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VULCAN ENERGY
ZERO CARBON LITHIUM™

Corporate Presentation

Q2 2023





DISCLAIMER

No investment or financial product advice. This Presentation, and the information provided in it, does not constitute, and is not intended to constitute, financial product or investment advice, or a recommendation to acquire Vulcan Shares, nor does it constitute, and is not intended to constitute, accounting, legal or tax advice. This Presentation does not, and will not, form any part of any contract for the acquisition of Vulcan Shares. This Presentation has been prepared without taking into account the objectives, financial or tax situation or particular needs of any individual. Before making an investment decision (including any investment in Vulcan Shares or Vulcan generally), prospective investors should consider the appropriateness of the information having regard to their own objectives, financial and tax situation and needs, and seek professional advice from their legal, financial, taxation or other independent adviser (having regard to the requirements of all relevant jurisdictions). Vulcan is not licensed to provide financial product advice in respect of an investment in shares. Any investment in any publicly-traded company, including Vulcan, is subject to significant risks of loss of income and capital.

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

DISCLAIMER

Ore Reserves and Mineral Resources Reporting. It is a requirement of the ASX Listing Rules that the reporting of ore reserves and mineral resources in Australia comply with the Joint Ore Reserves Committee's Australasian Code for Reporting of Mineral Resources and Ore Reserves ("**JORC Code**"). Investors outside Australia should note that while ore reserve and mineral resource estimates of the Company in this document comply with the JORC Code (such JORC Code-compliant ore reserves and mineral resources being "Ore Reserves" and "Mineral Resources" respectively), they may not comply with the relevant guidelines in other countries and, in particular, do not comply with (i) National Instrument 43-101 (Standards of Disclosure for Mineral Projects) of the Canadian Securities Administrators (the "Canadian NI 43-101 Standards"); or (ii) subpart 1300 of Regulation S-K under the US Securities Act of 1933, as amended (the "Securities Act"), which governs disclosures of mineral reserves in registration statements filed with the US Securities and Exchange Commission ("SEC"). Information contained in this Presentation describing mineral deposits may not be comparable to similar information made public by companies subject to the reporting and disclosure requirements of Canadian or US securities laws. On 31 October 2018, the SEC adopted amendments to its disclosure rules to modernise the mineral property disclosure requirements for issuers whose securities are registered with the SEC under the US Exchange Act of 1934, as amended (the "**Exchange Act**"). These amendments became effective 25 February 2019, with compliance required for the first fiscal year beginning on or after 1 January 2021. Under these amendments, the historical property disclosure requirements for mining registrants included in Industry Guide 7 under the Securities Act were rescinded and replaced with disclosure requirements in subpart 1300 of Regulation S-K. As a result of the adoption of subpart 1300 of Regulation S-K, the SEC's standards for mining property disclosures are now more closely aligned to the JORC Code's requirements. For example, the SEC now recognises estimates of "measured mineral resources", "indicated mineral resources" and "inferred mineral resources." In addition, the SEC has amended its definitions of "proven mineral reserves" and "probable mineral reserves" to be "substantially similar" to the corresponding standards under the JORC Code. However, despite these similarities, SEC standards are still not identical to the JORC Code. Accordingly, investors are cautioned that there can be no assurance that the reserves and resources reported by the Company under the JORC Code would be the same had it prepared its reserve or resource estimates under the standards adopted under subpart 1300 of Regulation S-K.

Financial data. All monetary values expressed as "\$" or "A\$" in this Presentation are in Australian dollars, unless stated otherwise. All monetary values expressed as EUR or € in this Presentation are in Euros, unless stated otherwise. All monetary values expressed as "US\$" in this Presentation are in US dollars, unless stated otherwise. The assumed exchange rate to convert Euros into Australian dollars or US dollars (as applicable) is shown in the footnote to each respective slide. In addition, prospective investors should be aware that financial data in this Presentation 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 Presentation, 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 Presentation, readers are cautioned not to place undue reliance on any such measures.

Technical information. Vulcan has so far only carried out a pre-feasibility study (the results of which were announced to the ASX in the announcement "Positive PFS & Maiden JORC Ore Reserve: Zero Carbon Lithium™ Project" dated 15 January 2021) ('PFS') and 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 "Vulcan Zero Carbon Lithium™ Project DFS Results, Resources and Reserves Update" dated 13 February 2023) ('DFS'). Vulcan has not yet carried out a definitive feasibility study for Phase Two of its Project. This Presentation includes information relating to both the PFS and DFS. Investors should not rely on the results of the PFS as Vulcan considers that the material assumptions underpinning that study are no longer up to date in light of the additional studies undertaken in preparing the DFS. The DFS is based on the material assumptions outlined elsewhere in the DFS 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 DFS will be achieved.

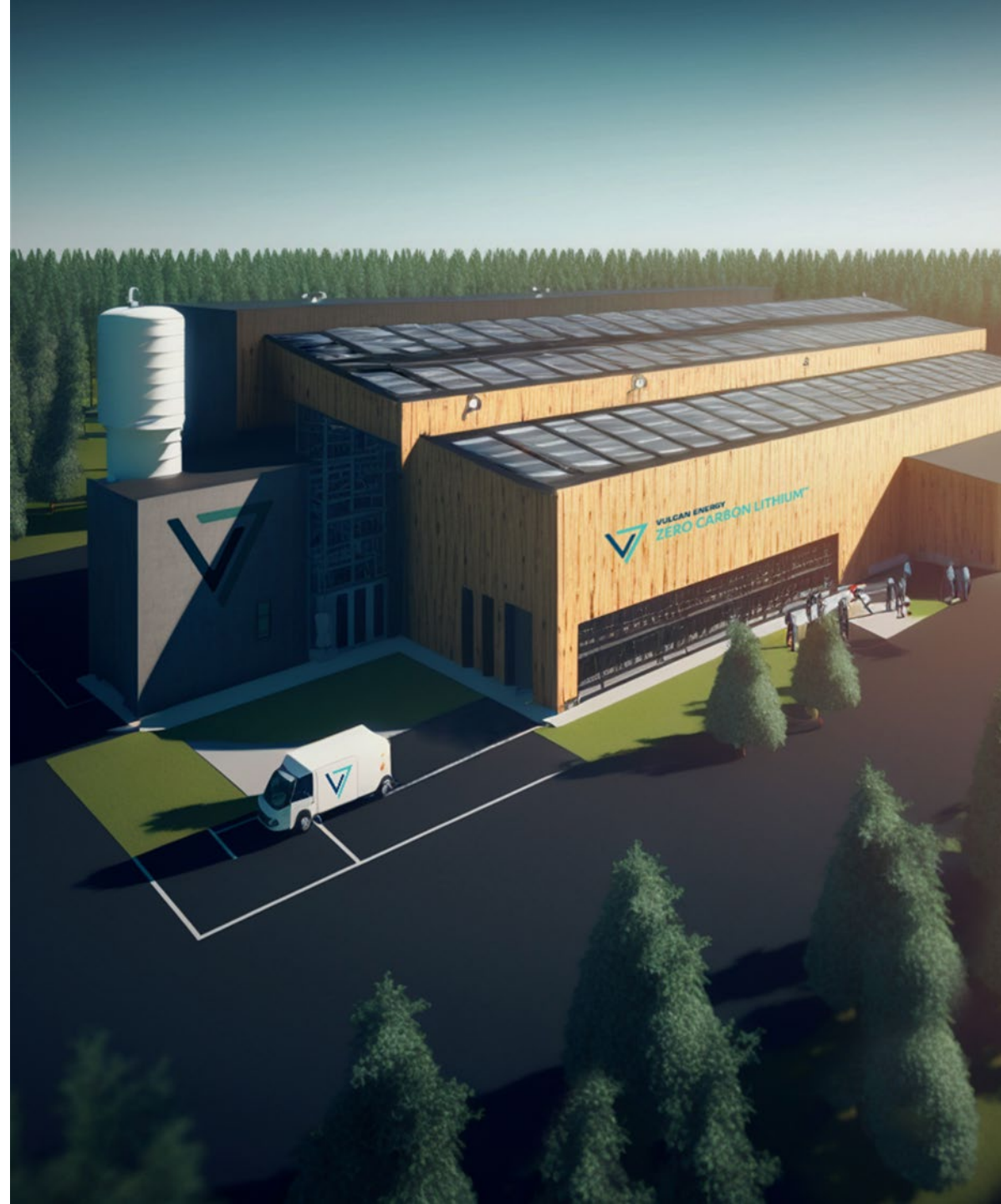
Funding Strategy. To achieve the range of outcomes indicated in the DFS, additional funding will be required. Investors should note that there is no certainty that Vulcan will be able to raise the amount of funding when needed. It is also possible that such funding may only be available on terms that 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.

Competent Person Statement: Please see Appendix 13 for the Competent Person Statement.

Acknowledgement and agreement. By attending an investor presentation or briefing, or accepting, accessing or reviewing this Presentation, you acknowledge and agree to the terms set out in this "Disclaimer" section of the Presentation.

WHY VULCAN?

- ✓ **World-leading product and brand** – carbon neutral, battery-grade lithium chemicals from **Zero Carbon Lithium™** Project
- ✓ **Right place** – located within the EU, fastest growing lithium market in the world
- ✓ **Long-life, sustainable asset, large growth potential** – largest lithium resource in EU, globally significant, ability to grow in modular phases
- ✓ **In-house IP** – VULSORB™ lithium sorbent means lithium extraction know-how is on-shored in EU and an in-house asset
- ✓ **Substantially de-risked** – three years of lithium extraction and piloting testwork completed on producing wells
- ✓ **High quality EU offtakes** – Stellantis, VW, Renault, LG, Umicore, provides support for debt funding
- ✓ **Renewable energy co-product** – provides additional revenue and benefit to local communities
- ✓ **Exceptional team** – in-house team of approx. 300 experienced personnel in development, execution and operations. In-house electric rigs for production well development.
- ✓ **Already a commercial producer** – operating a commercial geothermal renewable plant and wells
- ✓ **Well advanced** – DFS completed for Phase One integrated project, in bridging phase toward ordering long lead items
- ✓ **Well supported** – substantial investors include Stellantis and HPPL. Government ECAs in Europe provided in principle support to financing.





VULCAN ENERGY
ZERO CARBON LITHIUM™

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I. INTRODUCTION



I. INTRODUCTION

1. WHO ARE WE?

Vulcan is aiming to become the **world's first integrated lithium chemicals and renewable energy producer** with net zero greenhouse gas emissions.

Company created in 2018

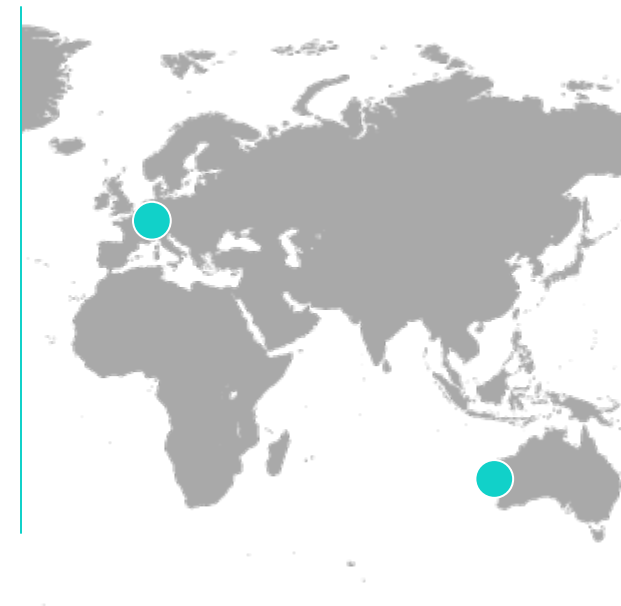
Offices in **Perth, Australia, Karlsruhe and Augsburg, Germany**

Dual listed on **ASX** and **Frankfurt Stock Exchange (Prime Standard)**

Majority of the approx. 300 personnel are in **Germany**

Extensive geothermal renewable energy and lithium chemicals expertise

Main focus is the **Zero Carbon Lithium™ Project**, a globally significant lithium resource, located on the border of Germany and France, in the **Upper Rhine Valley Brine Field (URVBF)**.



I. INTRODUCTION

2. OUR TARGETS

We are aiming to become the world's first integrated lithium chemicals and renewable energy producer with net zero greenhouse gas emissions.

Vulcan's unique **Zero Carbon Lithium™** Project aims to produce both renewable geothermal energy, and lithium hydroxide for Electric Vehicle (EV) batteries, from the same deep brine source in the Upper Rhine Valley, Germany.

Renewable heat production for more than **1 million** people by 2030¹



Enough **lithium hydroxide** production for **1 million** EVs per annum²



1 million tonnes of CO₂ emissions avoided per annum³

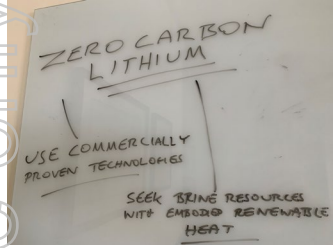


¹Based on average per capita heat consumption in Germany of 6,200 kWh (<https://www.destatis.de/>), and the estimated capacity for heat production from Vulcan's long term development areas, in a pure heat (no power) scenario. ²Based on Phase One production target of 24ktpa from DFS, Phase Two production target of approx. similar figure from PFS (refer to technical information statement), and Vulcan internal estimated average EV battery size and chemistry in Europe. ³CO₂ emissions avoidance target based on Minviro LCA data on Vulcan project and lithium industry peer averages in the same LCA.

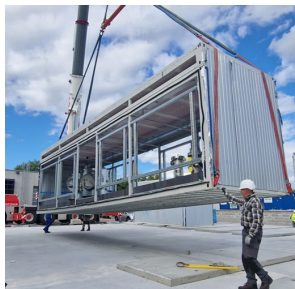
I. INTRODUCTION

3. OUR ACHIEVEMENTS TO DATE

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Vulcan Energy Resources Ltd. Founded privately as Zero Carbon Lithium Company by Dr. Francis Wedin and Dr. Horst Kreuter, starting from a "whiteboard idea"



1. Subject to definitive documentation and other conditions precedent.

I. INTRODUCTION

4. WHY DO WE NEED LITHIUM IN EUROPE?

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The market



- EU targets new cars to be **100%** electric by 2035¹
- **1,400GWh** li-ion battery manufacturing estimated capacity by 2030² for EV transition
- Predictions indicate Europe will see a **57-fold** increase in lithium demand³

The crisis



- **Zero** local supply of lithium hydroxide. **80%** reliant on China⁴
- Current supply of lithium is **CO₂** intensive. Western automakers want low carbon sources⁵

The solution



- Vulcan is developing the only **CO₂ neutral**, zero fossil fuel lithium project in the world, producing lithium **from Europe, for Europe**⁸
- Vulcan's Zero Carbon Lithium™ Project is the largest lithium resource in Europe⁹

Vulcan has offtake agreements with some of the largest battery, cathode and EV producers in Europe.



