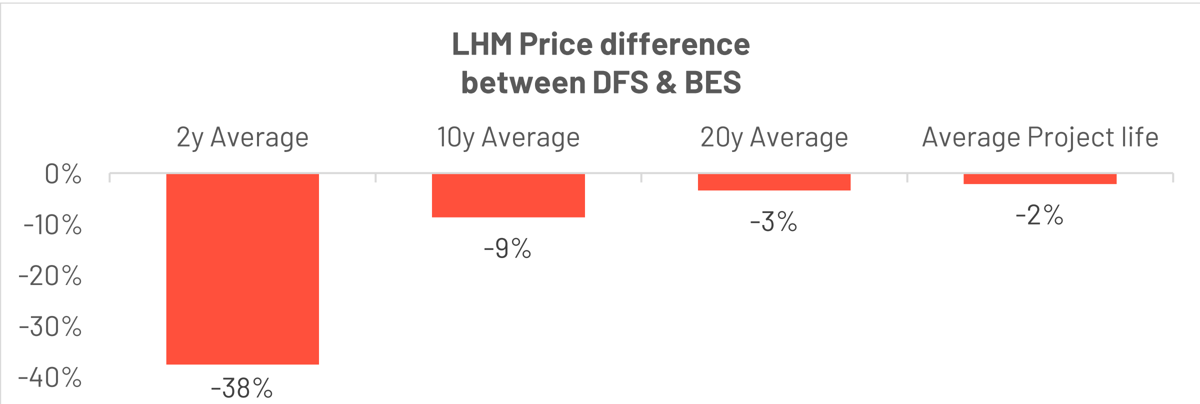


Figure 47 Lithium hydroxide price differences between DFS and BES (%).

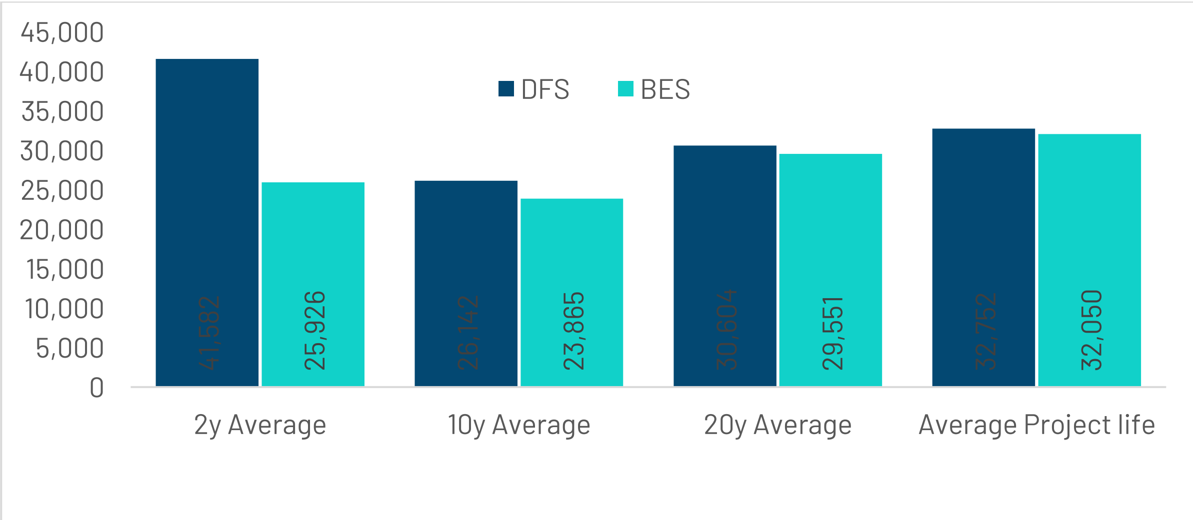


Figure 48 Lithium hydroxide price differences between DFS and BES (€).

Despite volatility in lithium prices, Vulcan has mitigated the potential impact on revenues by securing offtake agreements with high quality European-focused offtake partners, which are all binding, take-or-pay, with agreed pricing mechanisms. The pricing mechanisms are a basket of fixed, floor-ceiling and fully floating prices which provides assurance a more stability to lenders during payback period.

Figure 49 Vulcan's key LHM offtake partners.

1.12.1.2 Energy

1.12.1.2.1 Power

Vulcan will sell power to the grid from its geothermal facilities. Vulcan is subject to the German Renewable Energies Act (*Erneuerbare-Energien-Gesetz: EEG*) which applies to all plants for the generation of electricity from renewable energies and therefore also to the geothermal plants which Vulcan Group operates and intends to operate as a part of its renewable energy business.

The EEG provides a feed-in tariff of €252/MWh for the power sold to the grid by geothermal assets. The feed-in tariff doesn't act as a fixed price but as a price floor, which means that if power prices go over the feed-in tariff, the operator will sell power at those higher prices. In Vulcan's financial model, Aurora Energy Research's power price forecast is used and prices do not exceed the feed in tariff. The remuneration under the EEG is typically paid for a period of 20 years beginning from the commissioning date plus the remaining period of the calendar year in which the respective plant was commissioned. The feed-in tariff means that on average, over the first 20 years of the project, Vulcan is able to sell power to the grid at a price 192% higher than the base load price.

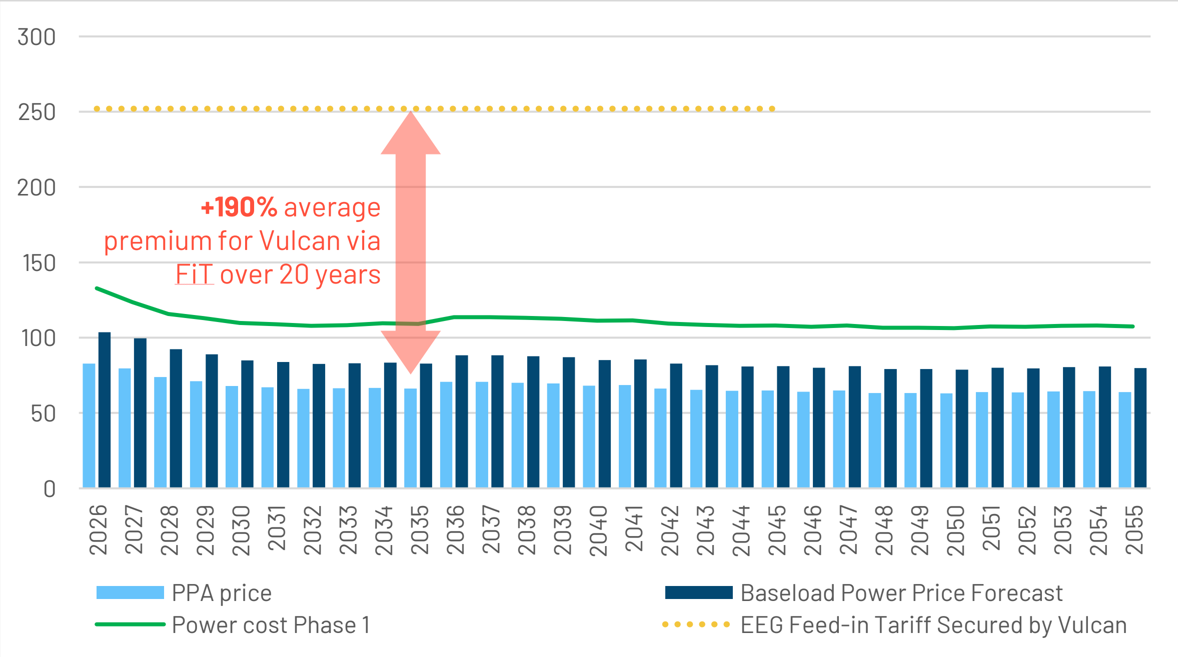


Figure 50 Power price forecast, excluding inflation (€/MWh, Germany).

1.12.1.2.2 Heat

Vulcan will also sell heat to nearby customers. Vulcan has already concluded a large heat offtake agreement with MVV in Mannheim but it will be covered by Phase 2 of the Project. The Company is in advanced discussions with the local municipalities to sell its heat production to the local energy utility as part of Phase One.

1.12.1.3 By-Product Chemical

Vulcan will produce one by-product at its CLP; Hydrochloric Acid (HCl) which is derived from chlorine production from the electrolysis process. HCl is a basic chemical with thousands of customers in Europe and can be sold locally. This by-product is non-core to Vulcan's business model.

1.12.2 Lithium Dilution

The produced lithium content of the brine will decrease over time as the concentration of lithium in the reservoir reduces with ongoing production and reinjection. This will impact revenues as with the same amount of brine extracted, less lithium is being produced. Vulcan's financial model takes into consideration lithium depletion at each well site but does not take into consideration a potential recharge of the lithium being leach-out from the mica rocks over time.

On average, in the Project area, lithium concentration drops by -1.8% per year based on the Base Case, -1.2% based on the High Case, and -3.2% based on the low case.

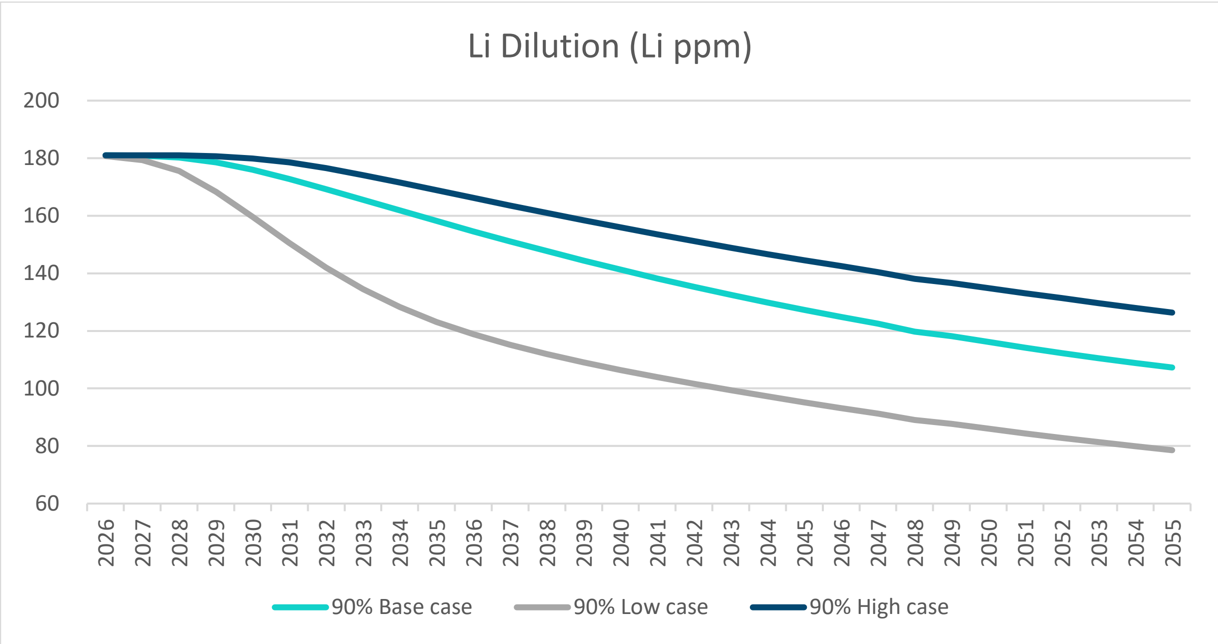


Figure 51 Phase One - Lithium Dilution (Li ppm) according to Low, Base and High Case. All cases produce positive NPV. For the low case. production economics are cut when lithium concentration drops below 100 mg/l Li in low case, and this still produces a positive NPV. In future studies, this cut off will be tested, as it is anticipated that the plant can run profitably below this level.

1.12.3 Lithium Production

Taking into consideration the factors listed below, Phase One LHM output has been calculated and displayed in the graph below.

- Brine flow rate
- Lithium concentration in the brine
- Lithium dilution over time
- Lithium recovery rate at the LEP
- LEP stream factor
- CLP Li recovery
- Production ramp-up rates

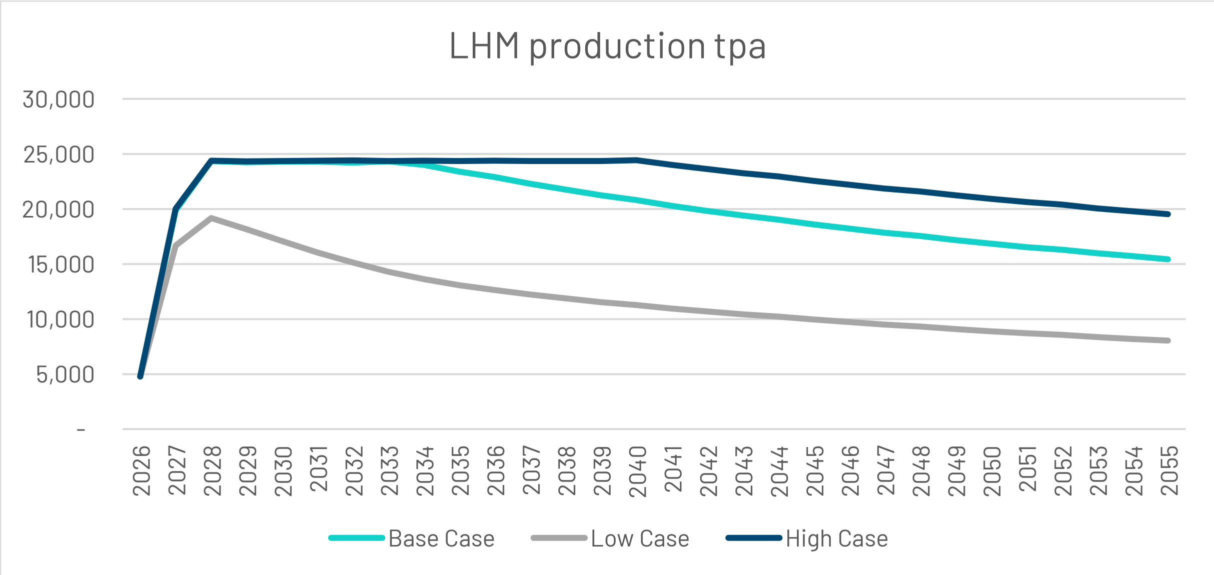


Figure 52 Phase One - LHM Production, tpa, based on Low, Base and High Case.

1.12.4 Energy Production

Phase One energy output has been displayed in the graph below and averages around 266,000MWh/a power and 560,000MWh heat.

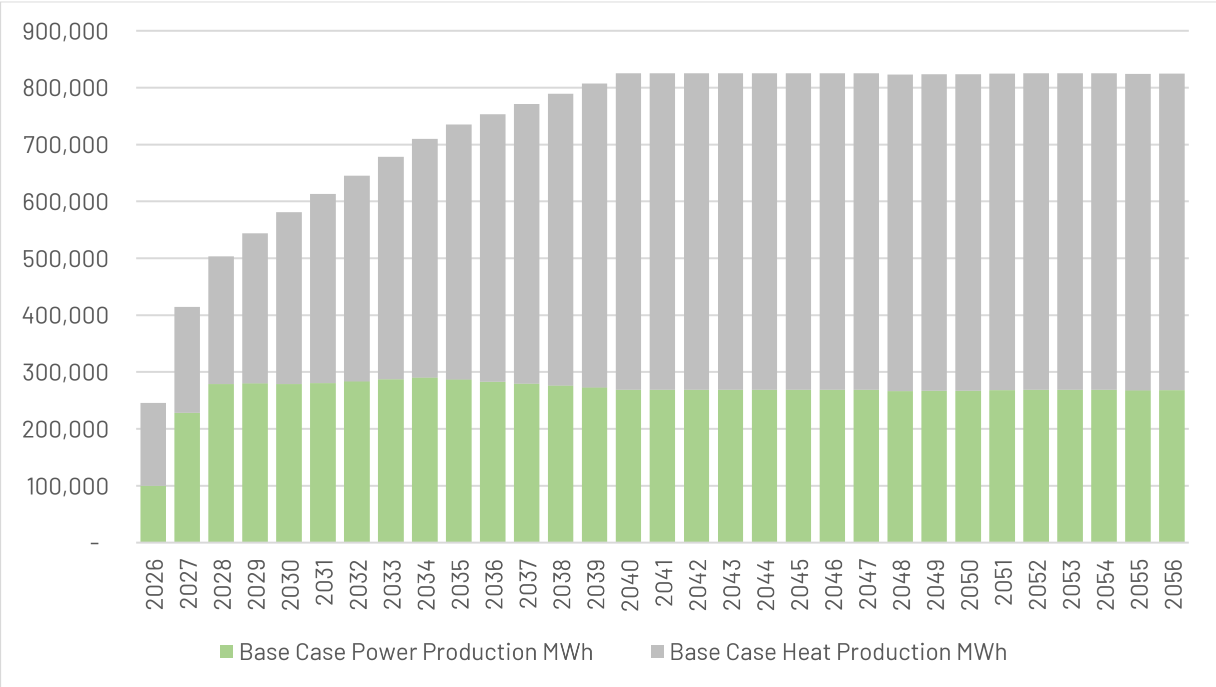


Figure 53 Phase One - Energy Production, 30 years, MWh/a.

1.12.5 Estimated Operating Costs

By far the largest cost component for Vulcan is energy in the form of power. It accounts for 40% of the total OPEX. Maintenance is the second largest OPEX component, accounting for 25% of the total. A contingency of 10% is included in the OPEX displayed below.

	LEP €M/a	CLP €M/a	LEP+CLP €M/a	Geothermal €M/a	Opex % of total
Power	13	18	31	24	40%
Maintenance	16	8	24	11	25%
Labour	5	5	10	0	8%
Materials (Ex reagents)	5	3	10	-	6%
Reagents	6	1	6	-	4%
Sorbent	2	-	2	-	2%
Utilities (Ex power)	2	1	3	-	2%
Logistics	2	1	3	-	2%
Other Fixed Costs	0	3	3	0	2%
Contingency (10%)	5	4	9	4	9%
Total incl. Contingency	55	44	99	40	100%

Table 4 Key operating cost inputs (€M/a), The OPEX is based on a production at designed capacity at 24,600t LHM and including an average power price over the project life.