¹ https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6462

² <https://www.spglobal.com/marketintelligence/en/news-insights/research/investment-in-lithium-ion-batteries-could-deliver-5-point-9-twh-capacity-by-2030>

³ <https://www.euractiv.com/section/economy-jobs/news/eu-unveils-critical-raw-materials-act-aiming-to-lessen-dependence-on-china/>

⁴ <https://www.bloomberg.com/news/articles/2020-12-03/eu-aims-to-have-30-million-electric-cars-on-the-road-by-2030?leadSource=verify%20wall>

⁵ Refer to next slide

⁶ Vulcan is not aware of any other such projects either in development or operation

⁷ According to public, JORC-compliant data

⁸ Vulcan is not aware of any other such projects either in development or operation. ⁹ According to public, JORC-compliant data.

5. WHY DO WE NEED CARBON NEUTRAL LITHIUM SUPPLY?

RENAULT GROUP

'Reducing **carbon footprint** is not just reducing vehicle emissions while they are being operated, but also from the company's resource extraction and production processes through to the end of the vehicle's life cycle'.¹



'We work in partnership to implement responsible procurement practices, to ensure **sustainable** progress throughout the entire supply chain, with specific emphasis on the wise use of natural resources'.²



'By 2025, the company aims to reduce the carbon footprint of cars and light-commercial vehicles across the entire value chain by 30 percent compared to 2015 – and by 2050 to make the entire Group's balance sheet **CO₂ neutral**'.³



'Umicore commits to carbon neutrality for its Scope 1 and Scope 2 GHG emissions by 2035 ... Umicore pledges that its future growth, whether organic or through M&A, will be entirely **carbon neutral**'.⁴



'LG Energy Solution commits to be 100 percent **carbon neutral** by 2030. LG will set an example in cutting carbon emissions through battery production and promote the expansion of EVs'.⁵

¹ <https://www.renaultgroup.com/en/our-commitments/respect-for-the-environment/carbon-footprint/>

² <https://www.stellantis.com/en/responsibility/csr-vision>

³ <https://www.volkswagenag.com/en/news/stories/2019/12/what-volkswagen-is-doing-for-the-environment.html#:~:text=To%20this%20end%2C%20Volkswagen%20has,balance%20sheet%20company%20by%202050.>

⁴ <https://www.umicore.com/en/newsroom/news/umicore-unveils-bold-sustainability-ambitions-and-commits-to-achieving-carbon-neutrality-by-2035/>

⁵ <https://www.lghomebattery.com.au/post/lg-energy-solution-commits-to-be-100-percent-carbon-neutral-by-2030>

6. WHY DO WE NEED GEOTHERMAL RENEWABLE ENERGY IN EUROPE?

The market



- EU to be climate neutral by 2050. Germany to be fully renewable by 2035¹
- EU wants to develop local sources of energy²

The crisis



- Dual crises: Ukraine war and climate crisis
- EU is now sourcing gas from Norway and other areas in the EU. Domestic energy sources are key³
- 55% of Germany's gas came from Russia pre-Ukraine invasion⁴
- European emissions need to fall dramatically to avoid climate breakdown and meet carbon neutral by 2050⁵

The solution



- Fraunhofer: Geothermal renewable energy can meet a quarter of Germany's heating needs⁶
- German Govt. announced in November '22 the need for 100 new Geothermal projects targeting 10 TWh of geothermal output by 2030⁷
- The Upper Rhine Valley Brine Field has the hottest geothermal resource in central Europe
- Vulcan is already commercially producing geothermal, baseload energy in Germany
- Vulcan is ramping up with the aim to supply a million households with renewable energy by 2030.⁸

¹ <https://www.reuters.com/business/sustainable-business/germany-aims-get-100-energy-renewable-sources-by-2035-2022-02-28/>

² https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

³ <https://www.consilium.europa.eu/en/infographics/eu-gas-supply/>

⁴ <https://www.cleanenergywire.org/factsheets/germanys-dependence-imported-fossil-fuels#:~:text=Germany%20%2D%20GAS,imports%2C%20according%20to%20the%20BGR.%E2%80%8B>

⁵ https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2050-long-term-strategy_en

⁶ Roadmap deep geothermal energy for Germany - recommendations for action for politics, business and science for a successful heat transition.

⁷ <https://www.thinkgeoenergy.com/germany-aims-for-100-new-geothermal-projects-by-2030/> ⁸ Based on average per capita heat consumption in Germany of 6,200 kWh (<https://www.destatis.de/>), and the estimated capacity for heat production from Vulcan's long term development areas, in a pure heat (no power) scenario.

7. POLICY TAILWINDS IN VULCAN'S FAVOUR

The recently released *Critical Raw Materials*¹ and *Net Zero Industry Acts*² present a strong focus on fast-tracking the permitting process and funding for technologies of relevance to the strategic autonomy of the EU economy

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	Critical Raw Materials Act - Proposed Framework	Net Zero Industry Act - Proposed Framework	Implications for Vulcan
Overview	<ul style="list-style-type: none"> Establishing a framework for ensuring a secure and sustainable supply of critical raw materials "Strategic project" status, indicating the status of the highest national significance possible 	<ul style="list-style-type: none"> Establishing a framework for strengthening Europe's net-zero technology products manufacturing ecosystem Net Zero Resilience Projects shall get the status of the highest national significance possible 	<ul style="list-style-type: none"> Should it be granted, Strategic Project and Net Zero Resilience Project status could significantly streamline project progress
Permitting	<ul style="list-style-type: none"> One stop-shop for permitting handled by one national authority, with all permitting documentation to be sent out to a centralised system Permit granting process shall not exceed 24 months for Strategic Projects 	<ul style="list-style-type: none"> Limit to permit granting procedures for Net Zero Resilience Projects are set to 12 months for the construction or expansion of Net Zero Resilience Projects, with a yearly production output of more than 1 GW. Environmental impact assessments to not exceed a period of 30 days from the date of project submission. 	<ul style="list-style-type: none"> Potentially fast track and streamline the permitting process
Funding	<ul style="list-style-type: none"> Better coordination and synergy creation between the existing funding programmes at Union and national level as well as ensuring better coordination and collaboration with industry and key private sector stakeholders. Potential public funding support, in the form of guarantees, loans or equity and quasi-equity investments. 	<ul style="list-style-type: none"> Member States to provide financial support to address financing gaps in the form of: <ul style="list-style-type: none"> a) guarantees to decrease borrowing costs b) off-take guarantees for tech made in Europe Innovation Fund auctions to allocate grants to Net Zero industry projects 	<ul style="list-style-type: none"> Potential EU & State grant/subsidies Assistance with other financing alternatives

¹ https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1661

² https://single-market-economy.ec.europa.eu/publications/net-zero-industry-act_en



I. INTRODUCTION

8. WHAT DO WE WANT TO BUILD?

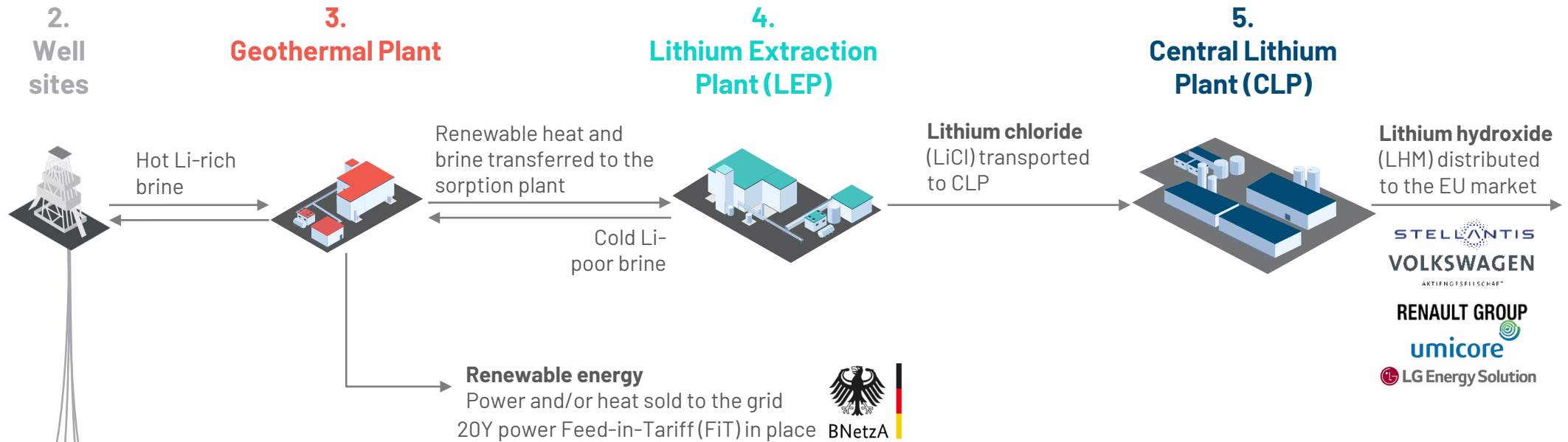
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Phase one

300GWh power
250GWh heat

LiCl concentrate for
24,000tpa LHM equivalent

24,000tpa
LHM



1. Resource: 3 to 5km deep reservoir, stretching across 300km in the URV

Wells are drilled into the deep, hot, lithium-rich brine resource, which is pumped to the surface

Re-injection of brine. A closed loop, circular system



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II. ZERO CARBON LITHIUM™ PROJECT



II. THE PROJECT

PHASE ONE UPSTREAM-DOWNSTREAM INTEGRATED PRODUCTION STRUCTURE

Phase One:
expanding upstream capacity,
building downstream

Increasing the number of production/re-injection well sites from 2 to 9

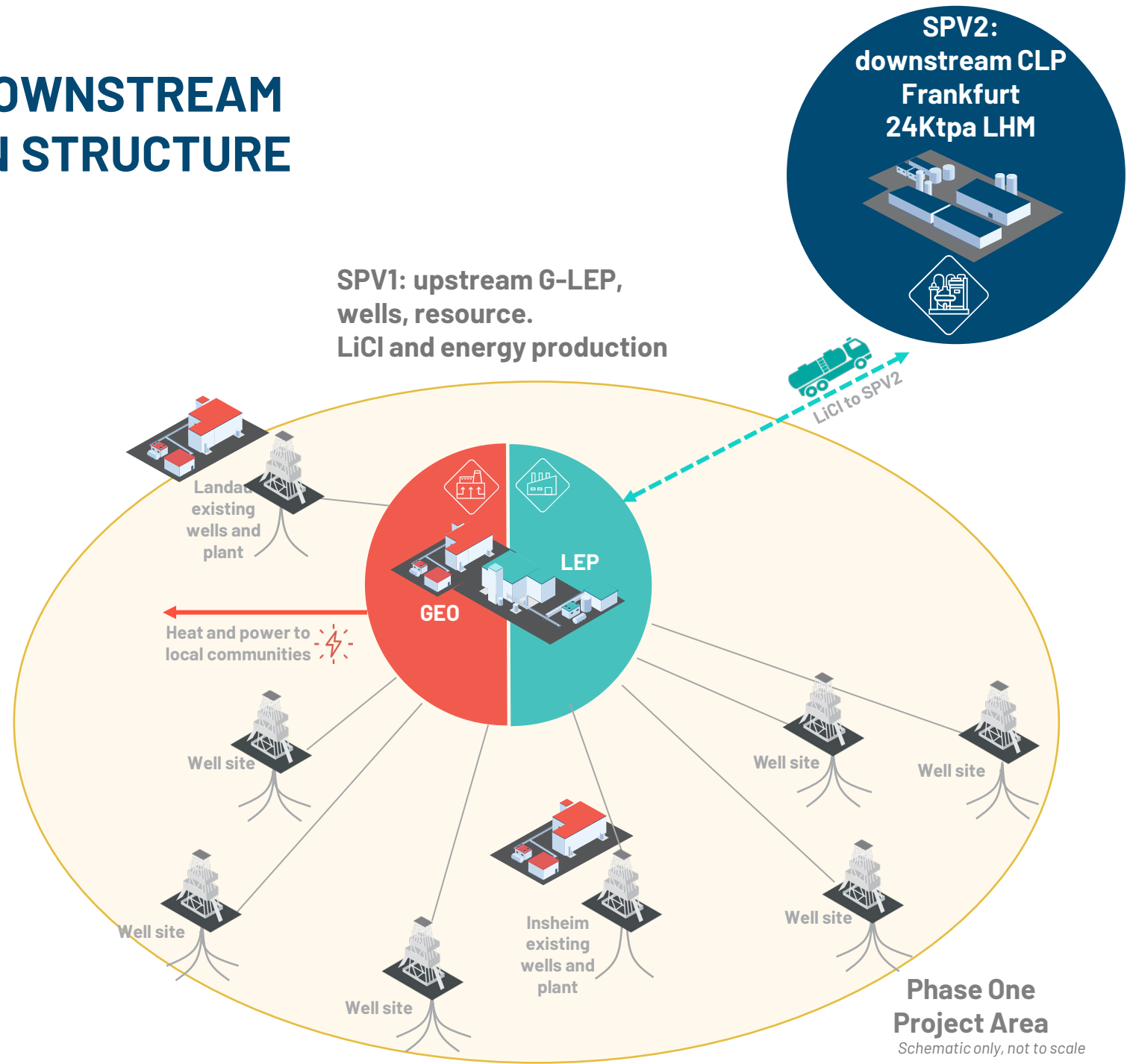
Building new, larger geothermal plant near existing one