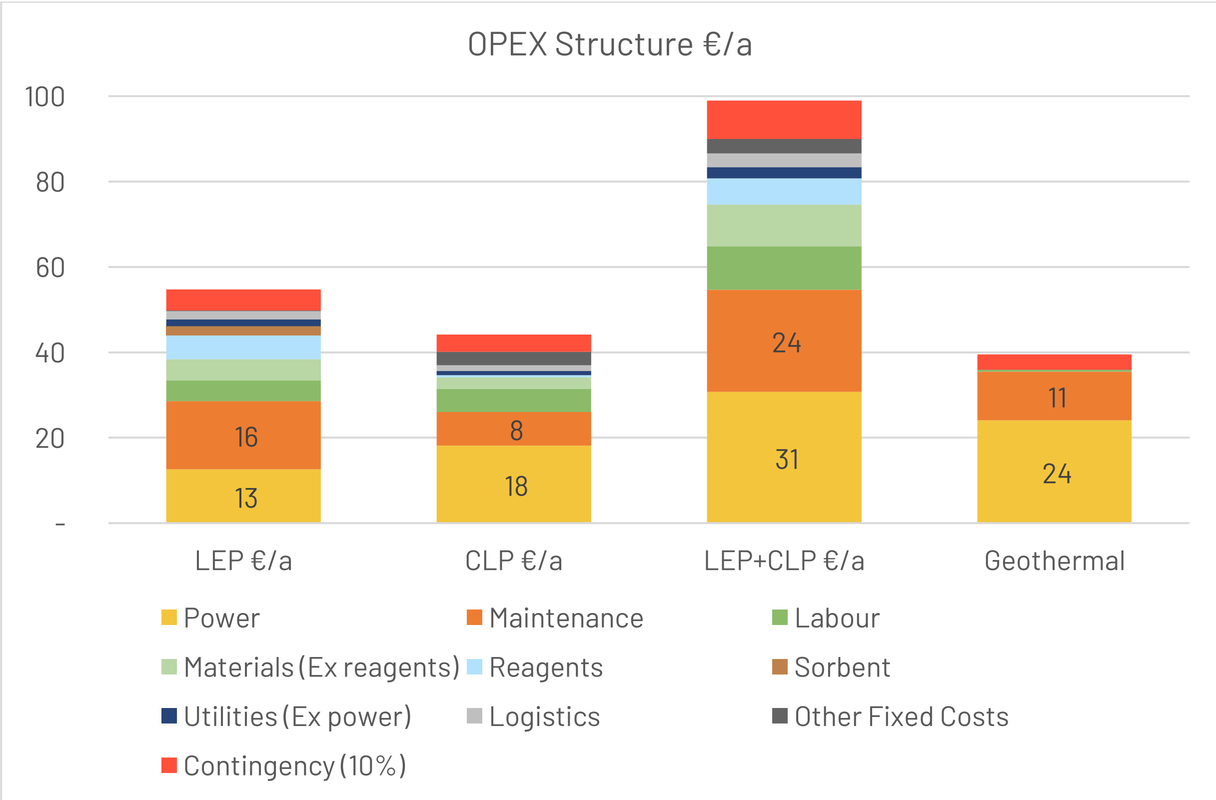


Figure 54 Key operating cost inputs (€M/a), the OPEX is based on a production at designed capacity at 24,600t LHM and including an average power price over the project life, excluding inflation.

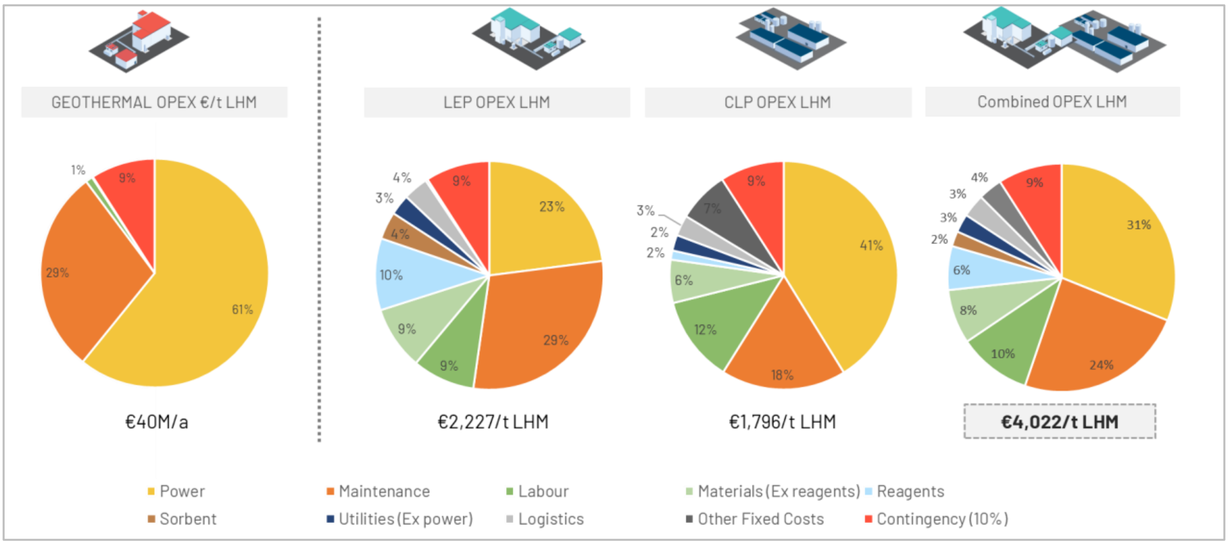


Figure 55 Key operating cost inputs (€M/a and €/t LHM), the OPEX is based on a production at designed capacity at 24,600t LHM and including an average power price over the project life, excluding inflation.

When looking at lithium specific costs, the main difference with other lithium assets, especially hard rock converters in China, is that Vulcan has very low feedstock costs. OPEX is dominated by electricity costs with 31% and maintenance for 24%. The Project has very limited consumption of reagents, with 6% of total costs, which usually represents the main operating costs for lithium producers in South America. Sorbent costs are also limited, around 2%.

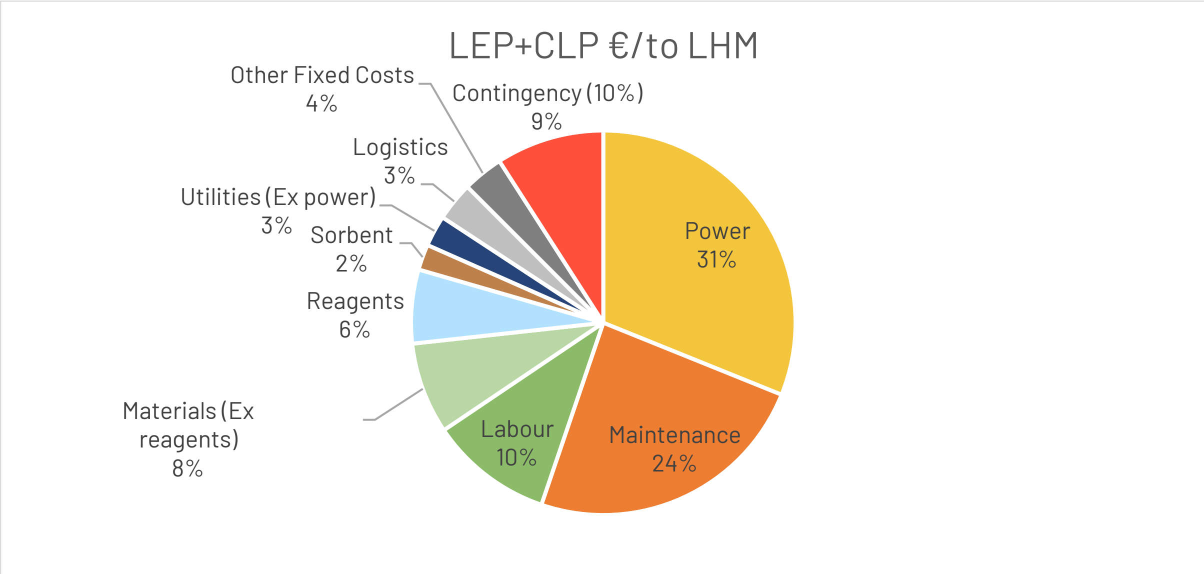


Figure 56 Key lithium operating cost inputs (€/t LHM), the OPEX is based on a production at designed capacity at 24,600t LHM and including an average power price over the project life, excluding inflation.

1.12.5.1 Electricity

Electricity cost is the largest operating cost in Vulcan's Project. The cost of electricity is calculated by using a long-term power price forecast for the German grid and adding location and consumption specific costs including fees and taxes. The forecast displayed in the figure below is not including grid costs as it is site specific but is displaying the long-term power price forecast as supplied by Aurora Energy Advisory.

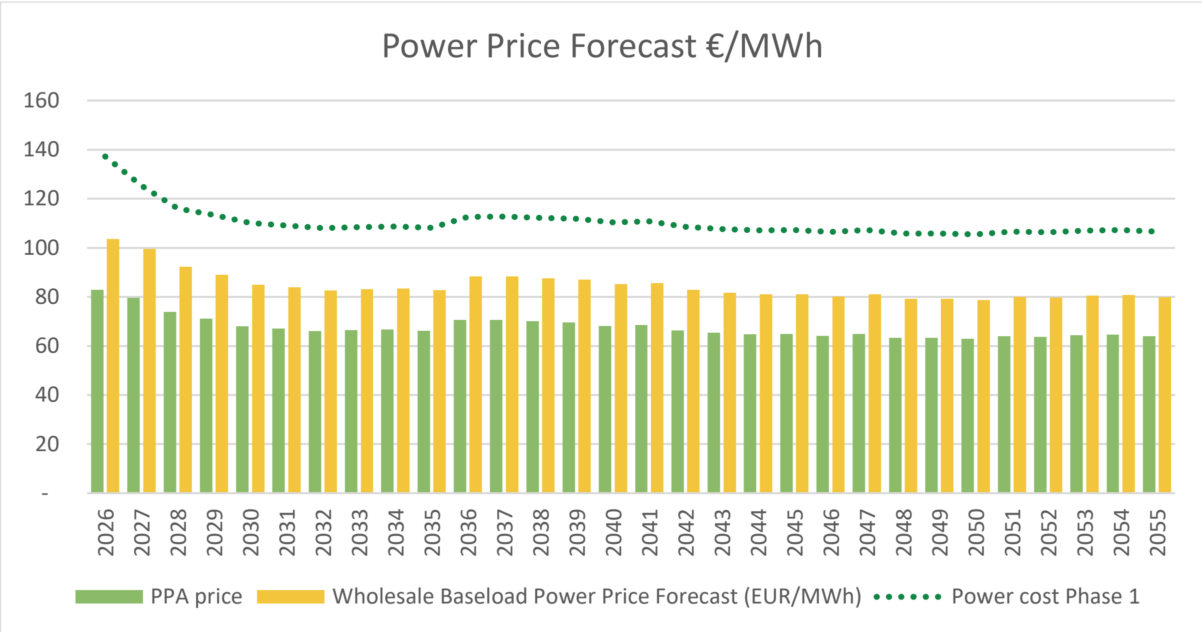


Figure 57 Power price forecast (€/MWh).

1.12.5.2 Global Cost Curve Position

Vulcan's forecast Phase One OPEX at around €4,022 or $4,223 places the Project at the bottom of the global cost curve for LHM. Vulcan benefits from not having to purchase feedstock of its lithium production, which is the main OPEX component for all spodumene converters, mostly located in China. Vulcan also benefits from a technology that uses limited volume of reagents, which is the main OPEX component for brine producers in South America.

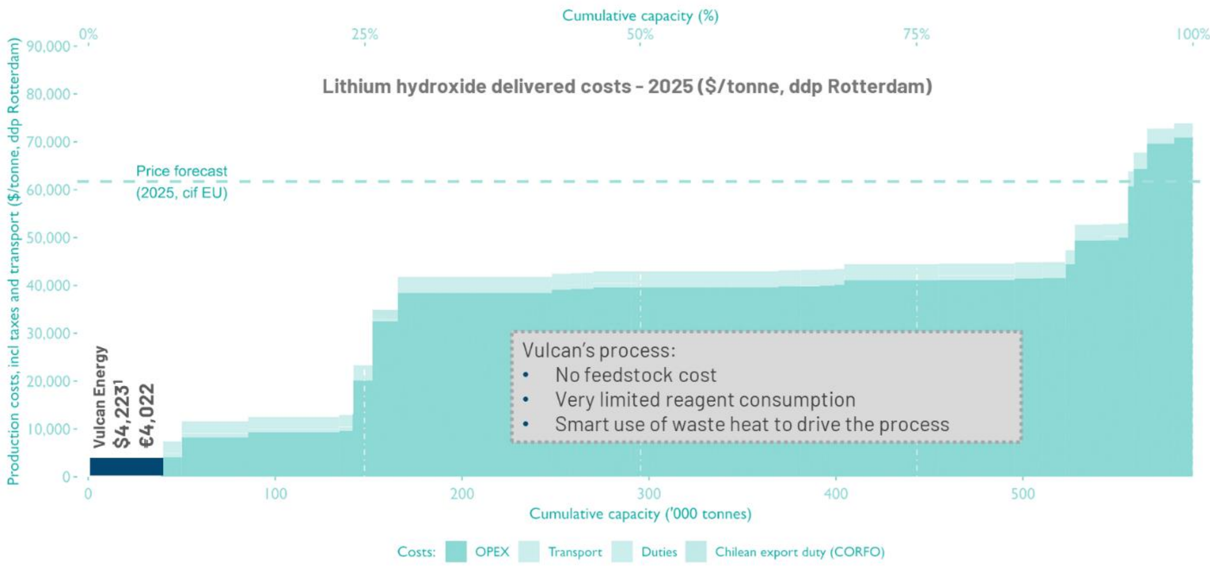


Figure 58 Projected cost curve provided by Fastmarkets and Vulcan's OPEX estimate provided by the Company.

Note: The OPEX is based on a production at designed capacity at 24,600t LHM and including an average power price over the project life, excluding inflation. Vulcan's OPEX converted from € to $ using 1.05 EUR/USD FX. Vulcan has used a projected cost curve by Fastmarkets as it is the Price Reporting Agency (PRA) for lithium for the London Metals Exchange, and as in Vulcan's view it would be invalid to compare Vulcan's future projected costs with current costs from other companies. Fastmarkets' estimate of a project's costs uses a bottom-up *approach based on assumptions about the operations. On top of this, costs for transport to a common location and any duties that would be applied are added to allow comparison from different sources. Please also refer to the Forward-Looking Statement disclaimer.*

1.12.6 Capital Expenditure

Vulcan has applied capital expenditure in-line with the costs supplied by Hatch and VEE. Contingency of 12% has been applied on capital expenditure. Total Capex reaches €1,399M as described in the table below.

Drilling	267 €
Wellsites	102 €
ORC	111 €
ICPP	201 €
LEP & BoP	360 €
CLP	358 €
Total	**1,399 €**

Table 5 Keys capital costs - Phase (€M).

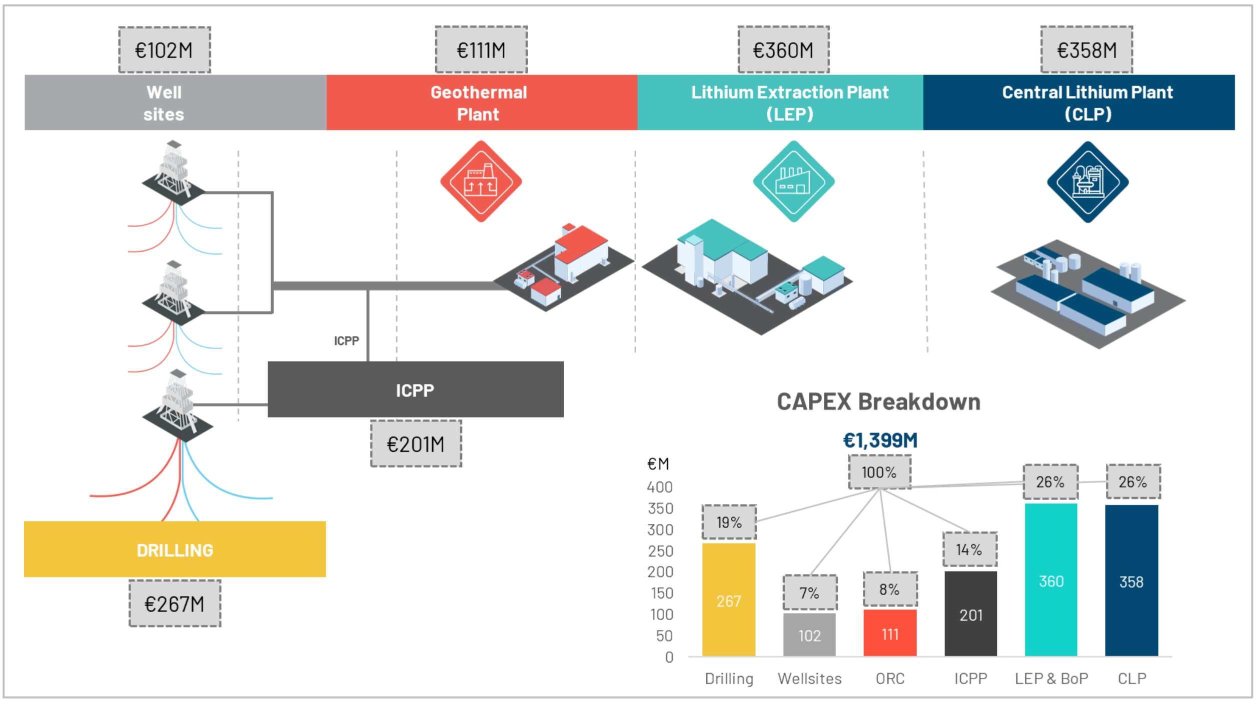


Figure 59 Key capital expenditure - Phase One (€M and %).

As part of the BES, a €97m CAPEX reduction down to €1,399m was achieved, combining assets, whilst moving to higher project definition:

- €97m CAPEX drop compared to the DFS despite more accurate engineering with Class 2 Estimate
- Contingency at 12%
- Drilling cost increase based on new FDP
- Wellsite cost updated based on actuals
- ICPP cost increase based on basic engineering

- Significant cost saving on LEP due to economies of scale (2 to 1 plant) and one ORC
- CAPEX includes contingency, indirect costs, owner's costs, EPCM, etc.

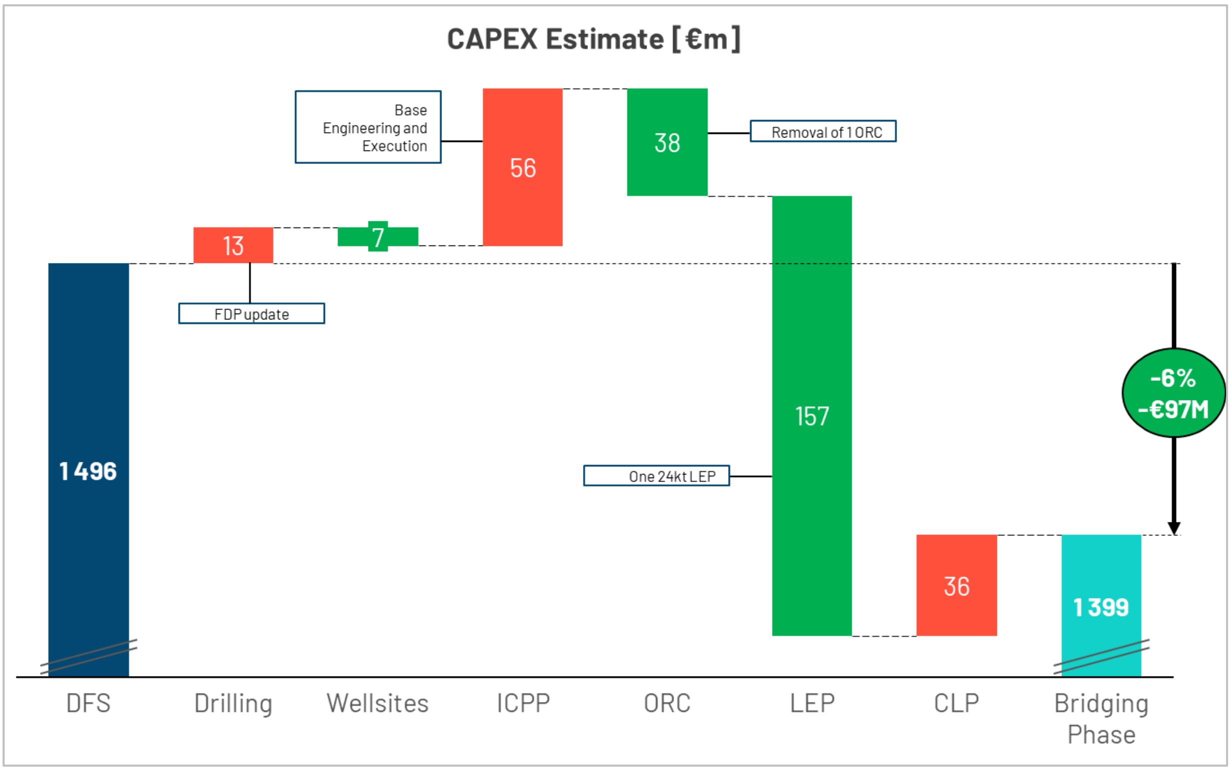


Figure 60 CAPEX Estimate €M Evolution between DFS and BES.