Building new Lithium Extraction Plant

Building new Central Lithium Plant

**SPV1: upstream G-LEP,
wells, resource.**
LiCl and energy production

**SPV2:
downstream CLP
Frankfurt
24Ktpa LHM**



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II. THE PROJECT

1. THE UPSTREAM RESOURCE

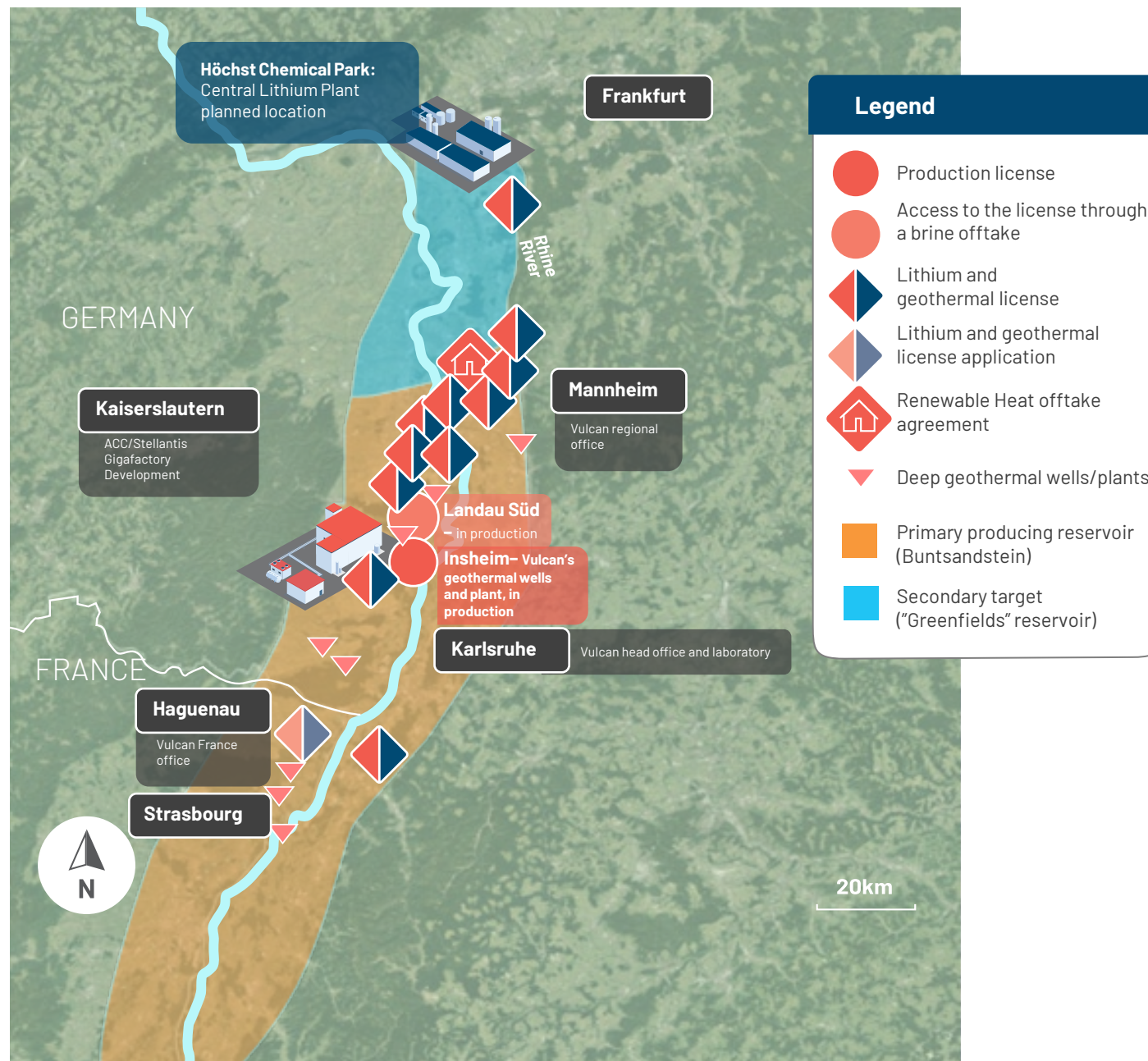


✓ Vulcan's Upper Rhine Valley Brine Field (URVBF), consisting of 15 licenses for a total area of 1,583 km², represents **Europe's largest lithium resource**¹, with **26.6Mt contained LCE from 10 of its 15 German licenses**.

✓ 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**². The Federal Government targets to reach 100 plants by 2030³

✓ URVBF area is a **mature, producing field**, with **>1,000 oil & gas** and **24 deep geothermal wells** already drilled in the URV



¹According to public, JORC-compliant data

²Bundesverband Geothermie

³Geothermie_Eckpunktepapier_ressortabgestimmt (bmwk.de);

II. THE PROJECT

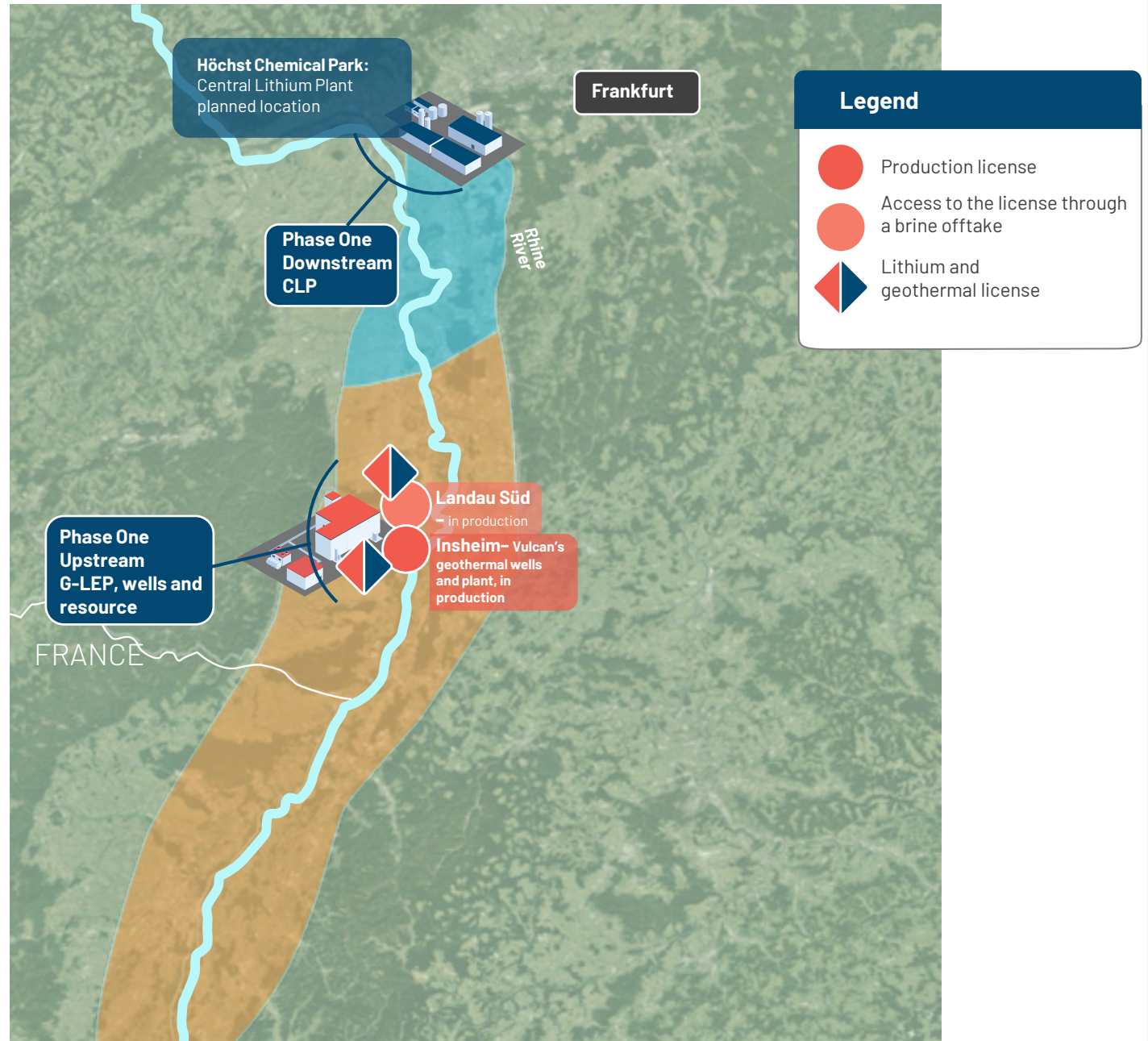
1. PHASE ONE AREA



Phased growth approach, starting from core of field where Vulcan already owns production/re-injection wells in operation.

Phase One focuses on the core of the field including existing production wells.

Large resource allows for further modular expansion



II. THE PROJECT

2. INCREASING UPSTREAM BRINE PRODUCTION



Well-known area

- >1,000 oil & gas and 24 deep geothermal wells already completed in the URVBF.
- In our Phase One project area, 4 deep geothermal wells have been in operation for more than 10 years.

In-house expertise, team and assets

- Vulcan has established its own in-house geothermal drilling company, Vercana, due to a high demand for geothermal renewable energy projects.
- Two electric rigs acquired in-house.
- Contract labour company acquired.

Conservative approach

- Targeting brine production from sandstone only, where seismicity risks are remote, in line with industry best-practice.
- Using conservative flow rates estimates, with an average flow rate (69l/s), below nearby projects (>100l/s), leaving room for upside.
- Brownfield development, Vulcan is increasing the number of its existing production well sites from 2 to 9 during Phase One project build.

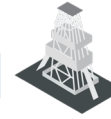
Execution

- Duration: expected 2.5 years starting H2 2023, part of Phase One CAPEX.
- Vulcan has secured a number of pre-EIA approvals for its sites and has also secured land to start wells.



II. THE PROJECT

2. LONG LIFE, SUSTAINABLE UPSTREAM PRODUCTION

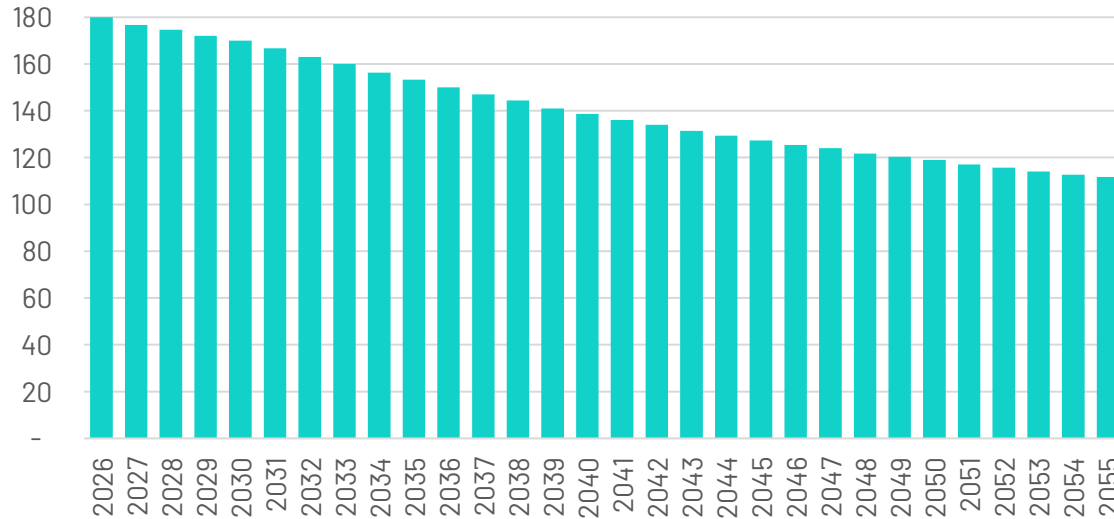


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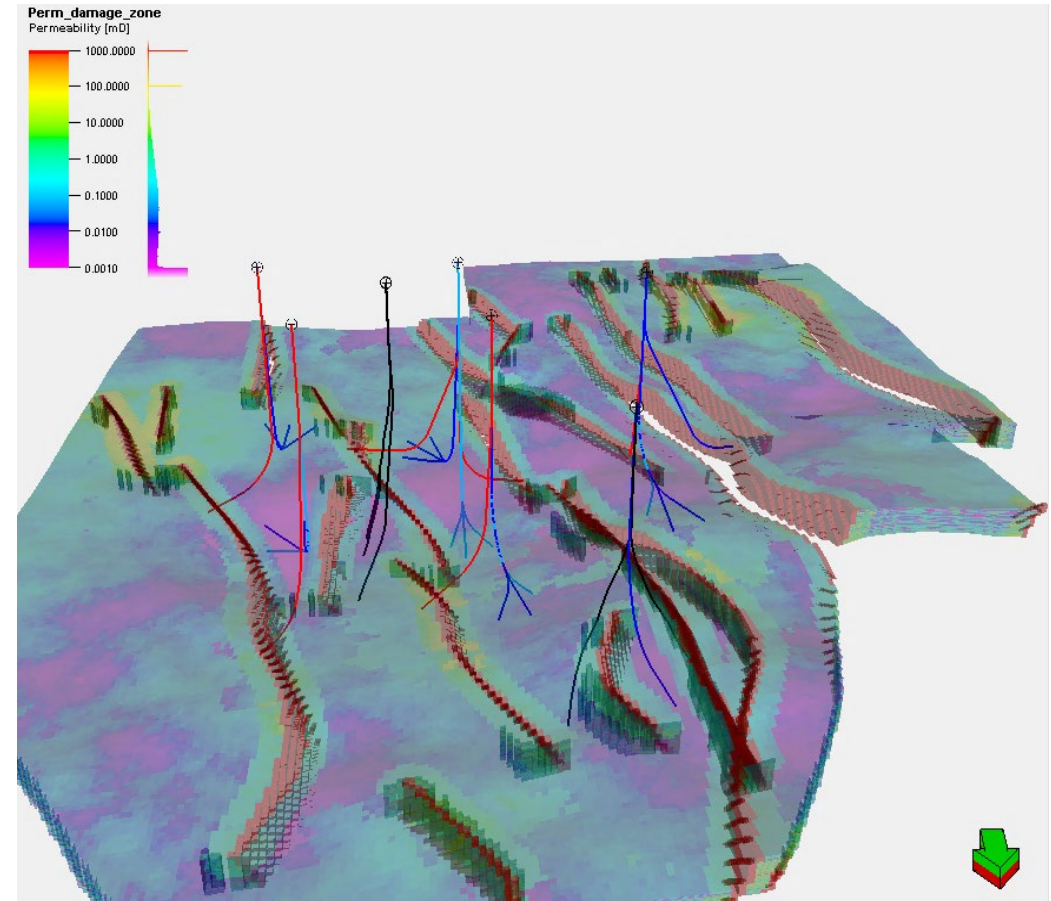
State-of-the art reservoir management principles from O&G industry

- Lithium dilution at the well sites modelled over 30 years and remains above cut-off, with only ~1.6% annual grade decrease.
- Production levels could be increased by adding new wells in the future, not modelled here¹.
- Heat modelling shows no material decrease over time.

Li dilution (Li ppm)



■ Li concentration



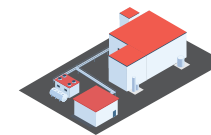
¹Production and dilution is based on reservoir estimation, modelling and simulation, and is subject to further review as further development wells are drilled to increase brine production from Phase One area. Dilution is based on weighted average of two areas.

Note: See the DFS announcement dated 13 February 2023, material assumptions on Appendix 14 of the 13 February 2023 presentation, risk factors in appendices 6 and 7 and Competent Persons Statement.

²Output of 24ktpa is estimated as at the fully ramped up commencement of production as shown above.