1.12.7 Projected Revenues

Based on the price assumptions discussed above, annual revenues are displayed below per for Phase One. Phase One has an annual revenue of €705M per year, dominated by lithium sales representing 88% of total revenues. In the graph below, point 1 shows start of production in H2 2026 with therefore lower revenues, point 2 revenue increase is explained by the end of a lithium offtake agreement with a fixed pricing component, and point 3 revenue drop is led by the end of the EEG Feed-in Tariff. From the 2030s onwards, LHM prices are mostly flat but lithium dilution in the brine and therefore a reduced LHM output over time impacts revenues.

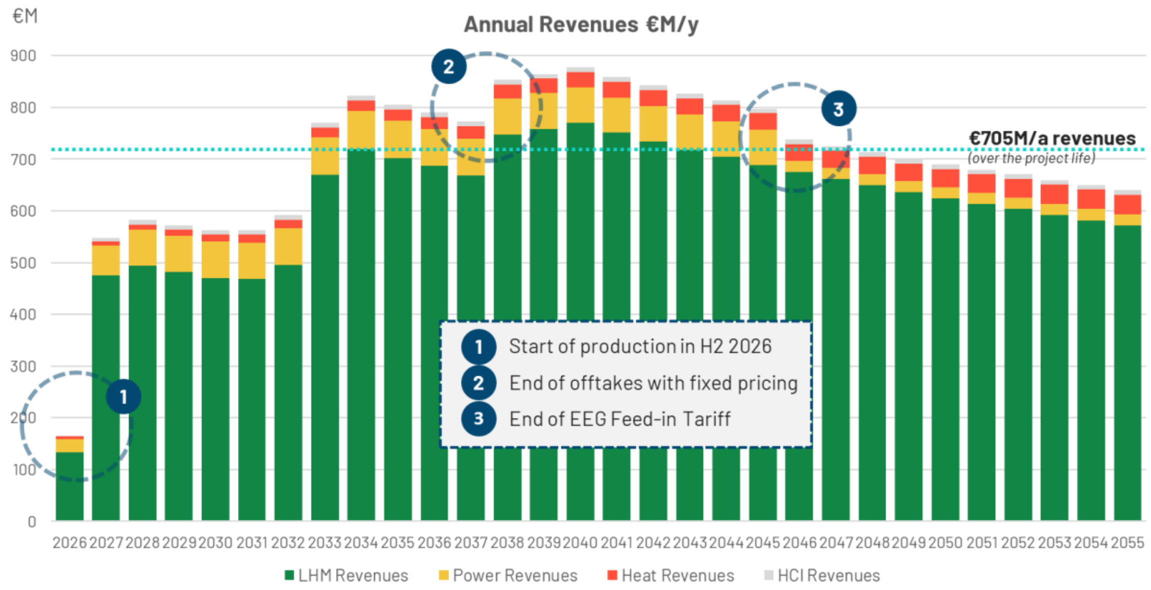


Figure 61 Base case - annual revenue €M/a.

Energy revenues dominated by baseload, renewable power sales during the EEG Feed-in Tariff period which ensures stable revenue generation for 20 years. Renewable heat supply to local communities increases over time as local demand increases. Over the life of the Project, power represents 74% of energy revenues and heat 26%, both combined amounting to €78M revenues per year.

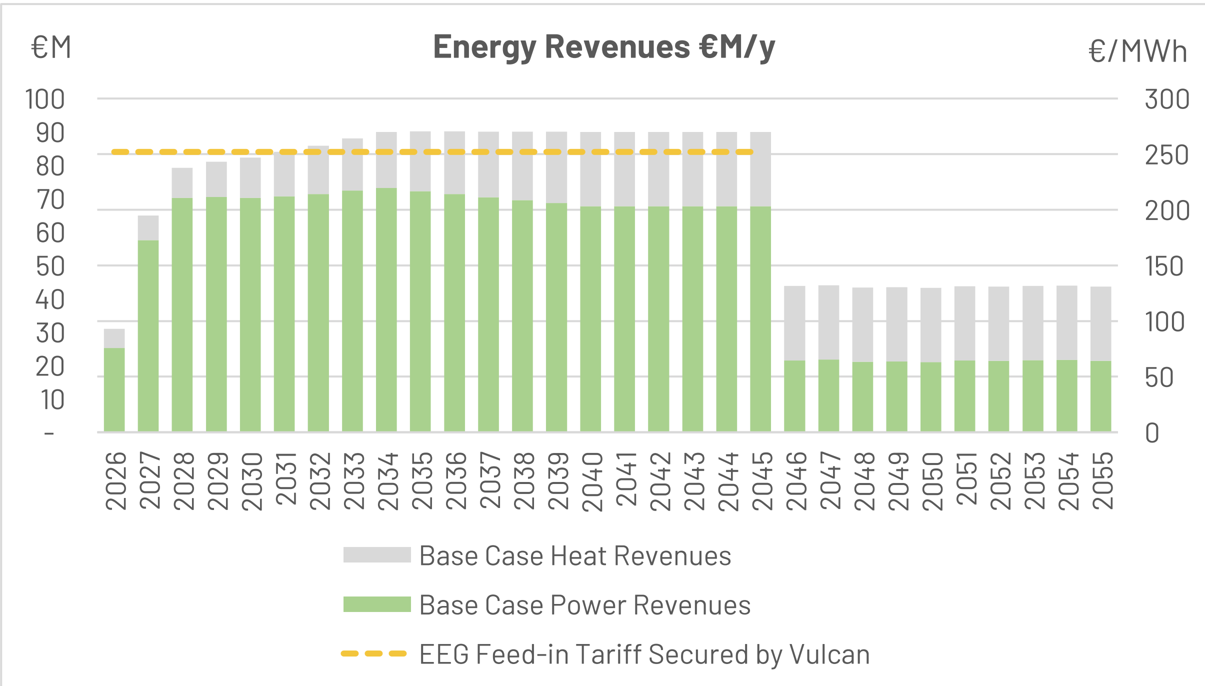


Figure 62 Energy revenue €M/a.

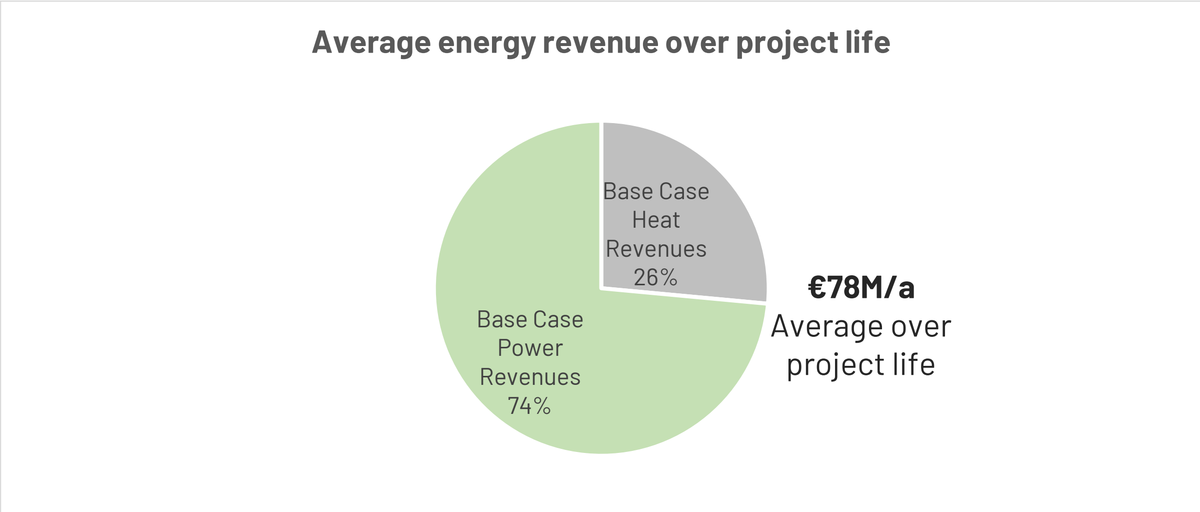


Figure 63 Average Energy revenue €M/a and split.

Phase One revenues are mostly dictated by LHM realised prices as 88% of all revenues are linked to those prices. Power accounts for 7% also drops later in the life of the project following the end of the feed-in tariff after 20 years

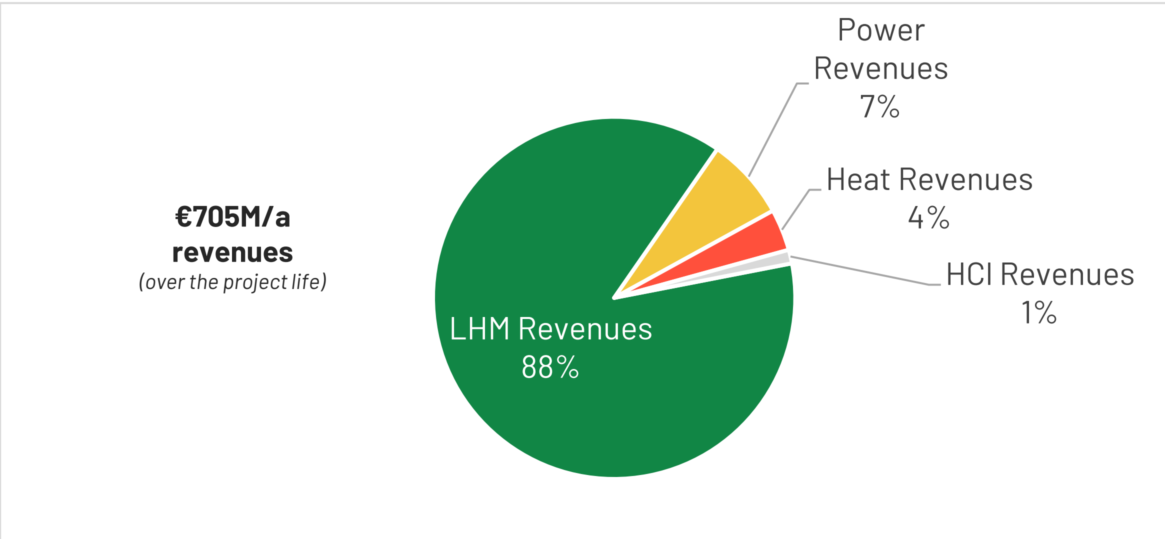


Figure 64 Phase One average annual revenues (%).

1.12.8 Project Economics

Using the above assumptions, the Project is expected to generate revenues of €705M/a over the life of the Project. The Project payback is 4.2 years. Pre-tax NPV is €3,906M and pre-tax IRR is 27.8%. Post-tax NPV is €2,566M and post-tax IRR is 22.5%.

	Base Case Financials Bridging Engineering[24]
Revenues €M/a	705
EBITDA €M/a	521
EBITDA margin %	74%
NPV pre-tax €M	**3,906**
NPV post-tax €M	**2,566**
IRR pre-tax %	**27.8%**
IRR post-tax %	**22.5%**
Payback in years	4.2
Total Capex €M	**1,399**
Avg Opex[25] €/t LHM	**4,022**
Avg LHM price 10y forecast[26] €/t	**€23,865**
Avg LHM price forecast€/t	€32,050

Table 6 Phase One - Project economics.

[24] Vulcan Energy's Phase One Bridging Engineering Study.These are targets and may not be achieved. Please refer to the Forward-Looking Statement disclaimer.

[25] *OPEX is based on a production at designed capacity at 24,600t, excluding inflation, LHM and including an average power price over the project life.*

[26] *The average forecast realised price per tonne of LHM is taking into consideration Fastmarkets long term price forecast (min 57.5% LiOH)($/kg, EU & US) and combining it with Vulcan's pricing concluded in offtake agreements which includes price floors and ceilings, fix prices, and price indexed on indexes like Fastmarkets.*

1.12.9 Sensitivity Analysis

A sensitivity analysis of the Vulcan Project has been carried out considering the LHM price, power price, FX, OPEX and CAPEX costs, flow rate and lithium concentration, at 10% increments (between +/-30%). Using these sensitivities, the analysis indicates that the Project is most sensitive to the items directly impacting revenue (flow rate, lithium concentration, lithium price and FX):

- EUR/USD: all LHM offtakes are linked to a Price Reporting Agency (PRA) with a USD index or a fixed price in USD – Vulcan is currently working on amending some of its offtake pricing mechanisms.
- Flow rate, Lithium concentration and LHM price: any fluctuation of those parameters impacts lithium output and therefore revenues. Conservative flow rates assumptions have been used in the BES. Lower LHM price forecast has also been used in the BES.
- CAPEX: Limited impact on NPV
- OPEX: as a low-cost operation, OPEX has a limited impact on financials
- Power price: limited impact as the price fluctuations impact both cost and revenues in a similar manner

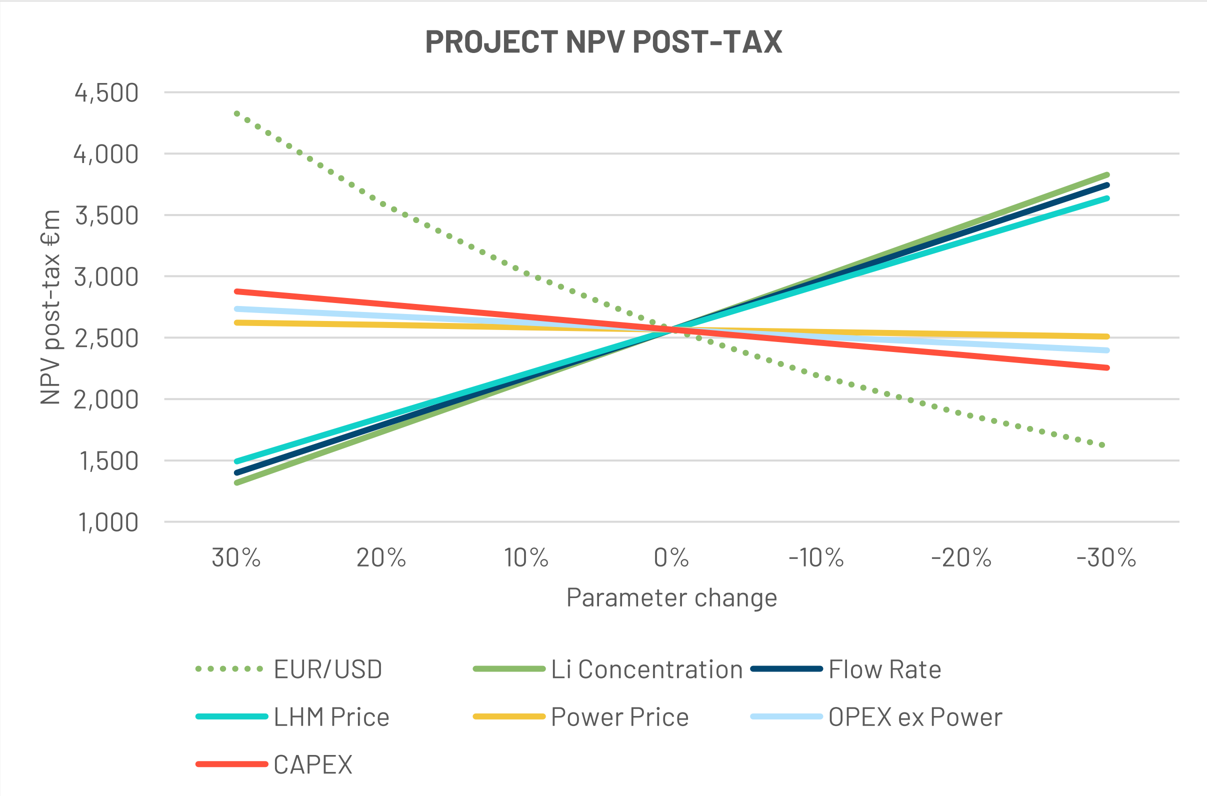


Figure 65 Post-tax NPV sensitivity – Phase One.

1.13 Financing considerations

Vulcan has made significant progress on financing. A Debt-financing market sounding was successfully completed after the DFS, led by BNP Paribas. Commercial and development banks under

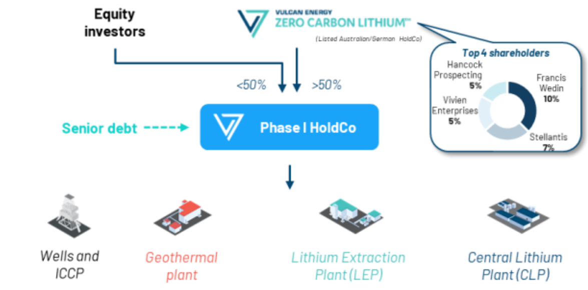
NDA expressed strong interest in participating in the process, awaiting formal start of process. Vulcan has also received substantial in-principle financing support received from government-backed Export Credit Agencies (ECAs) for financing, from France, Italy, Canada and Australia. The financing process with strategic and institutional investors for equity at the project level is set to commence in November 2023. The financing and project execution timeline has been adjusted and aligned to coincide with public grant funding application processes.

Preliminary Sources and Uses

Total CAPEX (incl. 12% contingency)	c. €1.399m
Other costs (Including financing costs, DSRA funding, ramp-up costs)	c. €0.4bn
Total equity need (assuming 65/35 gearing & including financing costs)	c. €0.63bn
Total debt need (assuming 65/35 gearing)	€1.17bn – Senior debt package
Public Funding	Not included in management case but the company is applying for public funding via different funding mechanisms

BNP PARIBAS coordinating **debt process**

Contemplated structure



Target entity	• Phase One Holdco (ProjectCo)
Business exposure	• Geothermal, LEP and CLP
Instrument	• Debt & Equity plus potential public funding
Structure	• Minority equity investment • Senior debt

Figure 66 Preliminary sources of financing and contemplated structure.

Vulcan and BNPP are launching Phase One financing process after the publication of the BES results and expect the financing process to last until mid-2024.

CONTEMPLATED PROCESS FOR EQUITY FUNDING

Official launch	• **November 2023** ✓
Phase 1 – Introduction + due diligence	• Teaser + NDA • Management firechats • Wall-cross procedure • Phase 1 Information package
Indicative offers	• **Q1 2024**
Phase 2 – Confirmatory due diligence	• Site visits • VDR access + expert sessions • Q&A
Targeted Signing	• **Q2 2024**

CONTEMPLATED PROCESS FOR DEBT FUNDING

Official launch	• **November 2023** ✓
1st Launch	• ECAs: ○ Expression of interest received from BPI ✓ ○ Expression of interest received from EDC ✓ ○ Expression of interest received from EFA ✓ ○ Expression of interest received from SACE ✓ • Structuring banks
Phase 1 – Due diligence	• ESIA – first report delivered ✓ • Lender Technical and Environmental & Social DD – Ongoing • Lender Market DD • Lender Legal DD, etc.
2nd Launch – Q1 2024	• Commercial banks
Targeted Signing	• **Q2 2024**

Figure 67 Contemplated process for Equity and Debt funding.

Vulcan targets raising its equity requirement at a project level and attracting both strategic partners (O&G, mining companies, OEMs, Chemical groups, etc.) and institutional investors (Private Equity, Infrastructure funds, Sovereign funds, Pension funds, etc.).

PROJECT LEVEL EQUITY

Vulcan targets raising its equity requirement at a project level

STRATEGIC PARTNERS

- Strategic equity partner bringing expertise, offtake capacity, credit to the project, and ability to commit large equity ticket.

Oil & Gas
Expertise in subsurface projects (incl. exploration, geothermal) and petrochemical activities

Mining
Minerals / lithium producers and processors

OEMs/ Battery
End-users. Offtakers with ability to commit equity

Chemicals
Expertise in DLE, electrolysis, petrochemical

Utilities/Construction
Large utilities with EPC and project management capacities. Large construction contractors

FINANCIAL PARTNERS

- Financial equity partner bringing long term capital with reinvestment capacity.
- Ability to commit large equity ticket for a minority stake.
- Ability to do project investment.
- Can consider a JV investment.

Private Equity with O&G / Mining record

Infrastructure

Sovereign

Pension Funds

PE & Other

TOP CO

- VUL has already raised €320m for the project.

ASX

BÖRSE FRANKFURT

Figure 68 Investor targets.

JORC Table 1

JORC Code 2012 Table 1. Section 1: Sampling Techniques and Data.

Criteria	JORC Code Explanation	Commentary
Sampling techniques	• Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling. • Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used. • Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (eg. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg. submarine nodules) may	• Vulcan's Zero Carbon LithiumTM Project Phase One Lionheart area as it pertains to Vulcan's mineral resource estimations and associated brine sampling programs contains the following licences: Insheim, Landau South, and Rift North. The Lionheart licences are located in the Upper Rhine Valley Brine Field (URVBF). Vulcan has access to existing, operating deep geothermal wells with proven drilling information and lithium brine grades within the core of the Lionheart licence area, through 100% ownership of the Insheim project and through access agreements to the Landau project. • Within the Lionheart area, geothermal wells access hot brine from the Permo-Carboniferous Rotliegend Group, Lower Triassic Buntsandstein Group, and the Middle Triassic Muschelkalk Group, (collectively, Permo-Triassic) sandstone and carbonate aquifers/reservoirs overlying the granitic basement, as well as the upper 100 m of the basement itself. Vulcan brine sampling programs collected Permo-Triassic brine samples from available wells through the following programs: ○ In 2021-23, extensive brine sampling at the Landau and Insheim geothermal wells and power plants for the lithium extraction pilot plant study was carried out. ○ In 2019-21, sampling and analysis from five different geothermal wells located throughout the URVBF (Landau Gt La1, Insheim GT2, Vendenheim and Soultz GPK2 wells) was undertaken to verify historically reported lithium concentrations. • Brine can be sampled at the well head, (the hot side of the geothermal production circuit) or after the heat exchanger (the cold side of the geothermal production circuit) prior to reinjection of the brine back down into the aquifer. Brine samples taken at the well head require a cooling mechanism (e.g., brine flows through a tube immersed in ice) and a mobile degasser unit to reduce CO2. No special equipment is required on the cold side of the production circuit. • The Mineral Resources CP for the Definitive Feasibility Study (DFS CP) for the DFS report dated February 2023 collected independent brine samples at the Landau and Insheim resource area during the November 2022 site visit and submitted these for analysis at AGAT Laboratories, an accredited and ISO 9001:2015 registered commercial analytical services firm located in Calgary, Canada. Splits of these samples were also submitted blindly to the Vulcan laboratory located in Karlsruhe, Germany. Results of the 2021-2022

	warrant disclosure of detailed information.	sampling program are consistent with previous Vulcan sampling programs and also with historical reporting associated with this field. • Brine sampling programs were conducted in 2019 and 2021 by Vulcan employees who maintained a chain of custody protocol from sample site to delivery of the samples to the Karlsruhe Institute of Technology (KIT), University of Heidelberg (Uni HD), and IBZ-Salzchemie GmbH & Co. KG in Halsbruecke, Germany, for analytical work. Industry standard collection techniques were applied to collect new samples averaging 10 litres in volume. A split of each sample collected by Vulcan in 2019 was shipped by commercial courier to the Pre-Feasibility Study (PFS) Mineral Resources CP from APEX Geoscience Ltd. and analysed at the accredited AGAT Laboratories facility in Edmonton, Alberta, Canada. In addition, four brine samples collected by GeoT were shipped by commercial courier to the PFS Mineral Resources CP in Edmonton, Alberta, Canada for analysis at the accredited and ISO 9001:2015 registered facilities of AGAT Laboratories and also at the accredited and ISO 9001:2015 registered Bureau Veritas Laboratory (formerly Maxxam Analytical). • The current Mineral Resources CP reviewed the techniques of the regional brine sampling and the Insheim resource area brine sampling programs carried out by Vulcan, along with their related analytical procedures, and concluded that these were conducted using reasonable and industry-standard techniques in the field of brine sample collection and assaying and that there are no significant issues or inconsistencies that would cause the validity of the sampling or analytical techniques used by Vulcan to be questioned. • In combination, these data support the Mineral Resource CP's conclusion that the Permo-Triassic brine in the URVBF and specifically within the Lionheart development reservoir units is consistently enriched in lithium.
Drilling techniques	• Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).	• A range of well data from various sources are available for this project covering different sections of the Mesozoic and Paleozoic rock formations of the URVBF. The majority of well data are from geothermal wells (GT) in the area that typically have been drilled into fault damage zones in the reservoir units and terminated in granitic basement. Insheim and Landau within the Lionheart development area are producing geothermal wells, the Appenhofen well on the Rift licence provides key data for the Buntsandstein reservoir, and the Vendenheim well was drilled into the granitic basement. Brühl GT1 was successfully drilled into the geothermal reservoir by a third party and was subsequently sealed, and Offenbach GT1 is an unsuccessful well that did not tap productive zones. Additional well data are available from publications addressing areas of the Landau and Römerberg oil fields or geothermal projects in Rittershoffen (e.g., well GRT-1) and Soultz-sous-Forêts (e.g., wells EPS-1, GPK-1, and GPK-2). Also contributing to the current Vulcan database are regional studies conducted in the URVBF in association with the trans-national GeORG project, which combines data from individual

		wells, excerpts from various well databases, and outcrop data to establish overall ranges on reservoir properties, lithologies and facies. • Since these are planned to be completed as part of the Field Development Plan for Phase One, Vulcan has not yet conducted any new drilling programs designed specifically to support exploration, evaluation, or resource estimation work programs. It is therefore currently reliant on its own existing, producing/re-injection geothermal wells, as well as published or otherwise available data from existing geothermal wells to characterise brine chemistry. • Geothermal and lithium production wells are usually designed with larger diameters than holes commonly drilled for production purposes in the oil industry. This is necessary to optimise fluid flow hydraulics for both brine production and injection wells. • Current geothermal well drilling in the URVBF generally consists of a 30" diameter (30") conductor casing drilled vertically to depth followed by several additional sections. These comprise a 20" surface casing in a 26" hole, a 13 3/8" intermediate liner in a 17 ½" hole, and a 9 5/8" production liner in a 12 ¼" hole, above a 7" liner in an 8 ½" hole. The final diameter hole is drilled into the targeted reservoir and to the well's total depth. Each section reduces in diameter as the drill hole deepens and their designed intervals are dependent on factors such as lithology and stability. • Drilling muds are typically water based and have weights chosen to correspond with lithological and pore pressure conditions. • Conventional rock coring within the reservoir interval may occur, and logging of cuttings returned with the drilling mud (mud logging) typically provides lithological and stratigraphical information for the units encountered (i.e., formation tops and formation thickness, etc.). Mudlogging is highly relevant in cases of drilling geothermal production or injection wells. Drilling data with regards to depth, time, rate of penetration (ROP), weight on bit (WOB), revolutions per minute (RPM), pump pressure, mud flow rates, and gas chromatography, among others, are constantly monitored and recorded. Resulting data are typically available or summarized in associated reporting.
Drill sample recovery	• Method of recording and assessing core and chip sample recoveries and results assessed. • Measures taken to maximise sample recovery and ensure representative nature of the samples. • Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to	• While Vulcan has yet to conduct any new drilling or core sampling programs within the URVBF, it owns its own production/re-injection wells in its core Insheim project and has access to operating geothermal production/re-injection wells at Landau, along with all associated technical information. This includes a large amount of drilling, geological, petrophysical and lithium brine data that apply to the Lionheart development area. • Brine samples from regional geothermal wells and the Insheim and Landau wells were generally recovered directly from the flowing brine stream within associated geothermal facility brine circuits, typically on both the "hot" and "cold" sides of such circuits. The brine sample collection method and sample collection documentation are in accordance with lithium brine industry standards and include procedures to avoid dilution of brine by drilling or process fluids prior to sample collection.

	preferential loss/gain of fine/coarse material.	
Logging	• Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies. • Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography. • The total length and percentage of the relevant intersections logged.	• Vulcan's Phase One Lionheart project area, located in the larger URVBF, benefited greatly from access to publicly available detailed lithological logs and down hole geophysical logs (where available) data for the various oil and gas and geothermal wells that occur within or adjacent to the licenced areas. Government agencies have compiled such data for more than 30,000 oil and gas wells, geothermal, thermal, mineral water and mining boreholes across the entire URVBF, within and proximal to Vulcan's resource areas. • During 2020, Vulcan acquired additional detailed lithological and downhole geophysical measurements from geothermal well Brühl GT1-3 which is located approximately 5km from Vulcan's northern licence areas. It penetrated through the same Permo-Triassic strata being assessed by Vulcan. Wireline logging runs were performed in the open hole and included: FMI-GR (resistivity image, caliper), DSI-GPIT-PPS-GR (sonic, caliper), LDS-GR (density, photo electric factor), and UBI-GR (acoustic image). The downhole information provided both qualitative (e.g., litho-logs) and quantitative information such as porosity and permeability measurements. These data were used to study and assess the hydrogeological characteristics and variations between, for example, host rock matrix porosity and fault zone fracture porosity. • From 2020 to 2022, Vulcan reinterpreted existing 2D seismic data in the Ortenau, Taro, and Lionheart (i.e., Insheim, Landau and Rift) licence areas. This interpretation benefited particularly from detailed study of historical well logs from two wells (Appenhofen 1 and Brühl GT1). These logs were acquired by companies other than Vulcan, but their content facilitated Vulcan's interpretation and correlation of subsurface stratigraphy. That is, the historical well logs data helped with interpretation of seismic line profiles and to confirm and validate key stratigraphic marker horizons including the Buntsandstein surface and various fault zones that are critical to the current resource estimation process. • In the Phase One area in late 2022 to early 2023 Vulcan acquired, processed, and interpreted state of the art depth imaged 3D seismic data. The new 3D seismic was integrated with existing subsurface data resulting in a high confidence reservoir model of the Phase One brine reservoir, which allowed for optimised well placement. • The detailed lithologic and geophysical well logging data acquired by Vulcan from various sources was assessed based on quality and resolution and incorporated into the Lionheart modelling that underlies the resource estimation program carried out by the company. • Based on validation discussions with Vulcan staff, plus review of compiled logging data and related geological and resource estimation digital models, the Mineral Resources CP has concluded that such data are acceptable for use in Vulcan's current brine resource estimation program.

Sub-sampling techniques and sample preparation	• If core, whether cut or sawn and whether quarter, half or all core taken.
	• If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.
	• For all sample types, the nature, quality and appropriateness of the sample preparation technique.
	• Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.
	• Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate/second-half sampling.
	• Whether sample sizes are appropriate to the grain size of the material being sampled.
		• As part of its lithium extraction piloting programme which has been running for 2.5 years, Vulcan collects regular samples from the hot and cold circuit sample points at Insheim and Landau, to gain an understanding of whether the geothermal plant cycle influences lithium concentration as the brine cycles through the plant.
		• The sample sizes are appropriate for industry standard brine assay testing and comparable to those documented in Vulcan's previous brine resource reports for the URVBF holdings prepared in 2019 and 2020.
		• Vulcan's sampling protocol includes collection of the following three aliquots:
		  o one aliquot of the unfiltered, non-acidized brine sample for anion analysis
		  o one aliquot of unfiltered brine with supra-pure HNO3 for total metal analysis via ICP-OES; and
		  o a filtered and acidized sample for analysing solutes (cations/ trace metals) and dissolved metal analysis via ICP-OES.
		• Insertion of Sample Blanks and Sample Standards into the sample stream is included in the Vulcan sampling protocol.
		• In addition, duplicate samples are collected at each sample site and the duplicate sample geochemical analyses was conducted at numerous laboratories that included independent University and commercially accredited laboratories. All labs have experience with analysing lithium in brine.

Quality of assay data and laboratory tests	• The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total. • For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc. • Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias)	• The brine sample collection, sample handling, analytical techniques, and QA/QC protocols used by Vulcan conform to industry standards. • The Mineral Resources CP concludes that Vulcan lithium brine sampling and analysis uses industry standard protocols and are acceptable for use in the Mineral Resource estimates.

	and precision have been established.	
Verification of sampling and assaying	• The verification of significant intersections by either independent or alternative company personnel. • The use of twinned holes. • Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols. • Discuss any adjustment to assay data.	• Vulcan has operating geothermal wells with proven drilling information and lithium grades within its Insheim licence and access to operating geothermal wells in the Landau licence, as well as access to historical and/or nearby well data. • A site visit was completed by the Mineral Resources CP for the DFS (DFS CP) who visited the Vulcan properties and Karlsruhe offices and laboratory for three full days, from November 8-10, 2022. At both the Landau and Insheim operations, the DFS CP collected five brine samples from the production wells. Two of samples were analysed at the Vulcan analytical laboratory in Karlsruhe, Germany (one sample location identified to Vulcan and one not identified). Two of the samples were analysed at the Karlsruhe Institute of Technology (KIT) Laboratory, (one sample location identified to Vulcan and one not identified). The fifth sample was analysed by AGAT Laboratories, an independent, ISO 9001:2015 registered laboratory in Calgary, Alberta, Canada (delivered by CP). All three labs routinely process high TDS brine, perform trace element analysis for lithium, and have rigorous internal QA/QC protocols. The mean lithium results from the three labs for site visit samples were similar (KIT 181 mg/L, Vulcan 177 mg/L and Canadian lab 171 mg/L). The results are also comparable to the lithium grade of 181 mg/L used in the current resource estimation for the southern Vulcan licences, which is based on previously collected data. • Verification samples were also collected by the PFS CP during site inspection in 2019. Samples were analysed at 2 separate commercial labs in Calgary, Alberta Canada (AGAT Laboratory and Bureau Veritas Laboratory). The analytical results showed a mean value of 180 mg/L Li. This result is similar to the average analytical result for Vulcan's regional well sampling and Insheim resource area well sampling programs (181 mg/L Li).
Location of data points	• Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation. • Specification of the grid system used. • Quality and adequacy of topographic control.	• The grid system used is UTM WGS84 zone 32N. • The surface Digital Elevation Model used in the three-dimensional model was acquired from JPL's Shuttle Radar Topography Mission (SRTM) dataset; the 1 arc-second gridded topography product provides a nominal 30 m ground coverage.
Data spacing and distribution	• Data spacing for reporting of Exploration Results. • Whether the data spacing, and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation	• The Lionheart Phase One Resource estimation uses subsurface lithological information from existing, operating wells within the Insheim and Landau licences, and from off-property geothermal wells including at Vendenheim and Brühl. These well locations are supplemented with extensive 2D seismic data and 3D seismic data. • Vulcan has existing, operating geothermal wells with proven drilling information and ongoing lithium grade sampling results within the Insheim and Landau resource areas that form the core of the field.

	procedure(s) and classifications applied. • Whether sample compositing has been applied.	Existing production/re-injection wells are located within 10m of each other on the surface, and within 2km of each other at the target depth. The Landau and Insheim production wells, as well as Appenhofen well, in the Measured Resource area in Phase One, are approximately 5km apart on the surface. • Subsurface 3D geological models were constructed by Vulcan, to outline the Permo-Triassic aquifers and fault domains underlying the URVBF, in support of resource estimation. Below is a description of the seismic surveys that were used to construct these models: o With several data purchases from third party public and private entities completed, the Vulcan 2D database was expanded over the past year and now includes most existing 2D seismic data sets across most of Vulcan's licence areas in the URVBF. o Late 2022 early 2023 Vulcan acquired, processed, and interpreted state of the art 3D seismic data over the Insheim, Landau South, and Rift North licences, the licences that cover the Phase One project area. o The GeORG Project provided an extensive interpreted 2D seismic grid across the URG which complemented interpretation. • The orientation of the Permo-Triassic strata is generally flat-lying and continuous in the URVBF area. High-angle faults have created a complex horst and graben structural environment. However, the Permo-Triassic strata are generally laterally continuous, despite being locally offset by rift-related faulting. It is noted that the Permo-Triassic strata have been mapped for approximately 250 km along the north-northeast strike length of the entire URVBF. • With respect to lithium brine concentration, the average brine analytical results from both the regional well sampling and detailed Vulcan sampling at the Upper Rhine Valley Brine Field resource area from 2019 to 2023 are comparable, with a combined average value of 181 mg/L lithium. In addition, these values are comparable to historical and proprietary lithium concentrations that were compiled throughout the URVBF. The combination of Vulcan-sampled and historically sampled and analysed brine shows a narrow range of lithium brine concentrations in the Permo-Triassic aquifer brine in the vicinity of and within Vulcan's licences, as well as consistency over time. • Given the consistency of the lithium grades within the reservoir, and the sedimentary, continuous nature of the reservoir itself, the data spacing, and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure (s) and classifications applied.
Orientation of data in relation to geological structure	• Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	• Vulcan has two operating geothermal wells (Insheim and Landau) with proven drilling information and ongoing lithium grade results. These wells were highly deviated to intercept fault zones that constitute corridors of high fluid flow. Based on the overall dimensions of the Permo-Triassic aquifer and consistent analytical results, no sample bias is expected.