II. THE PROJECT

3. INCREASING RENEWABLE ENERGY PRODUCTION



Long established industry with strong growth potential

- Geothermal energy: 16GW of power & 107GW of heat capacity deployed worldwide¹
- There are currently 36 geothermal plants operating in Germany, 42 active projects (c. 84 wells), and the Federal Government is targeting to reach new 100 projects by 2030²
- Vulcan owns an existing geothermal renewable energy plant with over 10 years of successful production
- The plant is supplying ~6,500 households with renewable power
- Extensive operational experience in-house
- Plants are simple and “off the shelf” from vendors

With more wells comes more geothermal renewable energy

- Phase One will utilise Vulcan’s existing operational capacity, and increase geothermal renewable energy production:
 - Insheim: 4.2MW power capacity
 - Additional total plant generation capacity: 33MW power capacity, 30MW heat capacity

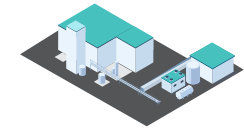


¹Global geothermal market and technology assessment (irena.org);

²Geothermie_Eckpunktepapier_ressortabgestimmt (bmwk.de);

II. THE PROJECT

4. LITHIUM EXTRACTION: PROVEN, SUSTAINABLE METHODS, IN-HOUSE IP



Commercially proven methods, combined. Testwork phase complete

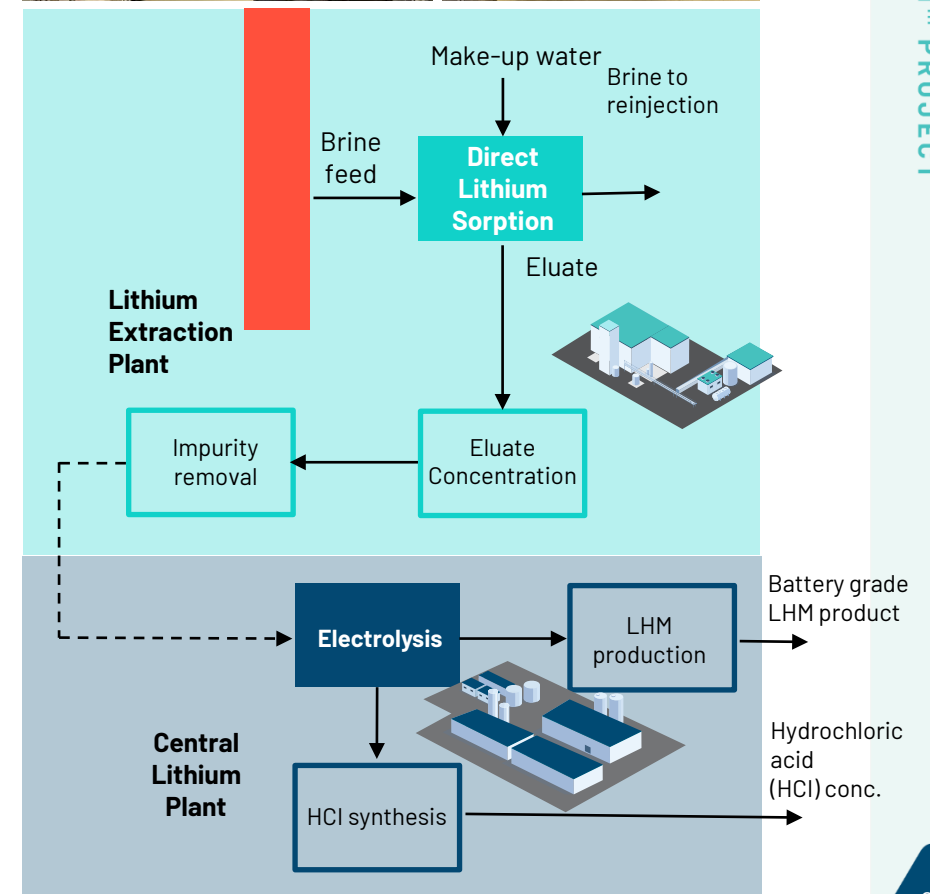
- ✓ Vulcan is using sorption to extract lithium; invented in the '70s and used commercially worldwide since 1996, including by top 5 producer Livent and multiple Chinese producers.
- ✓ Increasingly the “new normal” way of extracting lithium. Chile has declared new lithium projects will have to use these methods¹.
- ✓ 3 years of testwork and 2 years of in-house piloting on URVBF brines successfully completed at multiple well locations. Technology de-risked on our brine chemistry.
- ✓ Lithium hydroxide better than battery grade already produced.

In-house intellectual property

- ✓ Commercially available Li-sorbents are mostly manufactured in China and Russia, which have been successfully tested by Vulcan, however, Vulcan has developed its own sorbent, VULSORB™, which has demonstrated better performance.
- ✓ Vulcan is manufacturing VULSORB™ in France, thereby onshoring the critical parts of its supply chain in Europe.

Sustainable, quick process

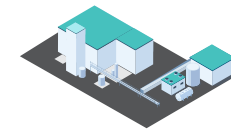
- ✓ Inputs to sorption are heat, salinity and water, all of which naturally occur in the URVBF brine. Process takes hours, instead of months with legacy methods.
- ✓ Vulcan’s process driven by renewable heat in the brine, major advantage over existing producers who use fossil gas to heat up the brine prior to sorption, and legacy production methods, which use large quantities of reagents.
- ✓ Produces very pure LiCl product, important for processing for battery EV industry.



¹ <https://www.mining.com/web/chilepushes-new-lithium-extraction-method-in-risk-to-future-supply/>

II. THE PROJECT

4. BUILDING NEW LITHIUM EXTRACTION PLANT (LEP)



Phase One commercial: sorption-type LEP

- To be constructed next to new Phase One geothermal plant
- Total targeted capacity to be 24,000tpa LHM equivalent in LiCl form
- From the LEP, LiCl concentrate solution will be trucked to the CLP
- Modular build allows for further phased development across other phases in URVBF
- Targeting Phase One start of production in late 2025
- In-house designed Optimisation Plant under construction, planned to start operation mid-year, training staff in pre-commercial environment prior to start of commercial production for **targeted operational readiness in 2025**
- Optimisation plant also built to start sending significant volume of product to offtakers for pre-qualifications



Planned new commercial Phase One geothermal and LEP development.
Top: construction of optimisation plant onsite

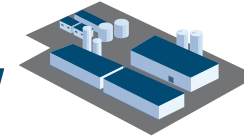
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ZERO CARBON LITHIUM™ PROJECT

II. THE PROCESS

5. LITHIUM PROCESSING: PROVEN, SUSTAINABLE METHODS, STRONG PARTNERS



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

- Vulcan to use the electrolysis process to convert lithium chloride into lithium hydroxide. Electrolysis produces very pure lithium hydroxide product, important for battery EV industry. 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 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.

Experienced partners

NORAM

- 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.

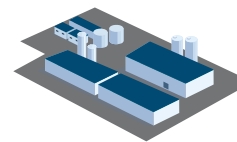
◆ **NOBIAN**

- Term sheet for JV agreement signed with Nobian, for strategic partnership and project level equity investment.¹
- Nobian has a strong pedigree in chlor-alkali operations and a heritage stretching back over 100 years. Nobian has a production site at the Hoechst Industrial Park, where Vulcan's site is also planned, providing additional synergies.
- Nobian and Vulcan have been collaborating for 15 months.

¹Equity investment subject to execution of definitive agreements, see announcement of 27 April 2023 for further information.

II. THE PROJECT

5. BUILDING NEW CENTRAL LITHIUM PLANT (CLP)



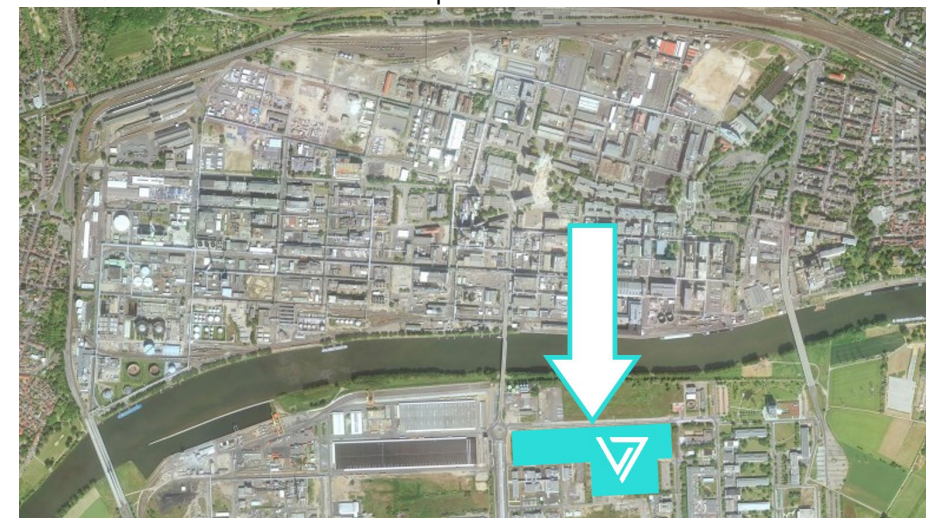
Commercial CLP



Optimisation plant under construction



Secured plot at Hoechst



- CLP planned to be located in Frankfurt (Höchst Industrial Park). Close to 100,000sqm secured.
- **Targeted 24,000tpa LHM capacity with space for further modular expansion.**
- Conversion of LiCl to battery grade LHM using electrolysis. By-products HCl and Sodium Hypochlorite. Significant synergies with existing chlor-alkali producers in the same chemical park, e.g. Nobian.
- Höchst is one of Europe's largest industrial estates and is home to around 90 chemical and pharmaceutical companies.
- Term sheet signed with Nobian, the fourth largest chlor-alkali producer in Europe and formerly part of Akzo-Nobel, for strategic partnership and 161m EUR cash equity investment, for 50% equity in SPV2, which contains the CLP.¹
- Nobian project-level equity investment values CLP at 322m EUR "pre-money".
- Investment would fully fund equity requirement for CLP, based on Vulcan's target 65:35 debt equity target for Phase One.
- Targeting late 2025 for commercial start of operations.
- Optimisation plant under construction, planned to start operation in H2, training staff in pre-commercial operational setting, will send significant volume of product to offtakers for pre-qualifications. Intended to ensure **commercial operational readiness**.

¹Equity investment subject to execution of definitive agreements, see announcement of 27 April 2023 for further information.

II. THE PROJECT

6. EXPERIENCED TEAM READY TO DELIVER



Deputy CEO
Cris Moreno

20+ years' major energy and chemicals project execution experience



MD-CEO
Dr. Francis Wedin

Founder of Zero Carbon Lithium™ Project. Extensive lithium and climate tech industry executive experience

CORE FUNCTIONS

SUPPORT FUNCTIONS

Development Organisation

Project Execution

Production Organisation

CDO
Thorsten Weimann

30+ years' drilling and geothermal leadership experience

CTO
Dr. Stefan Brand/ Dr. Stephen Harrison

25+ years' technical experience in speciality chemicals

Senior Director Programs
(starting 1 June)

25+ years' global project management experience

VP Production
Christian Tragut

30+ years' global chlor-alkali project execution and production experience

CCO
Vincent Ledoux-Pedailles

15+ years' commercial lithium leadership experience

CEO - GER
Dr. Horst Kreuter

35+ years' geothermal and rock mechanics experience, co-founder Vulcan

ESG LEAD
Storm Taylor

Director Comms & IR
Annabel Roedhammer

CFO
Markus Ritzauer (Germany)
Rob Ierace (Australia)

CoSec/ In-House Legal
Daniel Tydde (Australia)
Dr. Meinhard Grodde (Germany)

Executive experience

acquired across relevant corporations



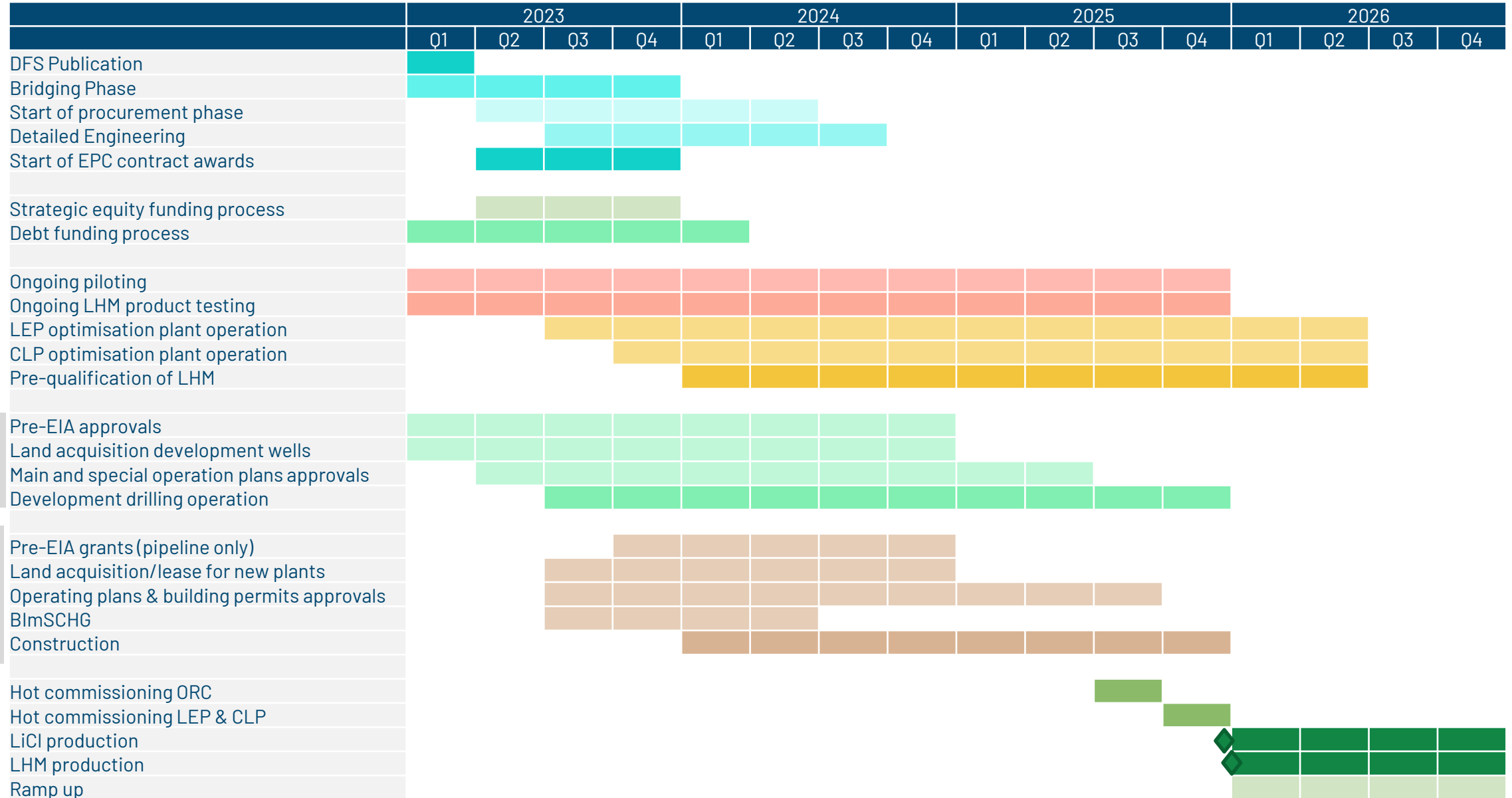
~300 personnel

spread across development, execution and production

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II. THE PROJECT

7. TARGET PROJECT TIMELINE - PHASE ONE



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Wells

Pipeline, ORC, LEP, CLP





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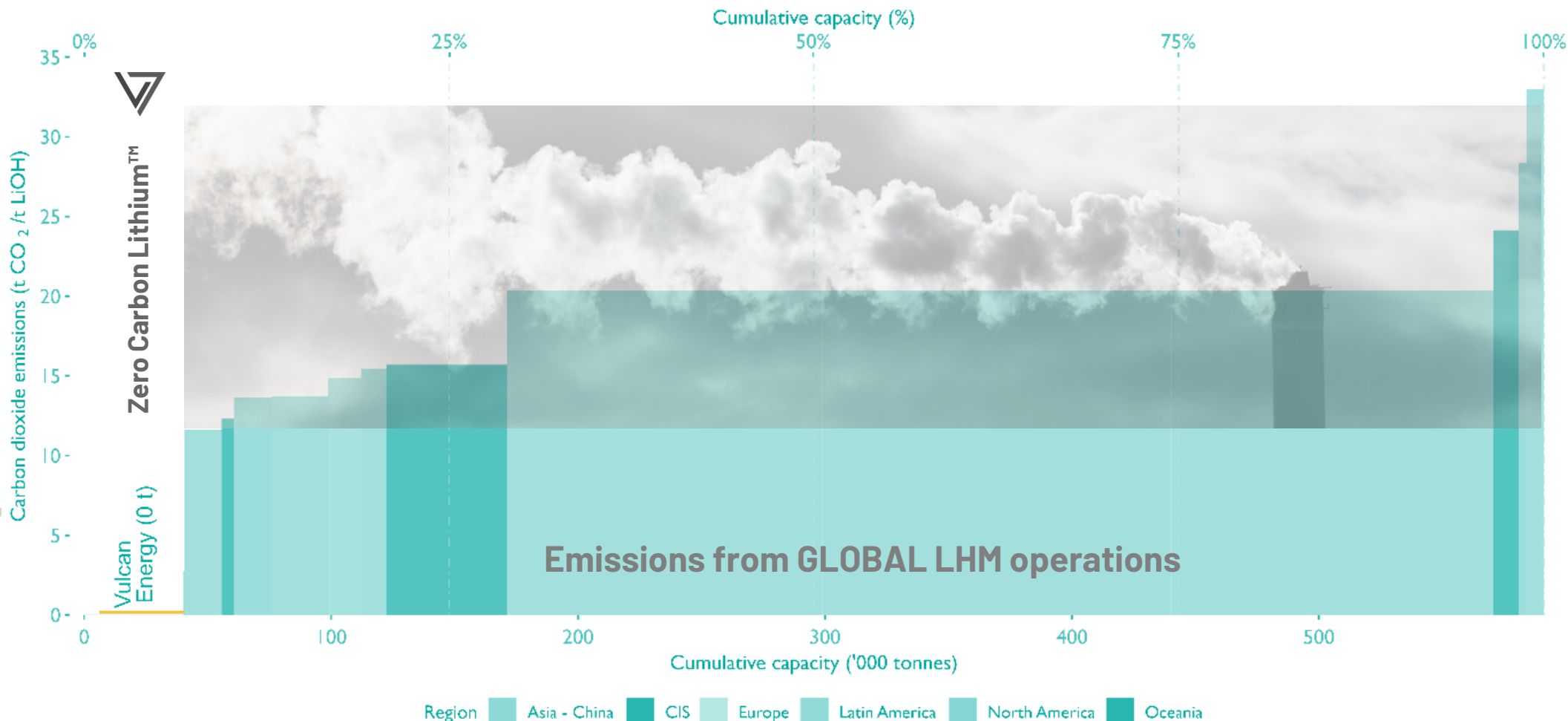
III. ENVIRONMENT, SOCIAL, GOVERNANCE



III. ESG

1. AIMING FOR LOWEST CO₂ FOOTPRINT IN THE LITHIUM INDUSTRY

- Vulcan is developing the first and only net zero carbon, zero fossil fuels lithium project in the world¹
- Globally significant decarbonisation opportunity through Vulcan's Zero Carbon Lithium™ Project



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¹Sources: Fastmarkets projection for industry. Vulcan CO₂ value provided by Minviro. 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 -1.7 kg CO₂ eq. per kg LiOH·H₂O using ISO-compliant methods for LCAs. Vulcan has amended to net zero for the purposes of the presentation, to clarify that this is not a carbon removal project. Vulcan is not aware of any other net zero carbon, zero fossil fuels lithium projects either in operation or development.

III. ESG

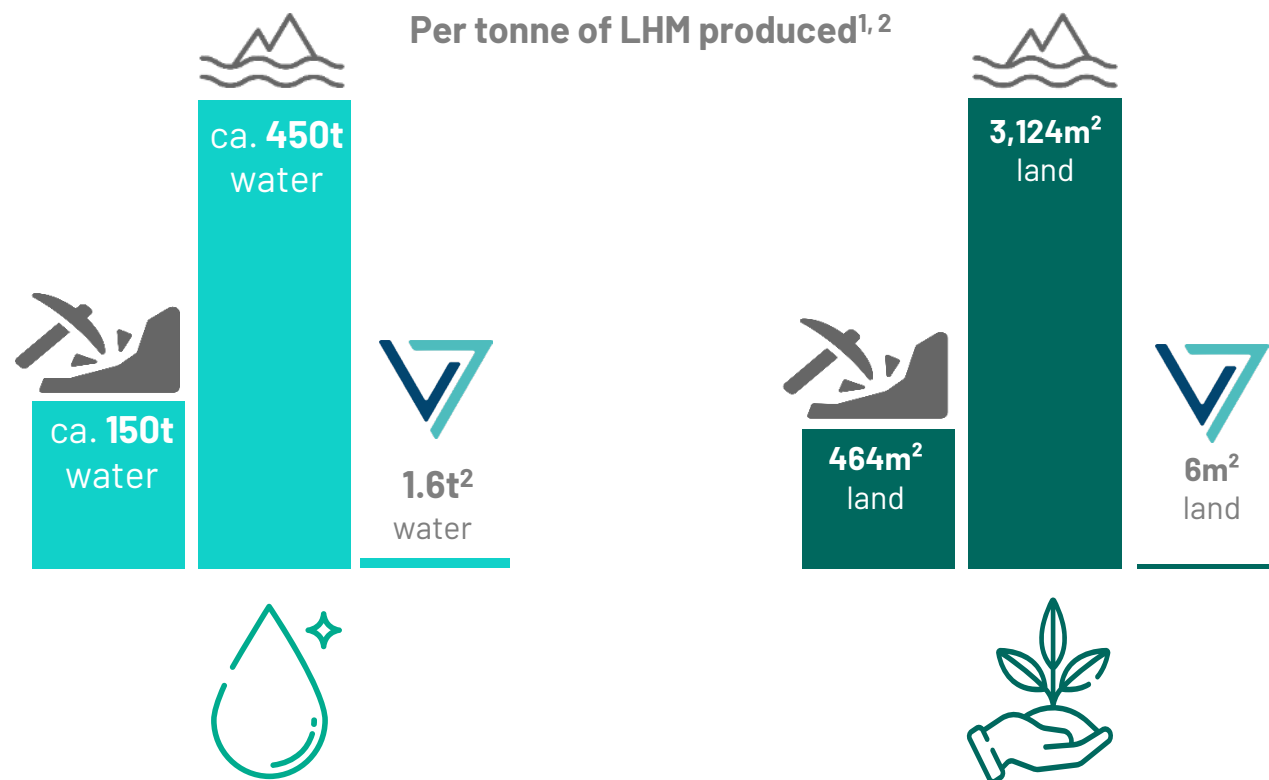
2. AIMING FOR LOWEST WATER AND LAND FOOTPRINT IN LITHIUM INDUSTRY

Engineered to have industry-leading environmental performance: our core mission

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-  **Hard rock mining**
~60% of world lithium production
-  **Evaporation ponds**
~40% of world lithium production
-  **Zero Carbon Lithium™**

Vulcan draws on naturally occurring, renewable geothermal energy to power the lithium extraction process and create a renewable energy by-product. This uses **no fossil fuels** in the process, requires **very little water** and has a **tiny land footprint**.



¹ Industry peer data generated from Minviro Life Cycle Assessment (see Vulcan ASX announcement, 4 August, 2021)

² Vulcan Energy's DFS, 13 February 2023

The Company's environmental credentials set out in this slide (and elsewhere in this Presentation) are based on the Company's Studies. There is no guarantee that the Company will be able to achieve the targeted metrics.

III. ESG

3. OTHER LEADING ESG CREDENTIALS

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Low ESG Risk Rating from Sustainalytics (01/2023)
First amongst peers and in the 2nd quartile Chemicals Industry



9,5kT CO₂ avoided from renewable energy generated at NatürLich Insheim in 2022.



ESG linked KPIs including individual and shared targets



Partnership with Karlsruhe Zoo Foundation supporting local biodiversity projects



Voluntary TCFD reporting company since 2021



Certified Carbon Neutral International Organisation from 2021¹



4 InfoCentres opened in Insheim, Landau, Karlsruhe, Mannheim and 1 mobile Infocentre for local community engagement

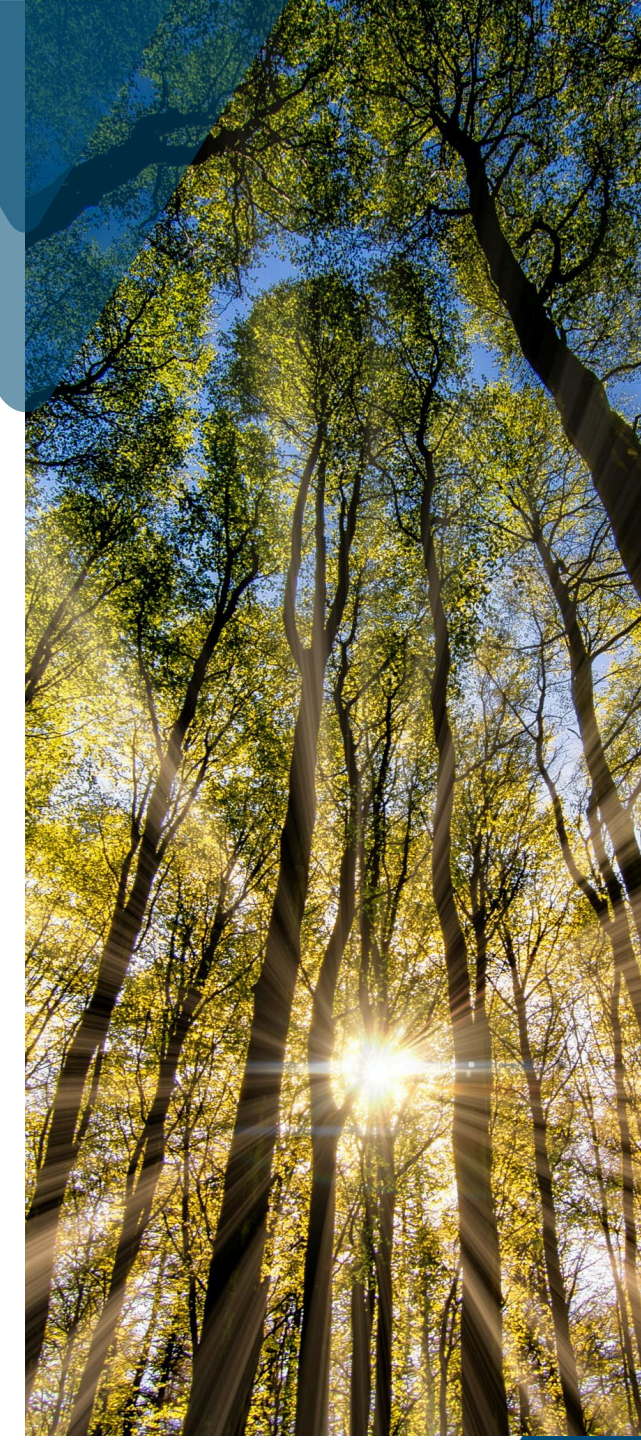


TNFD Forum Member assisting with framework development.



UNGC Member (Since February 2022)

¹Vulcan Group is certified as a carbon neutral organisation for 2021 under the Climate Active and South Pole certifications



4. PERMITTING PROGRESS ON TRACK

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Rhineland-Palatinate	Mining authority	Licenses	Exploration license 1
			Production license 2
		Production/Re-injection wells	Pre-EIA 3
			Main operation plan (one well site, all wells)
			Special operating plan: Well pad
			Special operating plan: Drilling
			Secure land 4
		Drilling start	
	Pipeline	Pre-EIA	
		Secure land	
		Special Operating Plan: Pipeline	
		Pipeline construction	
	Regional authority	ORC	Pre-EIA
			Land acquisition
			Building permit
ORC construction			
Mining authority	LEOP	Operation plan 5	
	LEP	Pre-EIA	
		Land acquisition	
		Building permit	
		Special Operating Plan	
LEP construction			
Hessen	Regional authority	CLP	Bimsch
			Building permit
			CLP construction

- ◆ Permitting progress
- 1 Multiple exploration licenses granted
- 2 Insheim geothermal production license acquired
- 3 Multiple pre-EIAs granted in Taro sector, negates need for full EIA for Phase One in this sector
- 4 Land acquired for Vulcan’s first expansion drilling
- 5 LEP Optimisation Plant operation plan approved

¹Vulcan notes that the permitting process for a geothermal project in Germany is continuous throughout integrated development, right up until the final permission to operate after the plants are built. Vulcan has initial approvals in place, and the permitting is progressing with finalisation expected within the planned development timeline. There is no guarantee that Vulcan will receive all of its permits within the planned time period or at all.
EIA = Environmental Impact Assessment

5. SOCIETAL ACCEPTANCE

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→ The Project is developed in cooperation with local communities, as Vulcan directly engages with them to understand and meet their needs.