	• If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	• The 3D geological models were constructed by Vulcan using its recent Lionheart 3D PSDM seismic data, calibrated to wells in a geophysical and structural sense, and extended to previously acquired seismic data to fully cover the Phase One and adjacent project area. Key stratigraphic markers such as top and base reservoir were correlated via its unique seismic character. Isochrone/isochore mapping was used to quality control the interpretations and to avoid unrealistic models. Fault zones were picked only where they could be positively identified in the seismic data and were correlated in consideration of their offset, dip angle and depth. Where possible, basic seismic attributes such as coherency and local structural azimuth or dip were used to validate the interpretations. • Marker horizons were validated against wireline logs and check shot data from the acquired well data drilled in or adjacent to the south and northeast portions of the URVBF resource area. • The 2022/2023 new 3D seismic data broadly confirmed the previous in-house interpretation based on existing 2D seismic data and further enhanced the confidence in the local stratigraphic record. • Access to detailed data from studies of nearby geothermal wells acquired by Vulcan in 2020 improved understanding of the hydrogeological characteristics of the fault and fracture zones within the Permo-Triassic strata. The structurally complex fault damage zones are interpreted to typically represent conduits for localised high fluid flow of mineralised brine, due to higher fracture abundance and high fracture connectivity. • In the opinion of the Mineral Resources CP, Vulcan's revised Lionheart geological models, based on the totality of seismic data and drilling data available to date, provide an acceptable level of confidence in the spatial location and orientation of the top and bottom surfaces of Muschelkalk, Buntsandstein and Rotliegend Group successions, as well as the basement surface and fault zones. Further, the resulting models are considered to provide a reasonable approach for estimating Gross Rock Volumes, for use in resource estimation.
Sample security	• The measures taken to ensure sample security.	• Vulcan's 2019 through 2022 brine sampling programs were conducted by Vulcan employees. Samples were transferred with chain of custody from sample site to analytical laboratories that included: the Vulcan Lab in Karlsruhe, the Karlsruhe Institute of Technology (KIT), University of Heidelberg (Uni HD), and IBZ-Salzchemie GmbH & Co. KG in Halsbruecke, Germany. • Independent sampling by the DFS CP was discussed earlier in JORC Table 1 Section 1, under "Verification of sampling and assaying."
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	• A review and check of the Lionheart resource estimations was completed by an external consultant independent from Vulcan (GLJ). In addition, the CP (independent of Vulcan) conducted a review of all Vulcan activities that supported resource estimation and the activities of the external resource check consultant. • The DFS CP assisted with, and reviewed, the adequacy of Vulcan's sample collection, sample preparation, security, analytical

		procedures and QA/QC protocol, and conducted a site inspection of the Vulcan Property in November 2022. • The Mineral Resources CP participated in numerous and ongoing discussions and meetings involving methods and interpretations for the exploration work to define the geometry and hydrogeological characterization of the Permo-Triassic aquifer that forms the basis of the current resource model. • Independent sampling by the DFS CP was discussed earlier, in Section 1, under "Verification of sampling and assaying."

1.14 Reporting of Exploration Results

Criteria	JORC Code Explanation	Commentary
Mineral tenement and land tenure status	• Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings. • The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.	• The Vulcan Zero Carbon Lithium™ Project area within the URVBF is comprised of 16 licences (14 exploration licences and two geothermal production licences), thirteen of which, including the Insheim production licence, are 100% owned by Vulcan. Rift North is an exploration licence where Vulcan has an agreement to develop geothermal brine projects in return for production compensation Landau South is a production licence where Vulcan has an offtake agreement with the owner operator for the existing geothermal operation, and a 51:49% JV agreement (in Vulcan's favour) to develop a new geothermal brine project on the same licence, at a separate location. All of them (apart from Lampertheim, Lampertheim II, Löwenherz, Waldnerturm and Ried) collectively cover the current lithium brine Mineral Resources described in this document. In addition, Vulcan has a further 155 km^2 of licence area applied for within the URVBF on the French side. For present purposes, the Insheim, Landau South and Rift North licences are referred to as Vulcan's Phase One Lionheart Project area. • An Exploration Licence is issued pursuant to the German Federal Mining Act (Bundesberggesetz: BBergG) which defines freely mineable mineral resources as property of the state that is administered by state authorities. Accordingly, state permits are required for exploration and extraction. Vulcan requires both an Exploration Licence and an Extraction Licence or Mining Proprietorship to ultimately produce from its holdings. Any future geothermal brine production from any site would also require granting of a Production Licence plus completion of an operating plan and planning approval procedure that comply with the Act on the Assessment of Environmental Impacts. • An Exploration Licence is granted for a maximum of five years and can be extended by a further three years under certain conditions. If exploration has not commenced within one year of the licence being granted, the licence may be revoked. The same result may apply if exploration is interrupted for more than one year. The Exploration Licence is merely a legal title for the exploration of mineral resources in the granted area and is not sufficient to carry out

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<td>technical programs such as seismic surveys or exploration work in the form of drilling. For such purposes, an operating plan (Betriebsplan) must be approved by the responsible state authority.

An Exploration Licence shall accord the holder the exclusive right to: Explore for the geothermal resources specified in the licence; to extract and acquire ownership in the resources that must be stripped or released during planned explorations; to erect and operate facilities that are required for exploring the resources and for carrying out related activities.
The CP was advised by Vulcan that all Exploration and Production Licences covering its Lionheart area were in good standing at the Effective Date of the current Mineral Resource estimate. A tabulation of Vulcan's Exploration Licence holdings within the Lionheart area is presented below.
The Insheim licence in the southern area of the licence group is 1,900 hectares and is centred at UTM 439040 m Easting, 5444442 m Northing, in the WGS84 UTM Zone 32N projection.
The Rift North licence in the southern area of the licence group is 6,483 hectares and is centred at UTM 435535 m Easting, 5442945 m Northing, in the WGS84 UTM Zone 32N projection.
The Landau South licence in the southern area of the licence group is 1,941 hectares and is centred at UTM 435916 m Easting, 5448130 m Northing, in the WGS84 UTM Zone 32N projection.
Vulcan has 100% interest in the Insheim licence. In Rift North, Vulcan has a 100% right to develop any new geothermal-lithium brine project there, subject to a production royalty. In Landau South, Vulcan has a brine offtake agreement with the owner-operator for the existing geothermal brine operation, and a 51:49 JV for a new development in the same licence.
On December 7, 2022 Vulcan and Geo Exploration Technologies GmbH, Mainz signed a shared Licence agreement. Under the terms of the agreement Vulcan has the exclusive right to explore and develop lithium and geothermal energy on the northern part of Geo Exploration Technologies' Rift North Licence based on a royalty agreement. The agreement has been approved in writing by the Rheinland Pfalz government office, which is managed by the Mainz State Office, Council for Geology and Mining, and is subject to formal registration of joint ownership of the licence by the same office.
The Insheim production Licence and Insheim Geothermal Power Plant were acquired by Vulcan through the 100% acquisition of Pfalzwerke geofuture GmbH effective on 1. of January 2022.
On November 5, 2021, Geo-x GmbH, Landau, owner of the Landau geothermal plant and Landau-Süd geothermal production licence, was granted 100% of the Ilka Exploration Licence for Lithium exploration by the Rheinland Pfalz government office, which is managed by the Mainz State Office, Council for Geology and Mining. In parallel in November 2021 Vulcan and geo-x GmbH signed a brine offtake agreement. Under the terms of the agreement Vulcan has the right to purchase and extract the lithium from the brine produced at the Landau plant until 2043. In addition, Vulcan has entered into a 51:49 JV to develop a new geothermal project on the Landau-Süd licence, separate to the existing project.

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		• The CP notes that there is always some risk or uncertainty that government regulations and policies could change between the issuance and termination dates of Exploration Licences, Production Licences and related permits issued by state authorities.
		• Any future geothermal and/or lithium brine production would require an operating plan and planning approval procedure that complies with the Act on the Assessment of Environmental Impacts.
		• In the URVBF, induced seismicity is a potential risk which can be caused by injection of brine. The CP notes that mitigation of such risk may be addressed by the following activities, among others:
		  o Performing regular seismic monitoring, as is currently practiced by Vulcan at its Insheim wells and plant;
		  o Reducing production flow rates temporarily if seismicity occurs during the operational phase.

Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	• The URV is under active exploration for its geothermal potential by multiple companies. Geothermal production is currently occurring at several sites other than those in which Vulcan is involved. As a result, important geological and brine data developed in support of non-Vulcan initiatives and evaluations is present. This has been accessed to the maximum degree possible by Vulcan for application in its own exploration and development programs. • Historical brine geochemical analytical results include historical analysis from the Landau, Insheim, Soultz, Brühl, and Vendenheim geothermal sites from 2019 to 2021. This includes samples from the Buntsandstein Group aquifer (n=6) and the Rotliegend Group-basement aquifer (n=11). The areal weighted mean concentration of these samples is 181 mg/l lithium. The historical data are presented in referenced journal manuscripts and the Mineral Resources CP has verified that the analytical protocols were standard in the field of brine analysis and conducted at university-based and/or accredited laboratories. The historical geochemical information was used as background information and was also used as part of the resource estimation process. • GeotIS and GeORG data were evaluated and used to support construction of the 3D geological model used in Vulcan's current Mineral Resource estimates. GeotIS and GeORG are digital geological atlases with emphasis on geothermal energy. They provide access to extensive compilations of well data, seismic profiles, information, and interpreted schematic cross sections from the evaluation of 2D seismic data with emphasis on deep stratigraphy and aquifers in Germany. The raw data, such as seismic data, are not available, as they are owned by the respective energy companies, but data profiles have been collated and interpreted for inclusion in the representative geo-dataset information systems. • The Lionheart Project area (Lionheart) and Taro-Lisbeth Licence area 3D modelling was improved beyond the constraints of GeoORG subsurface information through Vulcan's 2020 acquisition of 2D seismic profile lines for these areas. This 2D seismic data acquisition was then extended to Vulcan's other licence areas across the URV. These data were acquired by Vulcan specifically for

		the purpose of improving the associated 3D geological model. The seismic information and subsequent 3D geological models were re-interpreted by Vulcan as part of Vulcan's 2020-22 exploration work. • Any modelling or data artifacts within the model space were addressed by Vulcan and/or an independent consultant (GLJ) with involvement of the CP, in advance of the current Mineral Resource modelling. • Detailed studies of data from geothermal well Brühl GT-1 which is located ca. 5 km south of Vulcan's Ludwig licence and drilled in 2013, were carried out by Vulcan in 2020 to better understand the hydrogeological characteristics of the fault/fracture zones within the surrounding Permo-Triassic strata. The dataset included detailed lithological log and downhole wireline log information that included FMI-GR (resistivity image, caliper), DSI-GPIT-PPS-GR (sonic, caliper), LDS-GR (density, photo electric factor), and UBI-GR (acoustic image). Vulcan commissioned GeoT, now part of Vulcan, to describe and characterise this nearby well data. Specific focus was placed on the Buntsandstein Group pore space and micro-fractures to develop comparative models for the Permo-Triassic strata underlying the Lionheart and Taro areas. Insight gained from this detailed work was subsequently applied by Vulcan across the broader spatial extent of the URV.
Geology	• Deposit type, geological setting and style of mineralisation.	• The lithium mineralisation at the URVBF is situated within confined, subsurface aquifers associated with the Permocarboniferous Rotliegend Group, the Lower Triassic Buntsandstein Group, and the Middle Triassic Muschelkalk Group (collectively, the Permo-Triassic strata) sandstone aquifers and carbonates situated within the URVBF at depths of between 2,165 and 4,004 m below surface. • The Permo-Triassic strata are comprised predominantly of terrigenous sand facies, with minor shales, carbonates, and anhydrites, deposited in arid to semi-arid conditions in fluvial, sandflat, lacustrine and eolian sedimentary environments. • The various facies exert controls on the porosity (1% to 27%) and permeability (<1 to >100 mD) of sandstone sub-units. Within the Permo-Triassic strata, porosity, permeability, and fluid flow rates are dependent on the fault, fracture and micro-fracture zones that are targeted by geothermal companies in the URVBF. • Lithium mineralisation occurs in the brine that is occupying the Permo-Triassic aquifer pore space. • With respect to a deposit model, the lithium chemical signature of the brine is believed to be controlled by geothermal fluid-rock geochemical interactions. With increasing depth, total dissolved solids (TDS) increase in NaCl-dominated brine. Lithium enrichment associated with these deep brines is related to interaction with hot crystalline basement fluids and/or dissolution of micaceous materials at higher temperatures. • Vulcan's current URVBF geological models benefit from reinterpretation of existing 2D and 3D seismic data acquired in 2020-22 by Vulcan, as well as its 2022/2023 proprietary 3D seismic data. Depending upon the area considered, the seismic reinterpretation program mapped in detail four formation horizons based on their uniqueness within the seismic profiles. Faults were

		interpreted where doubling of a specific reflector occurs (thrust fault) or where a specific reflector is missing (normal fault). Numerous substantial faults penetrating through the Buntsandstein Group strata are interpreted for the entire Vulcan URVBF in the most recent geological model. The seismic interpretation mapped, in detail, formation horizons based on the uniqueness of the marker horizons within the seismic profiles. Faults were interpreted by evaluating every tenth inline and crossline (line spacing of approximately 20 m). To be interpreted as a fault zone, a feature was required to have a minimum horizontal extension of 400 m. Damage zone envelopes associated with particularly well-defined faults were developed through modelling and are applied as 200 m fault damage zone half widths from the fault centre. • In the opinion of the Mineral Resources CP, the current geological models provide a level of confidence that is reasonable in terms of identifying the spatial location and orientation of the Buntsandstein Group, Rotliegend Group, Muschelkalk zone, basement and constituent faults for use in the current resource estimates. • The structurally complex fault damage zone areas are interpreted from geological modelling as representing zones for localised high fluid flow of mineralised brine, due to higher fracture abundancy and connectivity.
Drill hole Information	• A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: o easting and northing of the drill hole collar o elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar o dip and azimuth of the hole o down hole length and interception depth o hole length. • If the exclusion of this information is justified on the basis that the information is	• Within the Lionheart area Vulcan has yet to conduct any new drilling or coring programs. However, the current Mineral Resource estimation was able to utilise subsurface lithological information from existing production/re-injection wells that Vulcan owns or has agreements to access, as well as historical wells within and adjacent to the holding. • There are numerous historical geothermal wells or petroleum wells drilled by other companies that extend deep enough to penetrate Permo-Triassic strata within the URVBF licence area. • Location coordinates plus orientation information for wells used to assess the lithium concentration of brine within Permo-Triassic aquifers covered by Vulcan's URVBF holdings are tabulated below. • Coordinate system: DHDN/3-degree Gauss zone 3, EPSG:31463.

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<td>not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.</td>
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<tr><th>Hole Name</th><th>Collar Easting (m)</th><th>Collar Northing (m)</th><th>Collar Elevation (m)</th><th>Azimuth (deg)</th><th>Total Depth (TVDSSm)</th><th>Top Perforation (TVDSSm)</th><th>Base Perforation (TVDSSm)</th></tr>
<tr><td>Landau Gt-La1</td><td>3436152</td><td>5450302</td><td>149</td><td>270</td><td>-2896</td><td>-2324</td><td>-2896</td></tr>
<tr><td rowspan="2">Landau Gt-La2</td><td rowspan="2">3436149</td><td rowspan="2">5450308</td><td rowspan="2">149</td><td rowspan="2">90</td><td rowspan="2">-3107</td><td>-2135</td><td>-2641</td></tr>
<tr><td>-2726</td><td>-2922</td></tr>
<tr><td>Insheim GTI1</td><td>3438343</td><td>5446624</td><td>139.78</td><td>146</td><td>-3410</td><td>-3113</td><td>-3410</td></tr>
<tr><td rowspan="4">Insheim GTI1b</td><td rowspan="4">3438343</td><td rowspan="4">5446624</td><td rowspan="4">139.78</td><td rowspan="4">146</td><td rowspan="4">-3611</td><td>-2319</td><td>-2624</td></tr>
<tr><td>-2657</td><td>-2680</td></tr>
<tr><td>-2850</td><td>-2873</td></tr>
<tr><td>-2972</td><td>-3611</td></tr>
<tr><td rowspan="2">Insheim GTI2</td><td rowspan="2">3438345</td><td rowspan="2">5446617</td><td rowspan="2">139.78</td><td rowspan="2">34</td><td rowspan="2">-3525</td><td>-2775</td><td>-3081</td></tr>
<tr><td>-3253</td><td>-3525</td></tr>
<tr><td>Soultz EPS1</td><td>3417106</td><td>5422154</td><td>176.6</td><td>n/a</td><td>-2035</td><td>-</td><td>-</td></tr>
<tr><td>Brühl GT1</td><td>3465862</td><td>5472347</td><td>98.3</td><td>n/a</td><td>-3174</td><td>-3022</td><td>-3183</td></tr>
<tr><td>Vendenheim GT1</td><td>3409685</td><td>5390570</td><td>135</td><td>~120-130</td><td>-4515</td><td>-</td><td>-</td></tr>
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<td>Data aggregation methods</td>
<td>• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.

• Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths of low-grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.