→ Vulcan is doing a substantial amount of work to consult as well as educate the public through: 4 Info-Centres have been set up across the region, information meetings held regularly, thematic stalls organised in public spaces.

→ Majority of local city councils have been voting in favour of Vulcan’s work programme for Phase I.

→ The project generally enjoys widespread support from the public, in favour of the tangible benefits of the renewable heat and local climate job creation, with limited opposition so far.





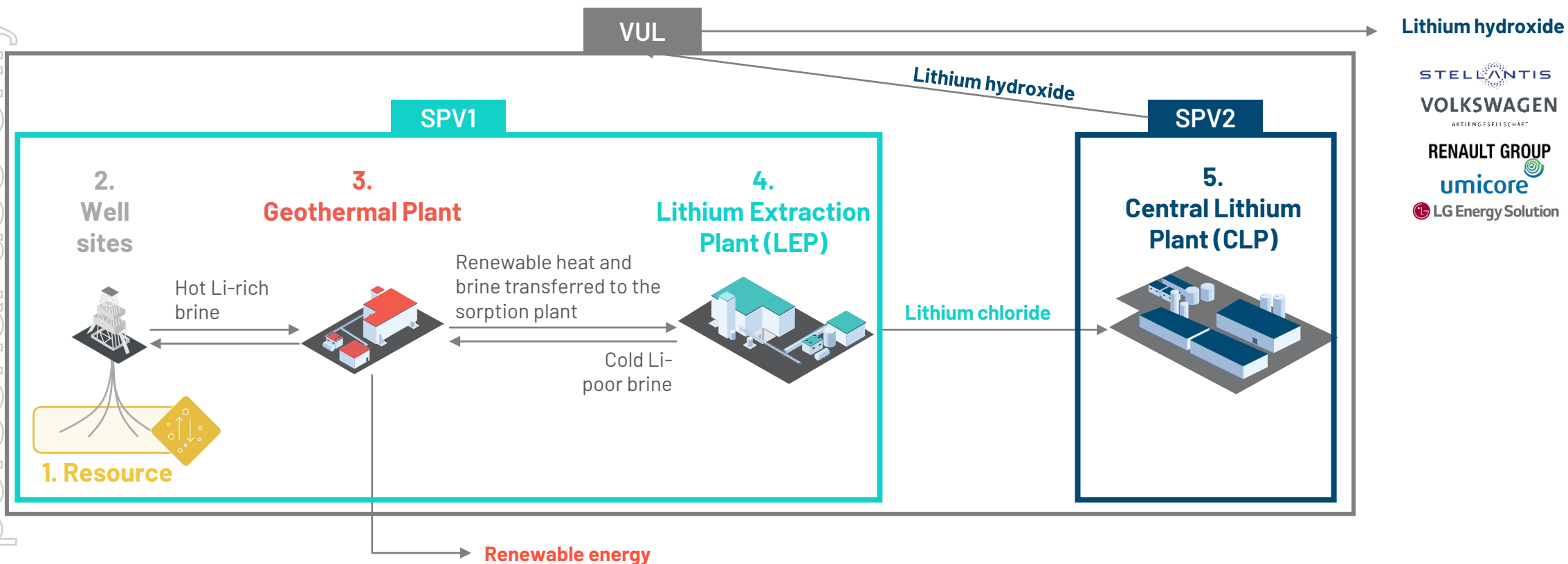
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IV. ECONOMICS AND FINANCING



1. PHASE ONE PROJECT VALUE FLOWS



SPV1 includes the plant and infrastructure associated with the production of renewable energy and lithium chloride (LiCl) and includes land, wells, pipelines, geothermal and lithium extraction plants. SPV1's output includes renewable energy and LiCl, the latter which is sold to SPV2.

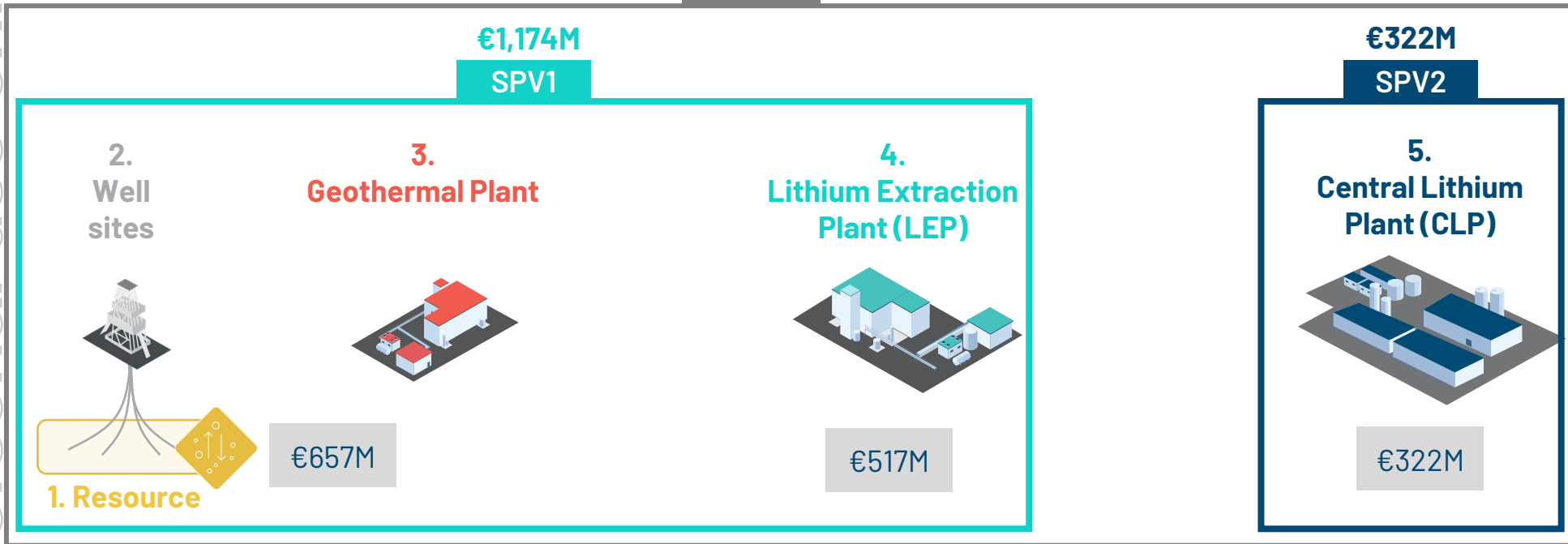
SPV2 includes the CLP which converts LiCl into LHM, with a by-product of HCl. LHM will be sold to the Vulcan parent company which will then distribute it to Vulcan's off-takers.

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2. CAPEX BREAKDOWN¹

VUL

Phase 1 estimated CAPEX: €1,496M



- CAPEX includes renewable energy generation, lithium extraction and lithium processing plant and infrastructure.
- Value improvement opportunities being assessed as part of bridging engineering phase.

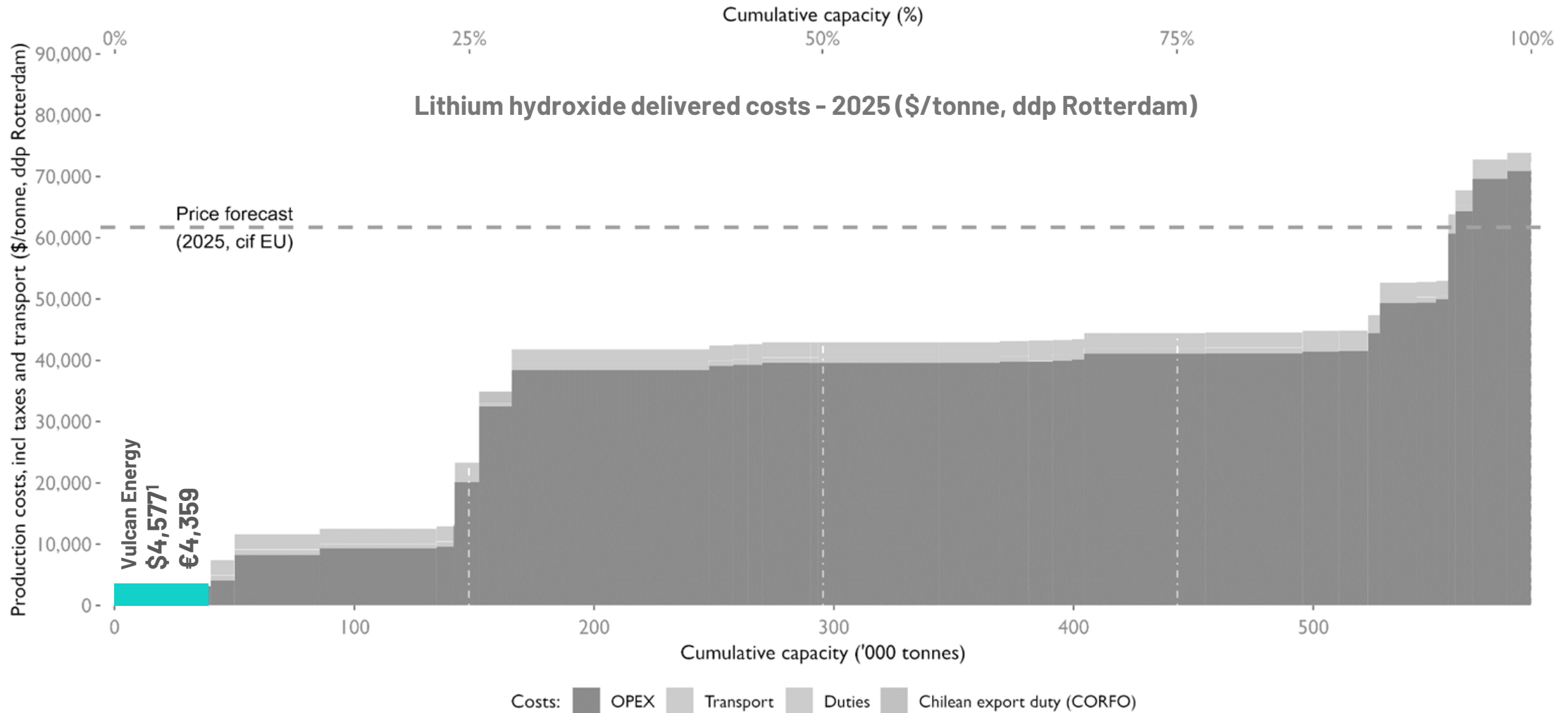
¹ Based on Vulcan Energy's DFS. These are targets and may not be achieved. Please refer to the Forward-Looking Statement disclaimer. Estimate Accuracy Based on Design Maturity: SPV Geothermal Est at +/-20%, SPV Lithium Est at +20/-15%. SPV Lithium planned to have the original DFS estimate at Class 3 accuracy (+/-15%), however several value improvements opportunities were identified late in the DFS and sufficient engineering was not able to be completed to achieve Class 3, therefore these opportunities have a lower accuracy than the original estimate, therefore giving an approximate DFS Phase accuracy of (+20/-15%). These opportunities are planned to be developed to the same detail and accuracy as the original estimate in the next phase

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IV. ECONOMICS & FINANCING

3. GLOBAL COST CURVE LHM – PROJECTED 2025

Vulcan’s Zero Carbon Lithium™ Project has the potential to be one of **the lowest cost integrated LHM projects** in the world.



¹Projected cost curve provided by Fastmarkets and Vulcan’s OPEX estimate provided by the Company. 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.

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IV. ECONOMICS & FINANCING

4. STRATEGIC SUPPLY PARTNER CONTRACTS

High quality of European-focused offtake partners.
 Average EUR 30,283/t price used by Vulcan over 20 year period, from a basket of fixed, floor-ceiling and fully floating price mechanisms in current offtake agreements, and using future forecast from Fastmarkets.
 Provides assurance to lenders during payback period.



€50M Equity investment
 Binding lithium hydroxide offtake agreement, initial 10-year term.



Binding lithium hydroxide offtake agreement, initial 5-year term.



Binding lithium hydroxide offtake agreement, initial 5-year term.

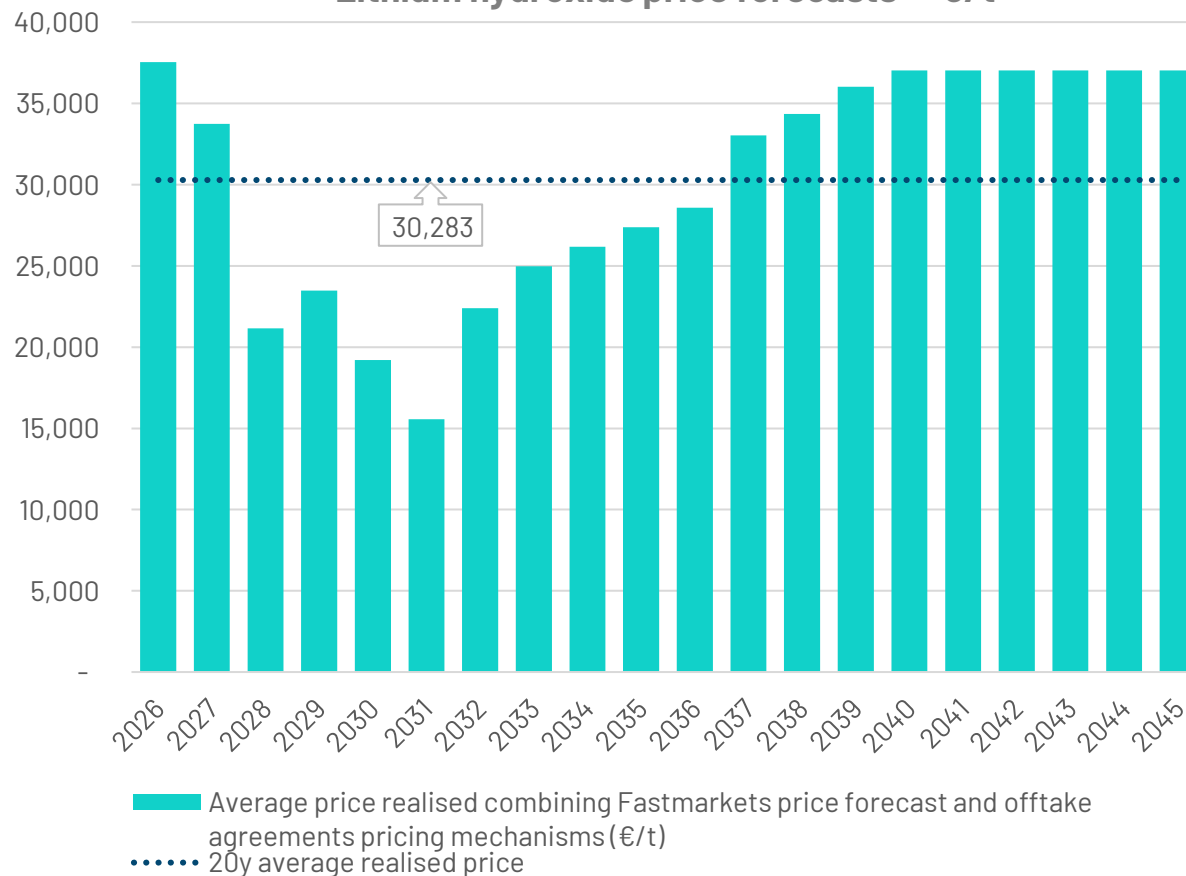


Binding lithium hydroxide offtake agreement, initial 5-year term.