• The assumptions used for any reporting of metal equivalent values should be clearly stated.</td>
<td>• For the Lionheart licences, the average lithium content from brine collected by Vulcan from six geothermal wells, (including its 100%-owned Insheim geothermal wells and plant), was used as the representative grade for Mineral Resource Estimation. This grade was 181 mg/L Lithium (n=13 total metal analyses by ICP-OES). In addition, a detailed assessment of Permo-Triassic aquifer brine at the Insheim resource area production well yielded 181 mg/L Lithium (n=26 analyses). This grade was also used as the regional Lithium brine value for previous resource estimates (ASX, 2020), and also for the current update. These brine geochemical results demonstrate that the Permo-Triassic brine in the Upper Rhine Graben has a relatively homogeneous lithium chemical composition in the vicinity of Vulcan's central and southern licence areas.
• The brine geochemical data presented and evaluated by Vulcan represent laboratory analytical values. Averaging of results has been carried out in some instances but resulting mean values are clearly identified as such where this has taken place.
• Elemental lithium values applied in the current Vulcan resource estimate were converted to Lithium Carbonate Equivalent ("LCE") using a conversion factor of 5.323, based on the stoichiometric quantity of lithium in Li_2CO_3. Reporting lithium values in LCE units is standard lithium industry practice.</td>
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<td>Relationship between mineralisation</td>
<td>• These relationships are particularly important in the</td>
<td>• Vulcan has operating geothermal wells with proven drilling information and ongoing measurement of lithium grades, within the Insheim and Landau licences in the core of the field.</td>
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widths and intercept lengths	reporting of Exploration Results. • If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported. • If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').	• With respect to the geothermal well data used, all engineering aspects of the wells are documented. Hence, the Mineral Resources CP has a good indication of the true vertical depths of the perforation windows used to sample and pump brine from the Permo-Triassic aquifers to the surface, for geothermal power generation. • As mineralisation is related to liquid brine within a confined aquifer, intercept widths are not a critical concept. Well perforation points essentially gather mineralised brine from the aquifer at large, assuming the pumping rate is sufficient to create drawdown in the aquifer.
Diagrams	• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	• The current associated News Release and previous News Releases by Vulcan include explanatory figures that were used in reporting of Project information to support respective resource estimation disclosures. • All map images include scale and direction information such that the reader can properly orientate the information being portrayed.
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	• Comprehensive reporting of all exploration results is presented in the associated News Release and in the Technical Reports associated with Vulcan's URV Exploration Licences. • There are no outlier analytical results in the geochemical dataset used to evaluate the lithium concentration of Permo-Triassic aquifer brine. The lithium brine values, within analytical error margins, are interpreted to be relatively homogenous in the vicinity of Vulcan's Exploration Licences, as informed by brine analytical data assembled by Vulcan.
Other substantive exploration data	• Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical	• A substantive amount of historical data was used to investigate and characterise the configuration and hydrogeological properties of the Permo-Triassic aquifers. These aquifers include the Buntsandstein Group, Rotliegend Group and Muschelkalk Group. Hydrogeological properties include porosity and permeability. Historical geochemical data were used to assess the lithium concentration in Permo-Triassic aquifer brine. A total of 43 historical brine analysis records were compiled. These historical

	survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	data were verified by Vulcan, and it is the opinion of the Mineral Resources CP that: • The Permo-Triassic aquifer is relatively homogeneous in terms of lithium concentration within the extent of Vulcan's Lionheart Licences. • The verification of historical geochemical results produced a geochemical dataset that is adequately reliable for inclusion in the current resource estimation. • During 2020, Vulcan commissioned GeoT, now part of Vulcan, to: 1) review the acquired seismic information and nearby well data, 2) to conduct hydrogeological characterisation studies specific to URVBF Permo-Triassic fault/fracture zones, and 3) make inferences on potential geothermal well (and Lithium brine) production scenarios and their influence on fluid flow within and adjacent to fault/fracture zones. The Mineral Resources CP has reviewed a series of related internal reports and found them to be factually prepared by persons holding post-secondary degrees with an abundance of experience and knowledge in geothermal and geochemical evaluation within the URVBF. • Numerous geothermal, or oil and gas wells, were historically drilled by companies other than Vulcan within the boundaries of the URVBF licences. • Intersected formation tops were reviewed for five historical wells in the Lionheart (i.e., Insheim, Landau, and Rift) development area. Two of these wells (Insheim GTI1 and GTI2) intersected formation tops of the Muschelkalk, Buntsandstein and Rotliegend groups as well as the basement rock.
Further work	• The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling). • Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	• The following next steps are planned as Vulcan progresses the Field Development Plan and execution of its Zero Carbon Lithium™ Project Phase One in the Upper Rhine Valley Brine Field: o Drill development wells in the Lionheart area per the plan outlined in this Bridging Study with first wells to be drilled at the Schleidberg well site. There are several benefits from the early development of these wells: ✓ To gather improved reservoir data through enhanced well logging, well tests, and core data which will further improve the geomodel and reservoir models, resulting in improved static and dynamic models. ✓ Validate the flow rate assumptions for brine production and re-injection further to the data available from the existing Insheim and Landau wells. o Conduct flow tests and pressure transient analysis at the new wells to validate assumptions for lithium concentrations in the brine, compositional analysis of the produced fluids, and reservoir behavior. This data will aid in validation of assumptions, improved reservoir modelling, further drill plans for well placement, and operational strategies. o Conduct research on the potential for a "recharge effect" on lithium from basement rocks, to estimate the long-term effects on the lithium resources in the region and incorporate into the dynamic flow models.

		○ Continue with optimization of the execution plan and preparation for operational readiness.

1.15 Estimation and Reporting of Mineral Resources

Criteria	JORC Code Explanation	Commentary
Database integrity	• Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes. • Data validation procedures used.	A review of compiled data was conducted by the Mineral Resource CP who, to the best of their knowledge, can confirm the data was generated with proper procedures, has been accurately transcribed from the original source and is suitable for use in the resource estimations. Independent sampling by the DFS CP was discussed earlier in Section 1, under "Verification of sampling and assaying." 3D geological models were prepared for the Vulcan licences, with the use of extensive 2D seismic data and 3D data. These data were interpreted by Vulcan and represented in modelling software Petrel. Interpreted features included picks for the upper and lower surfaces of the Muschelkalk Formation, Buntsandstein Group and Rotliegend Group, plus fault locations. Model representations were checked by the Mineral Resources CP (GLJ). In the opinion of the Mineral Resources CP, these geological representations, and the seismic data used to develop them are reasonable and appropriate for resource estimation. Numerous hydrodynamic property studies and data were compiled from throughout the URVBF by Vulcan, to support the selection of appropriate values for Effective Porosity (Phie) and Net to Gross ratio (NTG) to use in resource estimation. In the opinion of the CP, these studies, and the resource estimation parameters that were derived them, are reasonable and appropriate. Based on the Mineral Resources CP's previous experience in estimating lithium brine resources, and the DFS CP's extensive experience with associated sampling and analytical protocols, the CPs are satisfied with the integrity of the chemistry, geological and hydrodynamic datasets and information sources used to estimate Mineral Resources. For an additional summary of the lithium analytical results used in the resource estimation, please see ASX announcements by Vulcan dating 13 February 2023, 20 August 2020, and 4 December 2019. Recent lithium data from the lithium extraction Pilot Plant operations at the Insheim-Landau geothermal wells was materially similar and reinforced the confidence in the average values derived from these original results, within analytical error.
Site visits	• Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	The DFS CP visited the Vulcan properties and Karlsruhe offices and laboratory for three full days, from November 8-10, 2022. The inspection included detailed tours of the two operating sites (Landau and Insheim), a review of the in-progress 3D seismic survey on the Insheim licence, and reconnaissance visits to all the remaining licences.

	• If no site visits have been undertaken indicate why this is the case.	Independent sampling by the DFS CP was discussed earlier in Section 1, under "Verification of sampling and assaying."
Geological interpretation	• Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit. • Nature of the data used and of any assumptions made. • The effect, if any, of alternative interpretations on Mineral Resource estimation. • The use of geology in guiding and controlling Mineral Resource estimation. • The factors affecting continuity both of grade and geology.	The addition, and reinterpretation, of new and existing 2D and 3D seismic data, combined with verification of lithium grades over time from lithium pilot plant operations at the geothermal production well sites, significantly increased the Mineral Resources CP's confidence level in the subsurface 3D geological models that supported resource estimation. The interpreted seismic data and subsequent structural model enabled the Mineral Resources CP to create detailed Muschelkalk zone, Buntsandstein Group, Rotliegend Group surfaces. The 2D seismic profiles (including the GeORG data and other more recently acquired data) covered 100% of Vulcan's URVBF licences. Using the seismic profiles, subsurface stratigraphic horizons were correlated throughout the Lionheart licences. The marker horizons were validated against wireline logs from wells drilled in the southern and adjacent to the northern portions of the Lionheart licence areas. The fault/fracture zones were distinguished in the seismic profiles. The vertical displacement of the fault zones on the seismic profiles enabled definition of the activity level of the fault zone, with many interpreted to be active. The fault zones were picked only where they could be positively identified in the seismic lines and the faults were correlated in consideration of their offset, dip angle and depth. The vertical displacement of the fault zone on the seismic profiles was also used to make calculated inferences on the horizontal width of the fault zone in the geological model. The addition of 2D and 3D seismic data significantly increased the confidence level in the subsurface 3D geological model.
Dimensions	• The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.	The geometry of the Permo-Triassic strata in the URV has a gentle northward dip at the southern end of the field (i.e., at the Ortenau licence area) which transitions to a south-east dip further northwards at the Taro licence area. The top and base surface elevations of the Buntsandstein Group under the URV licences are approximately from 2000 m (south) to 3800 m (north) subsea (m SS) with an average thickness range of 310 m in the north and 380 m in the south, up to 475m thick locally. The top and base surface elevations of the Rotliegend Group under the URV licences south of the Taro licence are approximately from 2200 m SS to 3300 m SS with an average thickness range of 120 m to 310 m, across the URV.
Estimation **and modelling techniques**	• The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data	*The Lithium Resource is defined as the summation of the following, for all unique units within a given Licence:* *Total Volume of the Brine-Bearing Aquifer (GRV) x Average Effective Porosity (Phie) x Average Net to Gross (NTG) x Average Concentration of Lithium in the Brine (C).*

points. If a computer assisted estimation method was chosen include a description of computer software and parameters used.

- The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.
- The assumptions made regarding recovery of by-products.
- Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).
- In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.
- Any assumptions behind modelling of selective mining units.
- Any assumptions about correlation between variables.
- Description of how the geological interpretation was used to control the resource estimates.
- Discussion of basis for using or not using grade cutting or capping.
- The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.

- The parameter values used in the Resource Estimate are summarised in the table below.

Licence/ Area	**Reservoir**	**Classification**	**GRV** km^3	**Avg. NTG** %	**Avg. Phie** %	**Avg. Li** mg/L	**Elemental Li** t	**LCE** kt
Insheim	*MUS, BST, ROT, BM	Measured	13	69	9	181	151,823	808
Rift-North	*MUS, BST, ROT, BM	Measured	9.5	70	9	181	110,181	586
	*MUS, BST, ROT, BM	Indicated	29	71	9	181	355,443	1892
Landau South	*MUS, BST, ROT; BM	Measured	12	68	9	181	134,677	717
	*MUS, BST, ROT; BM	Indicated	2.7	69	9	181	29,620	158
Flaggenturm	BST	Indicated	7	90	10	181	115,215	613
	BST	Inferred	37	65	9	181	391,201	2,082
Kerner	BST	Indicated	5	90	10	181	76,242	406
	BST	Inferred	13	65	9	181	132,558	705
Kerner Ost	*MUS, BST, ROT	Indicated	4.3	73	8	181	66,708	355
Taro	*MUS, BST, ROT	Indicated	14.5	73	8	181	237,362	1,263
Ortenau	*MUS, BST, ROT	Indicated	57	73	8	181	659,013	3,507
	BST	Inferred	105	73	8	181	1,883,212	10,024
Mannheim	BST	Indicated	4	90	10	153	54,111	288
	BST	Inferred	32	65	9	153	290,312	1,545
Ludwig	BST	Indicated	7	90	10	153	93,220	496
	BST	Inferred	22	65	9	153	199,226	1,060
Therese	BST	Indicated	2	90	10	153	29,907	159
	BST	Inferred	22	65	9	153	200,708	1,068
						mg/L		**kt**
Total LCE		**Measured**				**181**		**2,112**
		Indicated				**178**		**9,137**
		Inferred				**172**		**16,484**

Note 1: Mineral Resources are not Ore Reserves and do not have demonstrated economic viability.

Note 2: The weights are reported in metric tonnes (1,000 kg or 2,204.6 lbs). Numbers may not add up due to rounding of the resource value percentages.

Note 3: Reservoir abbreviations: MUS – Muschelkalk Formation, BST – Buntsandstein Group; ROT – Rotliegend Group; BM - Basement.

Note 4: To describe the resource in terms of industry standard, a conversion factor of 5.323 is used to convert elemental Li to Li_2CO_3, or Lithium Carbonate Equivalent (LCE).

Note 5: NTG and Phie averages have been weighted to the thickness of the reservoir. These averages are consolidations of multiple local zones and therefore multiplied together will not equate to the global elemental lithium values presented. The elemental lithium values presented are determined separately using detailed data for each zone and then summed together to show a total value for the purposes of this summary table.

		Note 6: GRV refers to gross rock volume, also known as the aquifer volume. GRV values presented in this table are rounded to the first significant figure for presentation purposes. The elemental lithium values presented are calculated using GRV values that have not been rounded. Note 7: Mineral Resources are considered to have reasonable prospects for eventual economic extraction under current and forecast lithium market pricing with application of Vulcan's A-DLE processing. Note 8: The values shown are an approximation and with globalised rounding of values in the presented summary table as per JORC guidelines, cannot be multiplied through to achieve the Mineral Resource estimated volumes shown above. • The workflow implemented for the calculation of the Vulcan lithium-brine resource estimations included the following steps: o Based on seismic information, the geometry of the top and bottom surfaces of the Muschelkalk, Buntsandstein, and Rotliegend (where resolvable) were defined as well as 100 m of Basement o Based on seismic information, the faults within the Muschelkalk, Buntsandstein, and Rotliegend (where resolvable) were defined. o A conservative Fault Damage Zone (FDZ) half-width of 200m was defined for all faults based on the average displacement across the faults within the URVBF. o Estimation of volumes for applicable matrix bodies (Buntsandstein only) and FDZs within applicable geological units (depending on licence). o Identification of applicable Effective Porosity and Net to Gross Values for each of the volumes estimated above. The Effective porosity was based on wireline well log data of three wells within the URVBF (Appenhofen 1, Offenbach GT1, and Brühl GT1) as well as published porosity and permeability core plug measurement data within the URG (see Estimation Methodology section for references). In total, there are over 300 effective porosity measurements from core and outcrop analysis, and over 250 permeability measurements and/or interpretations for the Buntsandstein Group. Data points for the Rotliegend group include 62 core plug porosity measurements, as well as over 550 permeability measurements from core plugs. Porosity versus permeability plots using these data help determine cut-offs for effective fluid flow within reservoirs (Canadian Oil and Gas Evaluation

		Handbook, 2005; Nelson, 1994) achievable because of the availability of production data from producing geothermal and oil and gas wells within the URVBF (Landau 207, 211, Appenhofen 1, Römerberg A to E). For the Permo-Triassic sediments in the URVBF, a porosity cut-off of 5 %, equivalent to a permeability cut-off of 0.02 mD, is reasonable for significant fluid flow to occur. Net thickness is then determined from this relationship by applying the 5 % effective porosity cut-off to the gross interval thickness. Determination of applicable average lithium concentration (C) for each licence, based on Vulcan's brine sampling and interpretation program. Determination of average grade (C) is discussed under "Data Aggregation" Methods" in Section 2. o Spreadsheet compilation of all volumes and applicable parameter values, followed by resource calculation, according to the equation noted above. o Confirmation of reasonable prospects of eventual economic extraction for the identified resource zones. • The current Mineral Resource estimations replace and supersede the previously published estimates for the Insheim, Landau (Landau South) and Rift (Rift North) licences. • The only element being estimated is lithium, and consideration of deleterious elements is beyond the scope of this project and resource estimate. Determination of such factors is dependent on application of specific mineral processing and lithium recovery flowsheet assessments and comprehensive market studies. Based on the lithium extraction piloting that Vulcan has conducted since April 2021, no deleterious elements have been noted which have a materially negative effect on Vulcan's sorption-type lithium extraction process. • In the case of Landau South, Insheim and Rift North, the extent of the Measured Resource domain was estimated through dynamic modelling of a reasonable, future, full-scale recovery, and injection system. The overall circulation footprint of the system over a 15-year simulation period was used as the outer boundary (footprint) of the Measured Resource domain. This footprint generally conformed with the full spatial extents of the Insheim licence, and most of the Landau South licence. In the case of Rift North, the circulation footprint was considerably less than the licence extent. Portions of Rift North and Landau South that extend beyond the footprint were defined as Indicated Resource. • The average lithium-in-brine concentration used in the resource estimations is 181 mg/L. • No top cuts or capping upper limits have been applied, or are deemed to be necessary, as confined lithium brine deposits

		typically do not exhibit the same extreme values as precious metal deposits. This statement is applicable to the Permo-Triassic aquifer lithium brine data in this study. • A cut-off grade / resource quantity analysis was not strictly applicable to the resource, due to the use of average grade in the static resource estimate. However, it is noted that a grade for economic extraction of 100 mg/L has been established on a provisional basis for the lithium extraction process, and that all resources are currently estimated to exceed that grade. • The unit volumes, parameter values, and resource estimate calculations were checked and validated by the Mineral Resources CP. In the opinion of the CP, the volumes, parameter values and calculations are appropriate and provide Resource Estimate results that are reasonable for the assigned resource categories.
Moisture	• Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	• Not applicable. The lithium resource in the URV is a brine-hosted resource.
Cut-off parameters	• The basis of the adopted cut-off grade(s) or quality parameters applied.	• Cut-off considerations are discussed above.
Mining factors or assumptions	• Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	• It is the CPs opinion that geothermal facilities and lithium brine extraction operations represent a feasible co-production opportunity. • Vulcan's lithium brine extraction pilot plants in Landau and Insheim (or future commercial operations) are situated after the heat exchanger, and therefore do not influence the geothermal operations of the plant. Any future plants would follow the same approach. • Assuming the lithium extraction process causes only small compositional changes to the brine (which has been preliminarily shown in the geochemical data), the lithium-removed brine, as well as any evolved gases, could return to the subsurface aquifer via a reinjection well. Hence, it is assumed both operating interests (geothermal and lithium) are extracting their own commodity of interest with minimal interference between the two processes. • It is assumed that Vulcan could drill their own production/re-injection wells at the Lionheart licences to expand the existing production in the core of Vulcan's field. The 3D geological models completed for each licence shows there is a high degree of faulting with potential for high fluid flow in the Permo-Triassic strata underlying the Lionheart. • Dilution from re-injected brine has been factored into the production study on Phase One areas conducted by Vulcan, which shows a 1.8% annual lithium grade reduction on average over the project life. Since this study was limited to brine modelled within the confines of the licence area, and since any potential "recharge

		effect" from basement rocks was also not modelled, this could prove conservative.
Metallurgical factors or assumptions	• The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	• Vulcan uses an Adsorption-type Direct Lithium Extraction (A-DLE) process, similar to commercially operating A-DLE processes used on salar-type brines in Argentina and China. Because of environmental and meteorological considerations, Vulcan uses geothermal heat, instead of fossil gas and solar evaporation ponds, to drive the adsorption process and drive the subsequent concentration of the lithium eluate respectively. • It is the opinion of the CP that the extraction of lithium from salar-type brines using adsorption is commercially proven having been used since the 1990s, and the use of adsorption on the particular Upper Rhine Valley brine chemistry provides no technical impediment to the same process being applied, as evidenced by Vulcan's 2.5 year piloting programme. • Vulcan's lithium engineering team designed, and has since operated, a lithium extraction pilot plant demonstrating the sorption process on its geothermal brine since April 2021. Vulcan Energy Resources has operated its pilot plant at two existing geothermal operations (Insheim and Landau) since April 2021. The results of this operation back up the assumptions used in Vulcan's feasibility study and provide the basis for assumptions and predictions regarding metallurgical amenability. For the Lionheart Phase One of Vulcan's commercial operation, brine from these geothermal operations, combined with brine from additional planned geothermal production wells in the vicinity, will feed one lithium extraction plant (LEP), for a total annual rate of 24,000 TPY lithium hydroxide monohydrate (LHM) equivalent capacity in lithium chloride (LiCl).
Environmental factors or assumptions	• Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields Project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the	• German Federal and State policy is targeting net zero power and heating production, and EU policy targets the onshoring and bolstering the sustainability of lithium and other critical raw materials production. It is the opinion of the CP that combined geothermal energy and lithium extraction projects such as Vulcan's Zero Carbon Lithium™ Project have the necessary environmental credentials to enable stakeholder support. • Vulcan's process has been designed to be very low waste and circular, in that all brine produced is re-injected into the reservoir, in materially the same state but just with most of the lithium extracted. The surface footprint of planned operations, being geothermal wells and plant, and lithium extraction plants, are very small compared to a traditional mine or salar operations, and sites have been selected to be located on industrial or farming land. It is therefore likely that Vulcan will have a low environmental impact, and in fact will have a net positive effect on the climate by decarbonising the lithium supply chain and energy supply. • In Lionheart, induced seismicity is a potential risk which can be caused by injection of brine. The CP notes that mitigation of such risk may be addressed by the following activities, among others:

	environmental assumptions made.	- Performing regular seismic monitoring, as is currently practiced by Vulcan at its Insheim wells and plant; - Reducing production flow rates temporarily if seismicity occurs during the operational phase.
Bulk density	- Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples. - The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit. - Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	- Bulk density is not applicable, or necessary to be applied, to the liquid, brine-hosted resource. - Details of the resource calculations are provided above.
Classification	- The basis for the classification of the Mineral Resources into varying confidence categories. - Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data). - Whether the result appropriately reflects the Competent Person's view of the deposit.	- The Vulcan Lionheart lithium brine project has reasonable prospects for economic extraction based on aquifer geometry, delineation of fault zones using re-interpreted 2D and 3D seismic data, brine volume, brine composition, hydrogeological characterization, porosity, fluid flow, and the advancement of Vulcan's lithium adsorption technology and subsequent testwork through their pilot plants through thousands of hours of continuous processing data, and thousands of cycles of testwork. - The updated Lionheart lithium brine Mineral Resource estimations are classified as Measured and Indicated Mineral Resources, depending on location and availability of data. - Pertinent points to support a Measured and Indicated Mineral Resource classification within the producing core of the Upper Rhine Valley Brine Field, and Indicated classification within the wider fault damage zones include: 1) a greater level of confidence in the subsurface geological model due to Vulcan's acquisition of detailed 2D and 3D seismic data, 2) acquisition of a detailed downhole geophysical dataset to analyse the hydrogeological characteristics of a fault-associated fracture zone within a geothermal well, and 3) knowledge of Vulcan's commissioned

		lithium adsorption mineral processing testwork and results, following thousands of hours of testwork conducted over the course of 2.5 years, 4) Vulcan's acquisition of production/re-injection wells in the core of the field at Insheim, and agreement to access other production/re-injection wells at the neighbouring Landau geothermal plant, which has resulted in hundreds of additional analyses from live geothermal brine, and 5) Vulcan's integration of extensive reservoir production simulation into its models. The Mineral Resource estimate has been prepared by a multi-disciplinary team that include geologists, reservoir engineers, hydrogeologists, geothermal specialists, and chemical engineers with relevant experience in Permo-Triassic and other brine geology/hydrogeology and lithium brine processing environments. There is collective agreement that the Vulcan project has reasonable prospects for economic extraction at current and forecast lithium market pricing levels. Technical Report author Gabriella Carrelli, M.Sc., P. Geo takes responsibility for this statement, as Mineral Resources CP.
Audits or reviews.	• The results of any audits or reviews of Mineral Resource estimates.	• Vulcan's Lionheart Phase One lithium brine project consists of one field with one production centre fed by multiple well sites. Current resource estimation methodologies have been compared to past estimation methods utilised in the DFS and PFS.
Discussion of relative accuracy/ confidence	• Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate. • The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions	• In the opinion of the Mineral Resources CP, the Lionheart Measured and Indicated lithium brine Mineral Resource estimations are reasonable for the Permo-Triassic aquifer within the Vulcan Lionheart licences. • Risks and uncertainties as they pertain to the lithium brine Mineral Resource estimate include: o Risks and uncertainties associated with deep geothermal brine exploration are linked to the high cost of deep well drilling. As development continues, incorporation of associated results will reduce inherent Mineral Resource uncertainty and project risk. o The reader should be aware that the reality of any geothermal or lithium brine recovery program is that the extent of brine recovery from the resource estimate zone will be a function of the design of the recovery/reinjection system and the connectivity of the subsurface brine zones. To some extent, it will not be feasible to capture all brine from the subsurface strata included in the resource estimate. o The planned brine production system will be based on doublets with a production well and reinjection well. It is noted that dilution factors caused by injecting the spent brine into the hydraulic system could influence the operational timeline of a given

	made and the procedures used. • These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	well doublet, beyond the extent to which already modelled. ○ Localised high permeabilities can lead to channeling effects such that the geothermal reservoir potentially becomes inefficient in terms of capturing brine from a broader zone. Thus, the exploitation of fault zones can constitute a trade-off between high permeability and reduced reservoir volumes.

1.16 Estimation and Reporting of Ore Reserves

Section 4: Estimation and Reporting of Ore Reserves

Criteria	• JORC Code Explanation	• Commentary
Mineral Resource estimate for conversion to Ore Reserves	Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve. Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resource estimate was undertaken by the Mineral Resources CP as outlined in JORC Table 1 Section 3 above and takes into account the reasonable potential for eventual extraction, based on aquifer geometry, delineation of fault zones using re-interpreted 2-D and newly acquired 3-D seismic data, brine volume, brine composition, hydrogeological characterization, porosity, fluid flow, and the advancement of Vulcan's lithium sorption technology and subsequent test runs through their pilot plants. The Ore Reserve estimate was undertaken by the Ore Reserves CP as outlined in this section. Proved and Probable Ore Reserves are defined based on the Measured Mineral Resources for Lionheart, as required by the JORC Code. All Mineral Resources are reported inclusive of Ore Reserves.
Site visits	Comment on any site visits undertaken by the Competent Person and the outcome of those visits. If no site visits have been undertaken indicate why this is the case.	The Ore Reserves CP conducted a site visit on November 8-10, 2022. The visit included the Insheim geothermal plant, and the Landau geothermal plant which are operational. The visit also included the Vulcan laboratory in Karlsruhe. The site visit included 3D seismic operations while running Vibroseis equipment in the Insheim area. The site visit included the Vulcan corporate offices in Karlsruhe to interview Vulcan staff responsible for all aspects of the project to review the dynamic flow modelling, field development plans, drilling plans, geothermal and lithium process engineering design, infrastructure design, regulatory, environmental, costs, economics, marketing, and communications plans.
Study status	The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.	This Bridging Study for the Zero Carbon Lithium™ Project within the Phase One Lionheart area has been completed as of November 16, 2023, per this JORC Table 1.

	The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.	The Bridging study is preceded by the DFS, with Taro excluded in this report from Phase One as part of the optimization efforts to centralize the project to one area. The Bridging study has defined field development plans for Lionheart which are based on updated dynamic flow modelling linked to the revised geologic models (See JORC Table 1 Section 3). An iterative approach was taken to define optimal well placement. A well network has been defined for the design case which includes addition of 9 producer wells and 15 injector wells at Lionheart, to supplement the existing 2 doublets at Insheim and Landau. The modifying factors have been tested at several Vulcan pilots and have high level of certainty with technical and economic viability. The Definitive Feasibility Study (DFS) was completed in February 2023, which covered Phase One to include Lionheart and Taro. Different to the PFS is deferral of Ortenau to Phase 2. A Pre-Feasibility Study (PFS) was previously completed in January 2021, for Taro-Lisbeth and Ortenau. The results of the 2021 PFS and Phase 2 data reported in the DFS should be treated with caution until they are updated with more recent parameters.
Cut-off parameters	The basis of the cut-off grade(s) or quality parameters applied.	A cut-off of 100mg/L Li has been applied to the production forecasts used in the field development plans. Dilution from the original 181 mg/l Li concentration is included in the forecasts with economic cut-off assumed at 100 mg/l Li. This cut off is not reached in the base case used in this study. For the low case, production economics are cut around the 20 year mark when lithium concentration drops below 100 mg/l Li in low case, and this still produces a positive NPV. In future studies, this cut off will be tested, as it is anticipated that the plant can run profitably below this level.
Mining factors or assumptions	The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e., either by application of appropriate factors by optimization or by preliminary or detailed design). The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc. The assumptions made regarding geotechnical parameters (e.g., pit slopes, stope sizes, etc),	Measured Mineral Resources from the Lionheart licences are converted to Proved and Probable Ore Reserves, based on the results of the Bridging Study and with consideration of the modifying factors identified in the study. The results of the pilot tests for lithium extraction and electrolysis for conversion of LiCl to LHM have been taken into consideration in the Bridging study engineering design. The mining method is dictated by the deposit type, in which brine is hosted in pore spaces between grains of sediments and within natural faults and fractures. Deep wells are installed to allow for production of lithium enriched geothermal brine from the reservoir fault and matrix systems to the wells utilizing a pumping system to overcome hydraulic head. The lithium depleted brine is then reinjected back to the reservoir through injection wells. There is no open pit or underground excavation (because the brine is pumped out from wells) and no geotechnical

	grade control and pre-production drilling. The major assumptions made, and Mineral Resource model used for pit and stope optimization (if appropriate). The mining dilution factors used. The mining recovery factors used. Any minimum mining widths used. The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion. The infrastructure requirements of the selected mining methods.	parameters are directly measured. The future change of lithium concentration in wells will be monitored as part of the future monitoring and pumping activities. No brine recharge has been factored into this study due to the nature of the deep brine resource and the historical data from over 10 years of active geothermal doublet operations. This will be monitored when new wells and production starts in the future for Phase One. The mining recovery conversion from Resources to Reserves is typical of results for lithium brine operations, taking account of losses/recoveries through the recovery method and production plant. The lithium recovery estimated for the lithium extraction process design vary over the project life as lithium concentrations vary but the average recovery is 93.9% of the produced lithium production. Minimum mining widths are not relevant in the context of this Vulcan Project as there is no open pit mine. Inferred and Indicated Resources are not considered for the purposes of the production plan and Reserves for the Lionheart Phase One district. The infrastructure required for brine extraction is the establishment of the proposed well network, well sites, pipeline and power infrastructure, ORC plants, LEP surface facilities, and CLP surface facility.
Metallurgical factors or assumptions	The metallurgical process proposed and the appropriateness of that process to the style of mineralization. Whether the metallurgical process is well-tested technology or novel in nature. The nature, amount and representativeness of metallurgical testwork undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied. Any assumptions or allowances made for deleterious elements. The existence of any bulk sample or pilot scale testwork and the degree to which such samples are considered representative of the orebody as a whole. For minerals that are defined by a specification, has the ore reserve estimation been based on the	The metallurgical process proposed is Adsorption-type Direct Lithium Extraction (A-DLE), using a sorbent-based extraction method, which is a proven technology for lithium extraction as used by several producers worldwide, including in Chile, Argentina and China. The lithium chloride (LiCl) produced from the Lithium Extraction Plant (LEP) is then converted to battery grade lithium hydroxide monohydrate (LHM) at the Central Lithium Plant (CLP). The majority of the proposed equipment is in use in either lithium sorption projects or in the chlor-alkali industry, although the specific sorbent used as a basis for this study, as well as the specific electrolysis technology, is not in commercial use at this time for the exact same processes using Upper Rhine Valley brines. These technologies are considered appropriate for the production of LHM based on current testwork and the further testwork planned to incorporate into the development plan and engineering design. Vulcan has conducted thousands of hours of piloting test work with its pilot plant on the Upper Rhine Valley Brine, since April 2021. Substantial metallurgical testwork was carried out with bulk brine samples at vendors, independent laboratories, and Vulcan's laboratory and is considered appropriate for indications of performance to support the Vulcan Project. Process parameter optimisation testwork is planned at the pilots and the currently commissioning Optimisation Plants

	appropriate mineralogy to meet the specifications?	(LEOP and CLEOP), which will provide insights into the operations plan for the execution phase. Samples of the raw geothermal brine at the pilot plant in Insheim were sent for analysis by Inductively Couple Plasma-Optical Emission Spectroscopy (ICP-OES) and Ion Chromatography (IC) at the Vulcan laboratory in Durlach, on a frequent basis. With this data and other historical test data, it shows no significant variation in lithium grade. Similar findings were determined for Landau. Testwork on the pre-treatment of brine was previously carried out by IBZ-SALZChemie, supervised by Vulcan's chemical engineering team. Further investigations have been conducted by Vulcan at its own laboratory based on samples from the pilot plant. Pre-treatment tested removal of silica, impurities, and CO2. Vulcan has since conducted test work on a pressurised pilot, P1A, which has shown that pre-treatment will not be necessary prior to sorption. This design improvement was incorporated into the Bridging study engineering design. Sorbent testing was conducted by Vulcan at the pilot plant and laboratory with a number of commercially available sorbents being tested. Vulcan has conducted substantial testing and optimizations to define a sorbent that will be best for their future operations. Vulcan has selected its own internally made sorbent, VULSORB™, as the most optimal for commercial use, after thousands of hours of testwork and thousands of cycles of extraction. NESI has conducted successful testwork on the lithium electrolysis method using commercial scale cells. Vulcan has also conducted smaller scale testwork with Electrosynthesis on conversion of LiCl to LHM using electrolysis. Optimisation work will continue at the Optimisation Plant for LHM conversion, designated CLEOP.
Environmental	The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterization and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	No waste rock characterization studies are needed, due to the well-type of lithium brine extraction method proposed. Consideration has been given to local environmental and social restrictions when planning the well sites, infrastructure, transportation and surface facilities. Environmental assessments have been undertaken as applicable for various activities like drilling and are embedded as part of the permitting processes for Phase One. Vulcan is proactive in following the permitting process early and ensuring environmental protection requirements are considered in the project design.
Infrastructure	The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation	The Vulcan Project is in the Upper Rhine Valley, which is an area extremely well serviced by infrastructure for roads, rail, waterways, and power.

	(particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided or accessed.	There is a large availability of highly skilled labour and accommodations throughout the development areas to support the Vulcan project development. The decentralised project structure results in special requirements for the transport logistics from the production sites to the LEP, from both raw material suppliers to the LEP and CLP as well as from the LEP to the CLP. Vulcan is planning to use an Interconnecting Pipeline and Power system (ICPP). There will be an ICPP in the Lionheart project complex. The LiCl product from the LEP will be transported by regular road transport to the CLP.
Costs	The derivation of, or assumptions made, regarding projected capital costs in the study. The methodology used to estimate operating costs. Allowances made for the content of deleterious elements. The source of exchange rates used in the study. Derivation of transportation charges. The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc. The allowances made for royalties payable, both Government and private.	Vulcan has developed its cost estimate using a range of classification levels based on the maturity of each scope element at the end of bridging phase. Estimate inputs are based on project definition and engineering & procurement maturity both internal to Vulcan and using qualified 3rd party external engineering contractors to determine detailed Material Take Off (MTO) quantities that have been priced also from service and supply vendors such as ORC Supplier, VEE and VER. Vulcan has estimated the Owners capital costs. Labour rates were established in accordance with labour agreement information and basic wage data obtained for other similar projects in Germany/Europe. Operating costs were estimated by Vulcan for most of the operational processes except the wells and ORC power plant, which have been defined by Vulcan and ORC Supplier. Electricity prices and chemical prices correspond to expected costs for products delivered at the project's location. The process requires the removal of deleterious elements to specifications for the final high-quality product and has been considered in the estimation of costs. A lithium market study was conducted by experienced industry analyst Fastmarkets at the end of 2023. As well trade statistics were collected and collated by Vulcan's in-house lithium market expert, Vincent Ledoux Pedailles. All costs were estimated in Euros. Prices for lithium hydroxide considered in the economic evaluation, correspond to CIF Europe prices, with all cost items necessary to transport produced lithium hydroxide to European markets included in the operations costs. These costs include trucking the lithium hydroxide to cathode plants, which are the expected destinations for this product. Vulcan has 5 existing offtake contract agreements and has taken the pricing for these contracts into consideration in the economic analysis.

		Since no lithium production currently exists in Germany, royalty rates, if any, will need to be discussed with the state Mining Authority, and have been provisionally set at zero, based on Section 32-2 of the German Mining Law, which allows for an exemption of royalties, given Vulcan would be "ensuring a supply of raw materials to the market, for improving the utilization of deposits or for protecting any other national economic interests". This is also consistent with the project as a geothermal project, which is also exempt from mining royalties.
Revenue factors	The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc. The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	The head grade has been determined by the resource model which has been developed for the Vulcan Project and is based on regional drilling, geochemistry and seismic data, which was used to produce the Measured Mineral Resource estimate for Phase One. Commodity prices are based on forward estimates by experienced industry consultants Fastmarkets and offtake agreement pricing. All costs were estimated in Euros. For lithium pricing, a Euro-USD conversion rate has been used in calculations. Transportation costs are included in the estimation of operating costs. The operating costs include all aspects of the process from brine production from the wells, the ORC plants, the LEPs, and the CLP, plus transportation between the sites. No allowances for by-product credits, except for HCl, NaCl, and district heating are considered. Renewable energy produced by the geothermal plants is assumed to be sold into the grid at a fixed feed in tariff rate in accordance with the German Renewable Energy Law. It is assumed that the Vulcan operations will sell the geothermal renewable power produced and have to acquire renewable power from the grid. The power pricing is assumed based on Aurora Energy Research power price forecast where prices do not exceed the fee in tariff.
Market assessment	The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future. A customer and competitor analysis along with the identification of likely market windows for the product. Price and volume forecasts and the basis for these forecasts. For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.	The Company is well placed to benefit from the market window caused by the significant increase in demand related to electric vehicle uptake in Europe. Vulcan contracted Fastmarkets to conduct a lithium supply study which included supply, demand, and pricing outlooks. Fastmarkets concluded that Vulcan is strategically well positioned to benefit from the increasing demand for lithium in Europe. A-DLE production in conjunction with geothermal energy is a solution that makes sound economic and environmental sense. Some weaknesses and threats were identified by Fastmarkets for the lithium market, but none were specific to Vulcan's project, and they are more than offset by the strengths and opportunities that the project's strategy offers.