Binding lithium hydroxide offtake agreement, initial 6-year term.

Lithium hydroxide price forecasts¹- €/t

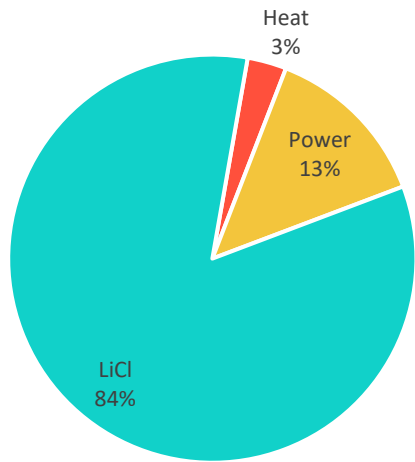
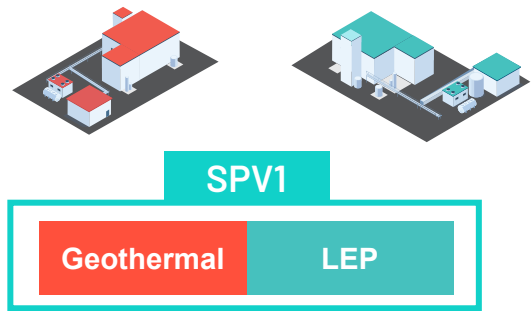


¹The average forecast realised price per tonne of LHM is taking into consideration Fastmarkets long term price forecast (min 57.5% LiOH)(\$/kg, EU & US) and combining it with Vulcan's pricing concluded in offtake agreements which includes price floors and ceilings, fix prices, and price indexed on indexes like Fastmarkets. Therefore, the average realised price forecast varies from the Fastmarkets long term price forecast. The average realised price forecast is taken into consideration in our financial model and is used to underpin forecast revenues. Lithium prices are subject to unpredictable fluctuations, driven in part by changes in the balance of global supply and demand as well as international, economic and geopolitical trends and developments. Any decrease or significant volatility in the price of or demand for lithium could have a detrimental effect on Vulcan Group's business.

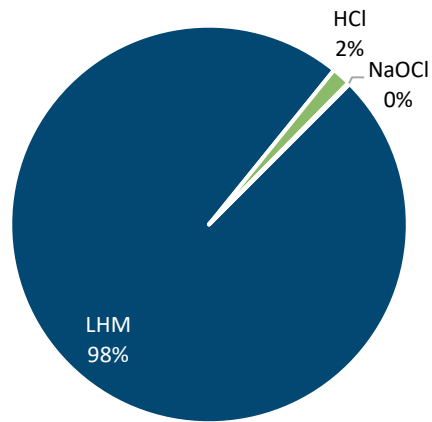
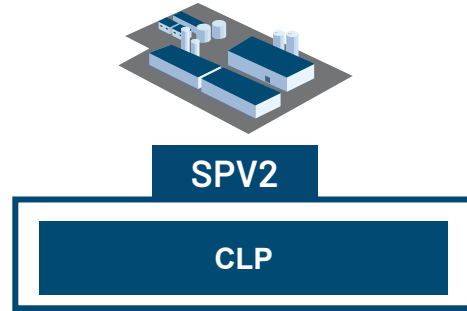
IV. ECONOMICS & FINANCING

5. TARGET REVENUES – 20Y AVERAGE¹

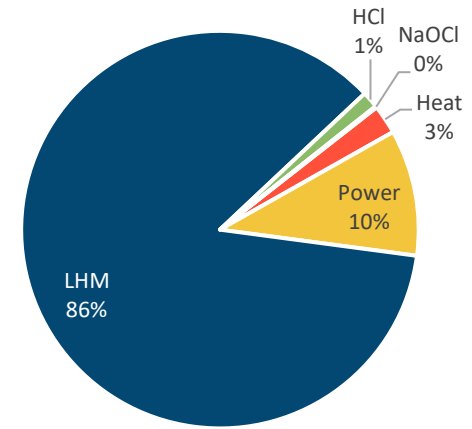
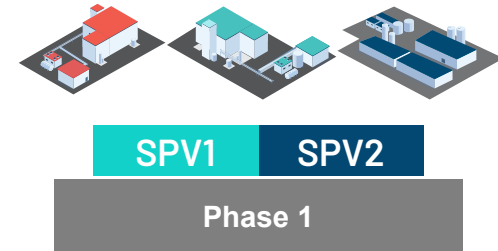
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€537M/a



€616M/a



€704M/a*

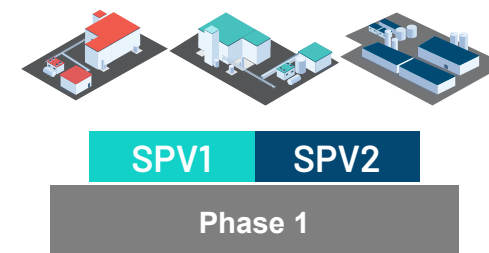
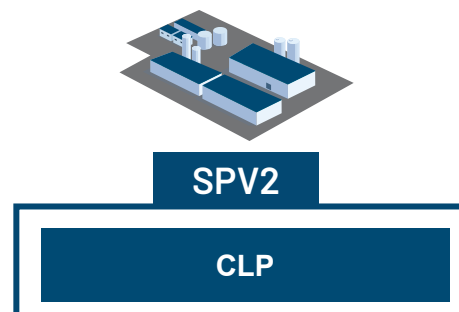
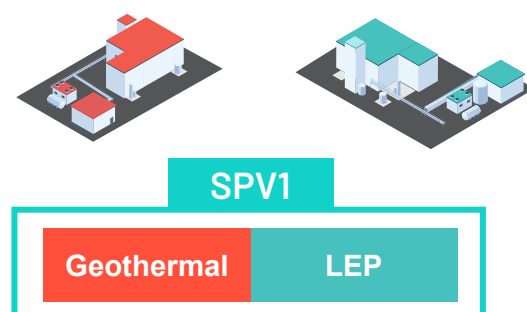
¹ Vulcan Energy's Phase One DFS, 13 February 2023.

* Consolidated revenue.



IV. ECONOMICS & FINANCING

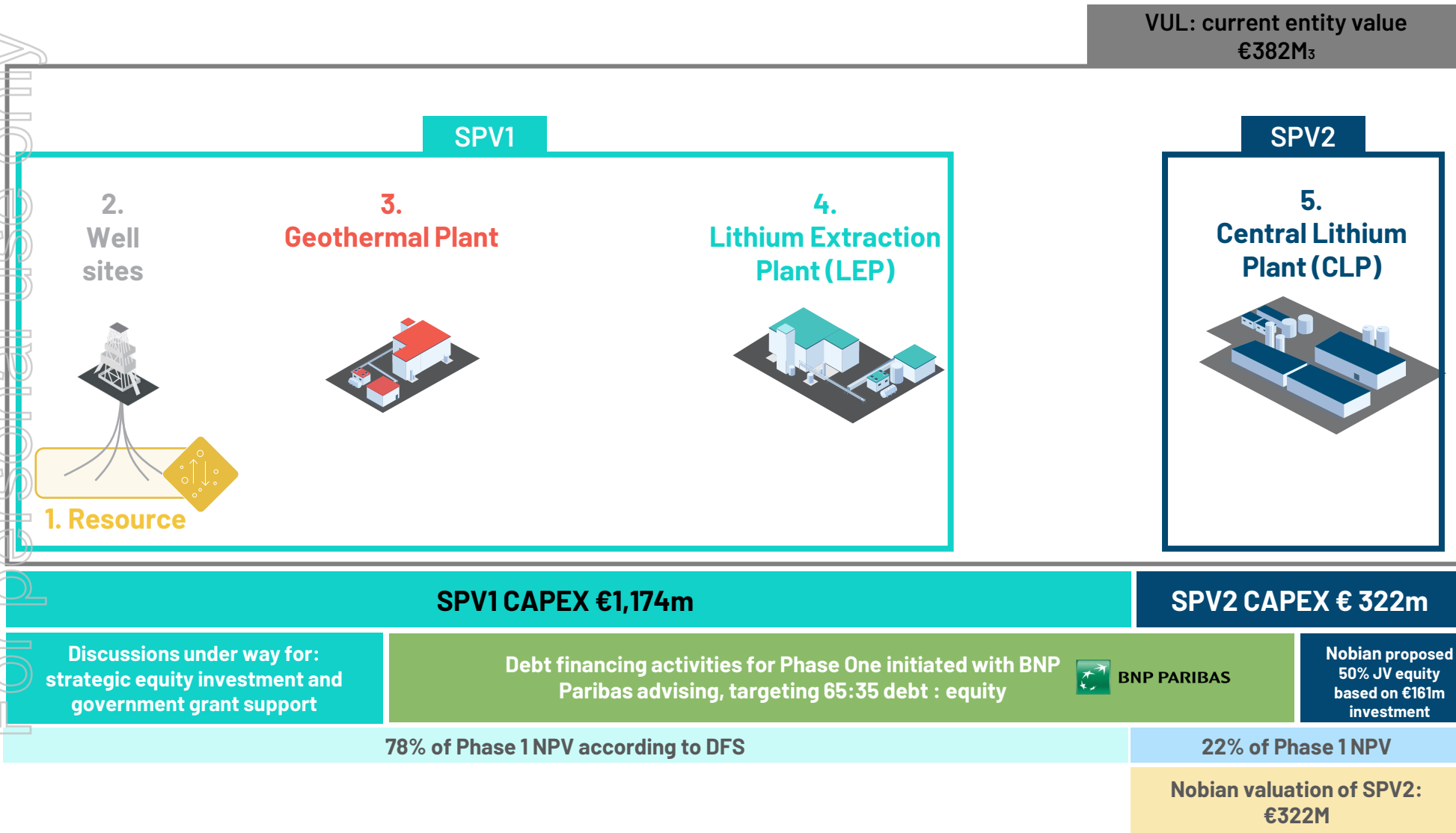
6. TARGET PROJECT ECONOMICS¹



Revenues €M/a	537	616	704
Net Op. Cash Flow €M/a	339	104	437
NPV pre-tax m€	3,022	895	3,917
NPV post-tax m€	1,998	572	2,584
IRR before Tax	34.1%	35.5%	34.4%
IRR after Tax	26%	26.1%	26.1%
Payback in years	3.5	3.3	3.3
Total Capex m€	1,174	322	1,496
<i>Geothermal</i>	657		657
<i>LEP</i>	517		517
<i>CLP</i>		322	322
Avg Opex €/t LiOH	2,656	1,704	4,359

¹ Vulcan Energy's DFS. These are targets and may not be achieved. Please refer to the Forward-Looking Statement disclaimer. Notes: Lithium Hydroxide Battery Quality at €30,283/t

7. PHASE ONE PROPOSED FINANCING STRATEGY AND PROGRESS UPDATE



- Debt market sounding exercise completed with positive feedback from banks and ECAs.
- Government backed ECAs from France, Italy and Canada have indicated strong support, including “untied” strategic financing from the French ECA, bpifrance.
- Nolian term sheet envisages 161m EUR (approx. A\$265m) cash equity contribution by Nolian into the CLP SPV2 at a project level, to fund CLP CAPEX.²
- Term sheet values SPV2 alone at 322m EUR.
- Based on Vulcan’s targeted 65:35% debt : equity ratio, the envisaged project level equity funding would fully fund the equity requirement for the CLP.
- Project-level equity investment, and EU government-backed debt financing, is consistent with Vulcan’s stated funding strategy.

¹There are no guarantees that Vulcan will be able to raise the funding required for the further implementation of its Zero Carbon Lithium™ Project. For further information please see the risk factors in Appendices 6 and 7. ²Equity investment subject to execution of definitive agreements, see announcement of 27 April 2023 for further information. 3. Entity value based on market cap as at 26 April 2023 (€494m) less cash at March 2023 quarter (€112m).



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V. CONCLUSION



1. SHORT TERM OBJECTIVES: AN EXCITING YEAR AHEAD



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Operational readiness

Optimisation plants to commence for operational readiness in 2025

Permits

Relevant permits in line with development timeline

Increase brine production

Start drilling of new production/re-injection wells in Phase One area

Funding

Secure funding: equity for Phase One, public funding and substantially advance debt funding process

Execution

Build and deliver project execution model: organisation in place, award key packages & contracts for Phase One