		The Company is well placed on the cost curve, and plans to produce a final battery grade product, unlike many hard rock competitor companies. The Vulcan Project is forecast to fall in the lower part of the cost curve, being competitive with other existing and forecasted new lithium projects. The economic model takes into consideration the pricing mechanisms concluded by Vulcan with its offtakers, which is specific to each agreement. The pricing model used in the economics also combined the Fastmarkets analysis with the offtake agreement pricing. Vulcan holds 5 offtake agreements with Umicore, Renault, Stellantis, Volkswagen, and LG Energy Solution. The Vulcan Project is expected to produce battery quality lithium hydroxide monohydrate (LHM), to the specifications of European cathode manufacturers.
Economic	The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc. NPV ranges and sensitivity to variations in the significant assumptions and inputs.	Vulcan conducted an economic analysis using its own financial model for this Bridging Study. Mining industry practitioners typically undertake financial modelling using real NPV terms, projecting constant costs and metal prices in real terms. The resultant cash flows are then discounted by a real risk-adjusted discount rate. Vulcan conformed with this practice. A discount rate of 8% was applied to the cashflow in line with the industry average for lithium assets. Sensitivity analyses were conducted to evaluate the LHM prices, exchange rates, OPEX, and CAPEX. The Vulcan Project is generally resilient to most major factors and is most sensitive to lithium pricing. The economic evaluation was based on the brine flow rates from the production forecast which include dilution of lithium concentrations over time.
Social	The status of agreements with key stakeholders and matters leading to social licence to operate.	Vulcan's Communications team has commenced engagement and consultation at local, state and federal levels. They have an extensive communications strategy utilizing multiple communication tools such as social media, open houses, mailings, call centre, etc. Vulcan is in advanced stages of negotiating a heat offtake agreement to supply renewable heat to the local community in the City of Landau area. Vulcan has installed information centres on the Insheim site, in Landau, Durlach and Mannheim.
Other	To the extent relevant, the impact of the following on the project and/or on the estimation	A number of risk factors has been identified, related to the natural environment and other aspects of the Vulcan Project. The natural risks identified are considered to be manageable, assisted by the extensive experience of the Vulcan team in

	and classification of the Ore Reserves: Any identified material naturally occurring risks. The status of material legal agreements and marketing arrangements. The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent	historical development of geothermal projects in the Upper Rhine Valley. Material legal agreements are understood to be in good standing. The properties are granted exploration licences and production licences at Insheim. Vulcan holds the rights to geothermal energy, brine and lithium in the Phase One areas either directly or through third party brine offtake agreements. Vulcan has signed onto 5 offtake agreements for LHM product sales. Preliminary EIAs have been approved, negating the need for full EIAs, for some drilling sites in the Phase One area. Permit applications for production/re-injection drilling sites have been approved or are in process awaiting approvals. The permit applications for facility construction and operation are in process. Whilst there can be no assurance that Vulcan will obtain all the permits it needs on time or at all, no reason is known of by the Company to expect delays to permit approvals based on the consultation that Vulcan has conducted with the regulatory agencies, local communities and other stakeholders. There are therefore reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in this report. This is further bolstered by the imperative from the German Federal and State governments for decarbonisation of energy, and from the European Union for onshoring of sustainable critical raw materials production, in particular lithium as announced as part of the EU Green Deal Industrial Plan.
Classification	The basis for the classification of the Ore Reserves into varying confidence categories. Whether the result appropriately reflects the Competent Person's view of the deposit. The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	The Ore Reserves CP is of the opinion that Vulcan has conducted sufficient geologic, reservoir engineering work, and mineral processing testwork to provide a high level of certainty for the modifying factors so that for Lionheart, Ore Reserves are estimated for Proved and Probable classifications. With Lionheart having existing brine production from the Insheim and Landau wells, and the pilot tests conducted at Insheim and Landau, there is historical data available to show consistency with the lithium concentration used for the Ore Reserves of 181 mg/l Li. The Ore Reserves estimates are taken from the Reference Point of the Wellhead or inlet to the LEP. The Ore Reserves estimate for Lionheart is Proved at 318 kt LCE, and Probable at 252 kt LCE. The Ore Reserves for Lionheart are derived from the Measured Mineral Resource mass estimated per Section 3 of this JORC Table 1 of 2112 kt LCE. This includes the licences in Insheim, Rift North and Landau South.

		Ore Reserve estimate has been prepared by a multi-disciplinary team that include geologists, reservoir engineers, hydrogeologists, geothermal specialists, chemical and process engineers with relevant experience in geothermal lithium brine projects. There is collective agreement that the Vulcan project has reasonable prospects for economic extraction at current and forecast lithium market pricing levels. Technical Report author Kim Mohler, P.Eng. takes responsibility for this statement, as Ore Reserves CP.
Audits or reviews	The results of any audits or reviews of Ore Reserve estimates.	The Ore Reserves have been independently reviewed by GLJ Ltd., who provided the Competent Person sign-off of production forecasts and ore reserves estimates.
Discussion of relative accuracy/ confidence	Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate. The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage. It is recognized that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the	The Proved and Probable Ore Reserve estimations reported for this report are considered to have a reasonable level of confidence based on the quality of data and testwork collected These data were interpreted by a technical team with local and international experience and expertise. This team also defined the field development plan and process engineering design. This level of confidence is further supported by the continuity of mineralization, the reservoir characterization, and the demonstration that lithium enriched brine can be pumped from deep wells in the Upper Rhine Valley and that lithium can be economically recovered and converted to battery grade LHM. Modifying factors include, but are not limited to, well design, well placement, production/injection plan, geothermal production, mineral processing, metallurgical testing, infrastructure design, surface facility design, marketing plan, economic analysis, legal, environmental, social, and government factors. The pilot tests have provided sufficient testwork results that the CP has a high level of confidence in the Bridging Study engineering design and expected results for the project. The permitting of the Vulcan Project by the government, which requires relevant environmental approvals depending on each location and site use, is a modifying factor. It is considered as a potential risk to the schedule, but based on information from the Company, the CPs have reason to believe that there is a reasonable probability for full approvals to meet the schedule start date. The CP's have relied on data provided by Vulcan and supporting third parties. The accuracy of any Mineral Resources or Ore Reserves estimate is a function of the quality and quantity of available data and of geologic and engineering interpretation and judgment. While Mineral Resources and Ore Reserves and production estimates presented herein are considered reasonable, the estimates should be accepted with the understanding that reservoir performance subsequent to the date of the estimate may justify revision, either upward or downward.

	estimate should be compared with production data, where available.	The metallurgical basis for the process engineering design and the design parameters and related costs, were relied upon by the CP as provided by Vulcan and third-party contractors. As the Project moves to the execution phase, there is potential for optimization, therefore it is possible that design specifications described in this report will be subject to change and the costs related to these changes will affect the reported economic results. Revenue projections presented in this report are based in part on forecasts of market prices, currency exchange rates, inflation, market demand and government policy which are subject to many uncertainties and may, in future, differ materially from the forecasts utilized herein. Present values of revenues documented in this report do not necessarily represent the fair market value of the reserves evaluated herein.

Listing Rule 5.9 Requirements – Ore Reserve

Item	**Location of item in this announcement**
Material assumptions and the outcomes from the preliminary feasibility study or the feasibility study (as the case may be). If the economic assumptions are commercially sensitive to the mining entity, an explanation of the methodology used to determine the assumptions rather than the actual figure can be reported	Please refer to page 130 and "Ore Reserves" section 1.5.3 of this announcement.
The criteria used for classification, including the classification of the mineral resources on which the ore reserves are based and the confidence in the modifying factors applied	Section 1.5.1 and 1.5.3, also pages 111, 114, 115, 116, 127
The mining method selected and other mining assumptions, including mining recovery factors and mining dilution factors	Section 1.5.2, also Pages 40, 112, 118, 76, 112 of this announcement.
The processing method selected and other processing assumptions, including the recovery factors applied and the allowances made for deleterious elements	Section 1.7 of this announcement
Basis of cut-off grade(s) or quality parameters applied	Pages 117-118 of this announcement
Estimation methodology	Pages 39-40, Section 1.5.3
Material modifying factors, including the status of environmental approvals, mining tenements and approvals, other governmental factors and infrastructure requirements for selected mining methods and for transportation to market	Sections 1.6, 1.7, 1.8, 1.9, P.126-127

Listing Rule 5.16 Requirements – Production Targets

Item	**Location of item in this announcement**
All material assumptions on which the production target is based. If the economic assumptions are commercially sensitive to the mining entity, an explanation of the	Please refer to page 130 and "Ore Reserves" section 1.5.3 this announcement.

methodology used to determine the assumptions rather than the actual figure can be reported	
A statement that the estimated ore reserves and/or mineral resources underpinning the production target has been prepared by a competent person or persons in accordance with the requirements of the JORC Code	See Competent Person Statement
The relevant proportions of: • Probable ore reserves and proved ore reserves; • Inferred mineral resources, indicated mineral resources and measured mineral resources; • An exploration target; and • Qualifying foreign estimates, Underpinning the production target	• See pages 2, 40 and 116. • See page 35 • n/a • n/a

Listing Rule 5.17 Requirements – Financial Forecasts

Item	**Location of item in this announcement**
All material assumptions on which the forecast financial information is based. If the economic assumptions are commercially sensitive to the +mining entity, an explanation of the methodology used to determine the assumptions rather than the actual figure can be reported.	Please refer to page 130 and "Ore Reserves" section 1.5.3 of this announcement. Also Section 1.10, Economic Analysis
The production target from which the forecast financial information is derived (including all the information contained in Rule 5.16).	Please refer to page 130 and "Ore Reserves" section 1.5.3 of this announcement.
If a significant proportion of the +production target is based on an exploration target, the implications for the forecast financial information of not including the +exploration target in the production target	N/A – none of the production target is based on an Exploration Target.

Disclaimer

The Bridging Study is based on the material assumptions outlined in this announcement. While Vulcan considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Bridging Study will be achieved.

To achieve the range of outcomes indicated in the Bridging Study, additional funding will be required. Investors should note that is no certainty that Vulcan will be able to raise the amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Vulcan's existing shares. It is also possible that Vulcan could pursue other financing strategies such as a partial sale or joint venture of the Project. If it does, this could materially reduce Vulcan's proportionate ownership of the Project.

Vulcan has carried out a definitive feasibility study for Phase One of its Zero Carbon Lithium™ Project ('Project'), the results of which were announced to the ASX in the announcement "Zero Carbon Lithium Project Phase One DFS Results" dated 13 February 2023 ('DFS'), ('DFS Announcement'). This announcement may include certain information relating to the DFS. The DFS is based on material assumptions outlined in the DFS Announcement. This announcement uses the results of the DFS as a basis to update its Mineral Resources and Ore Reserves, estimated in accordance with the 2012 Edition of the Australian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code). This announcement may also include information relating to Phase 2 of its Project, Vulcan has not yet carried out a definitive feasibility study for Phase Two of its Project.

Forward looking statements

Some of the statements appearing in this announcement are in the nature of forward-looking statements. Such forward-looking statements include details of the proposed production plant, production targets, forecast financial information (including revenue and EBITDA), estimated mineral resources and ore reserves, expected future demand for lithium products, planned strategies, corporate objectives, lithium recovery rates, projected concentrations, capital and operating costs, permits and approvals, levies, the Project development timeline and exchange rates, among others.

Vulcan has concluded that it has a reasonable basis for providing the forward-looking statements included in this announcement. However, you should be aware that such statements are only predictions and are subject to inherent risks and uncertainties including those mentioned elsewhere in this announcement. Those risks and uncertainties include factors and risks specific to the industries in which Vulcan operates and proposes to operate as well as general economic conditions, uncertainty and disruption from COVID-19 or the Russian invasion of Ukraine, prevailing exchange rates and interest rates and conditions in the financial markets, among other things. These risks and uncertainties may be known or unknown (see further Risk Factors section below). Actual events or results may differ materially from the events or results expressed or implied in any forward-looking statement. No forward-looking statement is a guarantee or representation as to future performance or any other future matters, which will be influenced by a number of factors and subject to various uncertainties and contingencies, many of which will be outside Vulcan's control.

including those generally associated with the lithium industry and/or resources exploration companies, including but not limited to the risks listed in Appendices 5 and 6 of the Corporate Presentation dated 28 April 2023 as well as the risks contained in the Prospectus dated 5 May 2023, and the ASX Announcement "Vulcan Zero Carbon Lithium™ Project DFS results and Resources-Reserves update" released to ASX on 13 February 2023 and the International Offering Circular dated 4 May 2023 (together the "**Previous Disclosures**").

Vulcan does not undertake any obligation to update publicly or release any revisions to these forward-looking statements to reflect events or circumstances after today's date or to reflect the occurrence of unanticipated events. No representation or warranty, express or implied, is made as to the fairness, accuracy, completeness or correctness of the information, opinions or conclusions contained in this announcement. To the maximum extent permitted by law, none of Vulcan, its Directors, employees, advisors or agents, nor any other person, accepts any liability for any loss arising from the use of the information contained in this announcement. You are cautioned not to place undue reliance on any forward-looking statement. The forward-looking statements in this announcement reflect views held only as at the date of this announcement.

No investment

This announcement is not an offer, invitation or recommendation to subscribe for, or purchase securities by Vulcan. Nor does this announcement constitute investment or financial product advice (nor tax, accounting or legal advice) and is not intended to be used for the basis of making an investment decision. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Bridging Study, and should obtain their own advice before making any investment decision.

Industry data

Certain market and industry data used in connection with or referenced in this announcement may have been obtained from public filings, research, surveys or studies made or conducted by third parties, including as published in industry-specific or general publications. Neither Vulcan nor its advisers, nor their respective representatives, have independently verified any such market or industry data. To the maximum extent permitted by law, each of these persons expressly disclaims any responsibility or liability in connection with such data.

Investment Risks

As noted elsewhere in this announcement, in the risks listed in Appendices 5 and 6 of the Corporate Presentation dated 28 April 2023 as well as the risks contained in the Prospectus dated 5 May 2023, and the ASX Announcement "Vulcan Zero Carbon Lithium™ Project DFS results and Resources-Reserves update" released to ASX on 13 February 2023 and the International Offering Circular dated 4 May 2023 (together the "**Previous Disclosures**"), an investment in Vulcan is subject to both known and unknown risks, some of which are beyond the control of Vulcan. These factors may include, but are not limited to, changes in commodity and renewable energy prices, foreign exchange fluctuations and general economic conditions, increased costs and demand for production inputs lithium, the speculative nature of exploration and project development (including the risks of obtaining necessary licences and permits and diminishing quantities or grades of reserves), political and social risks, changes.

Vulcan does not guarantee any particular rate of return or its performance, nor does it guarantee any particular tax treatment. Prospective investors should have regard to the risks in the Previous Disclosures particularly the May 2023 Prospectus, which have not materially changed, when making their investment decision, and should make their own enquires and investigations regarding all information in this Presentation, including, but not limited to, the assumptions, uncertainties and contingencies that may affect Vulcan's future operations, and the impact that different future outcomes may have on Vulcan. There is no guarantee that any investment in Vulcan will make a return on the capital invested, that dividends will be paid on any fully paid ordinary shares in Vulcan, or that there will be an increase in the value of Vulcan in the future. Accordingly, an investment in Vulcan and Vulcan Shares should be considered highly speculative, and potential investors should consult their professional advisers before deciding whether to invest in Vulcan.

Effect of rounding

A number of figures, amounts, percentages, estimates, calculations of value and fractions in this announcement are subject to the effect of rounding. Accordingly, the actual calculation of these figures may differ from the figures set out in this announcement.

Financial data

All monetary values expressed as "$" or "A$" in this announcement are in Australian dollars, unless stated otherwise. All monetary values expressed as EUR or € in this announcement are in Euros, unless stated otherwise. All monetary values expressed as "US$" in this announcement are in US dollars, unless stated otherwise.

In addition, prospective investors should be aware that financial data in this announcement includes "non-IFRS financial information" under ASIC Regulatory Guide 230 'Disclosing non-IFRS financial information' published by ASIC and also 'non-GAAP financial measures' within the meaning of Regulation G under the U.S. Securities Exchange Act of 1934.

The non-IFRS financial measures do not have standardised meanings prescribed by Australian Accounting Standards and, therefore, may not be comparable to similarly titled measures presented by other entities, nor should they be construed as an alternative to other financial measures determined in accordance with Australian Accounting Standards. Although Vulcan believes the non-IFRS financial information (and non-IFRS financial measures) provide useful information to readers of this announcement, readers are cautioned not to place any undue reliance on any non-IFRS financial information (or non-IFRS financial measures).

Similarly, non-GAAP financial measures do not have a standardised meaning prescribed by Australian Accounting Standards or International Financial Reporting Standards and therefore may not be comparable to similarly titled measures presented by other entities, nor should they be construed as an alternative to other financial measures determined in accordance with Australian Accounting Standards or International Financial Reporting Standards. Although Vulcan believes that these non-

GAAP financial measures provide useful information to readers of this announcement, readers are cautioned not to place undue reliance on any such measures.

Competent Person Statement

The information in this announcement that relates to Mineral Resources is based on and fairly represents, information that was reviewed, and audited by G. Gabriella Carrelli, M.Sc., P.Geo., who is a full-time employee of GLJ Ltd. and deemed to be a 'Competent Person'. Ms. Carrelli is a Professional Geoscientist of the Association of Professional Engineers and Geoscientists of Alberta (APEGA), with certification in the Province of Alberta, Canada, a 'Recognised Professional Organisation' included in a list that is posted on the ASX website from time to time. Ms. Carrelli has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which she is undertaking to qualify as a Competent Person as defined in the JORC Code. Ms. Carrelli consents to the disclosure of the technical information as it relates to the Mineral Resources information in this document in the form and context in which it appears.

The information in this announcement that relates to Production Target and Ore Reserves is based on and fairly represents, information that was reviewed, overseen, and compiled by Ms. Kim Mohler, P.Eng., who is a full-time employee of GLJ Ltd. and deemed to be a 'Competent Person'. Ms. Mohler is a member as a Professional Engineer of the Association of Professional Engineers and Geoscientists of Alberta (APEGA), a 'Recognised Professional Organisation' included in a list that is posted on the ASX website from time to time. Ms. Mohler has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity that she is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the Australian Code for the Reporting of Exploration Results, Mineral Resources, and Ore Reserves (JORC Code). Ms. Mohler consents to the disclosure of the technical information as it relates to the Production Target and Ore Reserve information in this announcement in the form and context in which it appears.

Production Target Material Assumptions and Parameters

Key inputs and outputs of model

General	
General and economics	
FX EUR/USD	1.05
NPV discount rate	8%[27]
Tax rate	30%
State royalty	0%[28]
Brine royalty	Applied on 2 locations
Life of Mine	30 years
Life of Mine production target	0.595Mt LHM
LHM grade	57%
CO_2 emissions/t of LHM[29]	0t CO_2/of LHM

Production and ramp-up LEP and CLP (%)

	Q3 2026	Q4 2026	Q1 2027	Q2 2027	Q3 2027	Q4 2027	Q1 2028	Q2 2028	Q3 2028
Ramp-up	40%	50%	60%	75%	80%	85%	90%	95%	100%

[27] *WACC rate is 8% which is based on peer industry average.*

[28] *Geothermal exempt from royalty. Lithium expected to also be exempt due under § 32 BBergG, since it is classified as a strategic raw material by the EU – to be confirmed with state authorities during ongoing permitting process. Up to 10% royalty would apply if it was not exempt.*

[29] *Vulcan CO2 value provided by Minviro, see DFS announcement. The CO2 assessment is a cradle-to-gate study. It starts with the cradle: extraction of geothermal brine. Thermal energy of the brine is extracted and used for electricity and steam generation. Generated electricity is assumed to be exported to the German electrical grid. Part of the heat is exported for district heating, substituting natural gas use, and the rest of the heat is used for internal processes. It is assumed that of the electricity used throughout all processes 50% is sourced from the German grid and 50% is procured from additional wind generated electricity, on top of wind based electricity that is already present in the German grid mix. Electricity, steam, hydrochloric acid (30% concentration) and sodium hypochlorite (15.8% concentration) are co-products of the lithium hydroxide monohydrate product. All co-products are accounted for using system expansion, meaning no allocation is required. The climate change impact for the lithium hydroxide monohydrate product for the assumptions described above is -1.6 kg CO_2 eq. per kg $LiOH \cdot H_2O$.*

Geothermal assets	
Input	
Brine Flow rate	950 l/s total for Phase One
Lithium Concentration in Brine*	181 mg/l
Output	
Power produced and sold	Up to 275,000MWh/a
Heat produced and sold	Up to 560,000MWth/a
Steam produced for own consumption	9MW
Li-rich brine flow to LEP	950 l/s total for Phase One
LEP assets	
Input	
Brine Flow from geothermal asset	950 l/s total for Phase One
Steam consumed	9MW
Output	
LiCl Production in LHM equivalent*	24,600 t/a
CLP asset	
Input	
LiCl in LHM equivalent*	24,600 t/a
Output	
LHM Production (Battery-grade)	24,600 t/a
HCl Production (30%wt)	66,420 t/a (net of CLP consumption)
*Capacity	