Phase+

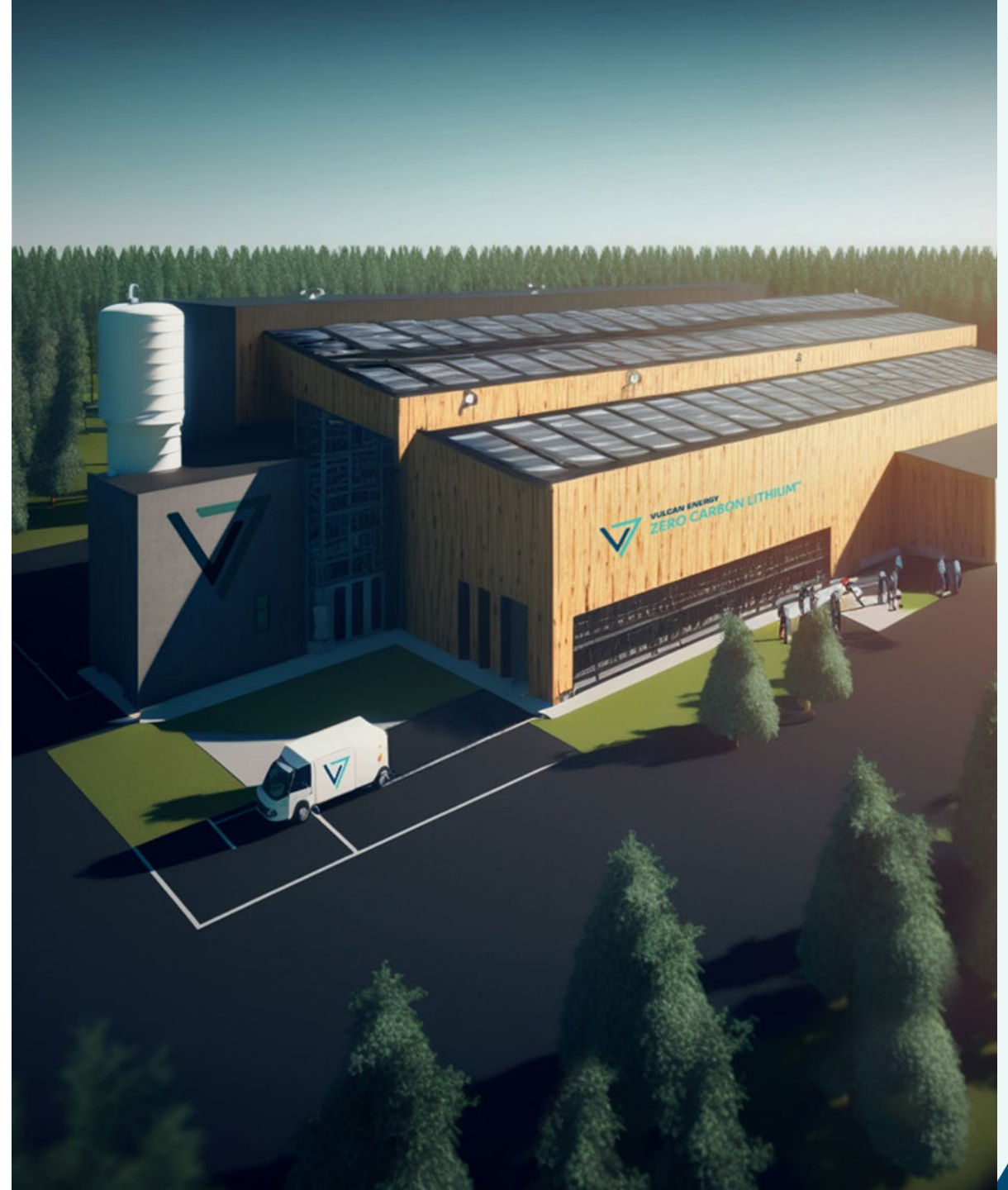
Complete Phase Two feasibility study



V. CONCLUSION

2. KEY TAKEAWAYS

- The **first integrated renewable energy, lithium extraction and lithium hydroxide refining project** development, seeking to supply the battery electric vehicle industry from Europe, for Europe.
- **World-leading sustainability credentials:** engineered specifically to be world-first zero Scope 1 fossil fuels, net zero GHG emissions, very low water consumption project.
- **Compelling financial model** from DFS.
- Company moving Phase One Project into **bridging engineering** phase, assisted by Hatch Ltd.
- Focus going forward on **transitioning to project execution** and operations company.
- Optimisation Plant to assist with **building operational readiness**.
- Team focused on **further de-risking** during project development, particularly during permitting process.
- Targeted **start of production end-2025**.
- **Financing process for Phase One has commenced**, working with BNP Paribas as debt advisor. Equity financing at a project level, as well as parent level, being viewed as an option. Initial term sheet for project level equity investment already signed with Nobian.



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ZERO CARBON LITHIUM™ PROJECT

V. CONCLUSION

3. SHARE PRICE AND CAPITAL STRUCTURE

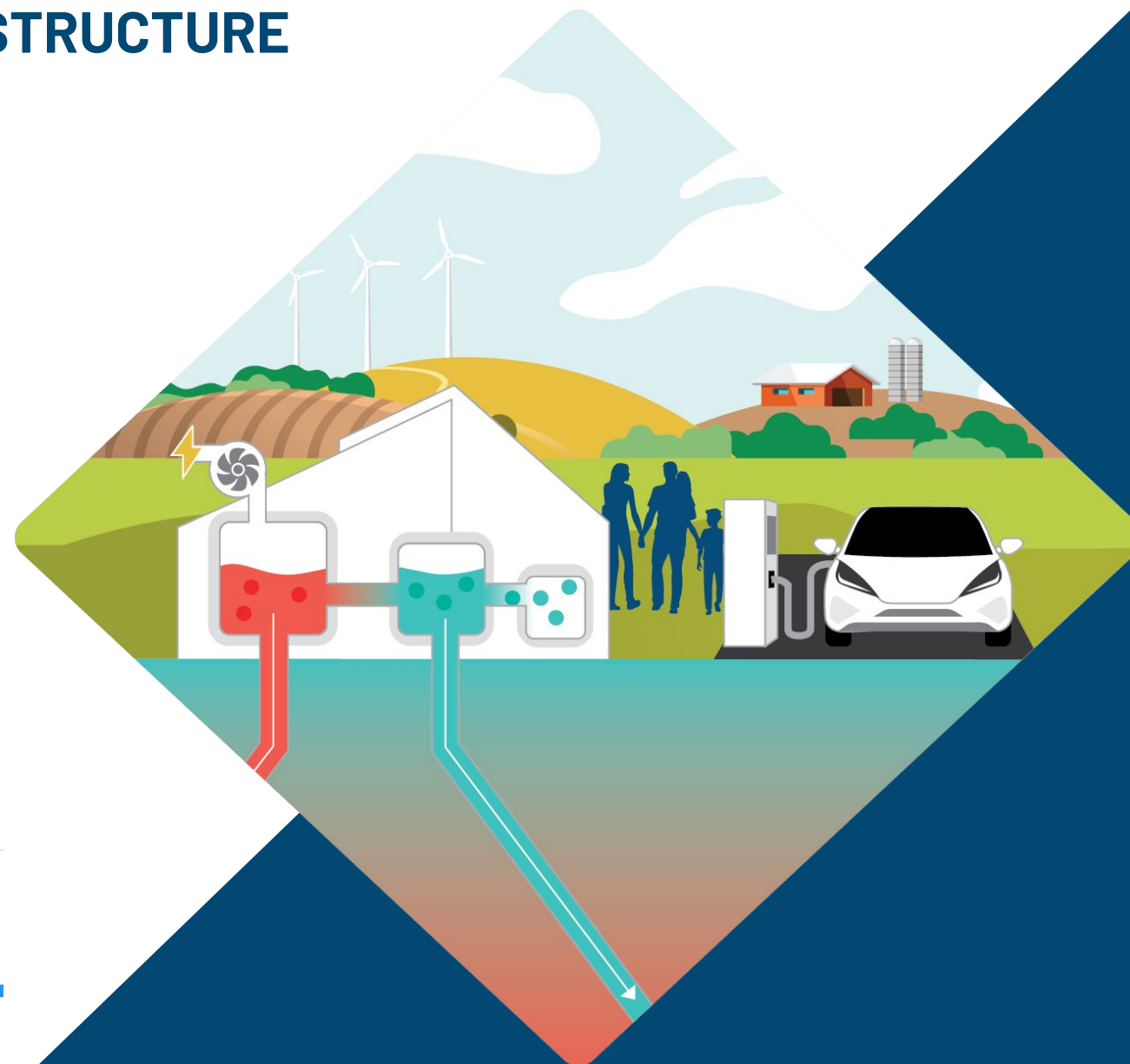
ASX : VUL

Shares on Issue	143,435,301
Performance Shares	91,174
Performance Rights	8,382,801
Market Capitalisation at \$5.73 (undiluted as at 26 April 2023)	~\$822m
Cash Position (as at 31 Mar 2023)	€112M
Top 20 Shareholders	~61%
Management (undiluted)	~17%
Frankfurt: VUL	

KEY SHAREHOLDERS

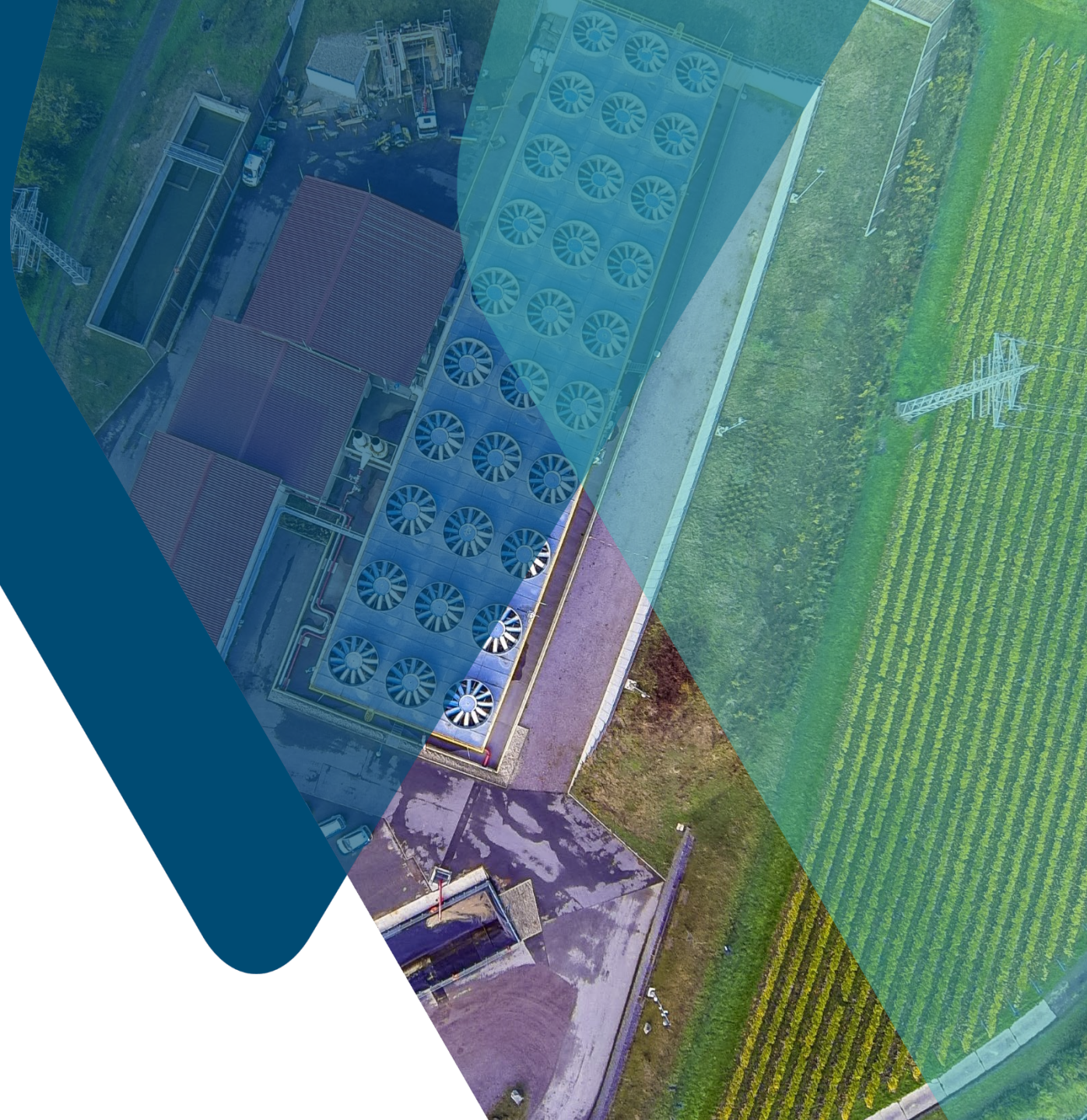
Dr. Francis Wedin (10.91%) and Dr Wedin and Katy Wedin (0.57%)	11.50%
Stellantis Group (PSA Automobiles)	8.00%
Vivien Enterprises Pte Ltd	5.30%
Hancock Prospecting Pty Ltd	5.18%

VUL SHARE PRICE (AUD) (1 JAN 2021 – 31 MAR 2023)



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APPENDICES



ZERO CARBON LITHIUM™ PROJECT

APPENDIX 1: BOARD OF DIRECTORS



Dr. Francis Wedin
Managing Director & CEO

Founder of Vulcan Zero Carbon Lithium™ Project. Lithium industry executive since 2014. Previously Executive Director of ASX-listed Exore Resources Ltd. Track record of success in lithium industry as an executive since 2014, including the discovery of three resources on two continents. PhD in Geology, MBA in Renewable Energy, global experience in battery metals sector.



Gavin Rezos
Chair

Executive Chair/CEO positions of three companies that grew from start-ups to the ASX 300. Extensive international investment banking experience. Investment banking Director of HSBC with senior multi-regional roles in investment banking, legal and compliance functions. Currently Chair of Resource and Energy Group, principal of Viaticus Capital, Non-Executive Director of Kuniko Limited and Non-Executive Chair Resources & Energy Group Limited.



Ranya Alkadamani
Non-Executive Director

Founder of Impact Group International. A communications strategist, focused on amplifying the work of companies that have a positive social or environmental impact. Experience in working across media markets and for high profile people, including one of Australia's leading philanthropists, Andrew Forrest and Australia's former Foreign Minister and former Prime Minister, Kevin Rudd.



Annie Liu
Non-Executive Director

Annie was the Executive Director of Purchasing for the Ford Model e Line, for all electric products and technology. Annie started her 20+ year career as an engineer at Microsoft before moving to Tesla where she progressed to Head of Supply Chain, Battery and Energy at Tesla. Annie is experienced in building and leading teams from product incubation stage to scale up and mature market bringing a unique blend of entrepreneurial initiative and ability to meet organisation and market growth needs.



Dr. Heidi Grön
Non-Executive Director

Dr. Grön is a chemical engineer by background and an accomplished business leader with over 22 years' experience in the chemicals industry. Since 2007, Dr. Grön has been a senior executive with Evonik, one of the largest specialty chemicals companies in the world, with a market capitalization of €14B and 32,000 employees.



Josephine Bush
Non-Executive Director

Member of the EY Power and Utilities Board. Led and delivered the EY Global Renewables and Sustainable Business Plan and spearheaded a series of major Renewable Market Transactions. Successfully advised on the first environmental yieldco London Stock Exchange listing, Greencoat UK Wind PLC. Ms. Bush is a Chartered Tax Advisor, holds an MA Law degree from St Catharine's College, Cambridge, and brings a wealth of experience in ESG strategic advisory.



Dr. Günter Hilken
Non-Executive Director

Dr. Hilken has over 35 years' experience in and a deep understanding of the German chemicals, renewables and infrastructure investment sectors and, through leading industry advocacy associations, the German Government at the State and Federal level. Dr. Hilken is a Senior Advisor to Macquarie Asset Management, Director of Currenta and President and Chairman of the Board of the German Federation of Industrial Energy Consumers (VIK).



Mark Skelton
Non-Executive Director

Mr Skelton has more than 35 years' experience including a 29-year tenure at BP and then at Fortescue Metals Group (Fortescue) in Project Development and general management. A senior leader and advisor with a proven record in delivering major projects, business transformation and developing organisational capability within the mining, energy and oil and gas industries, Mr Skelton has extensive project experience in Australia and internationally.

A wealth of multi-disciplinary experience across the span of industries that we cover

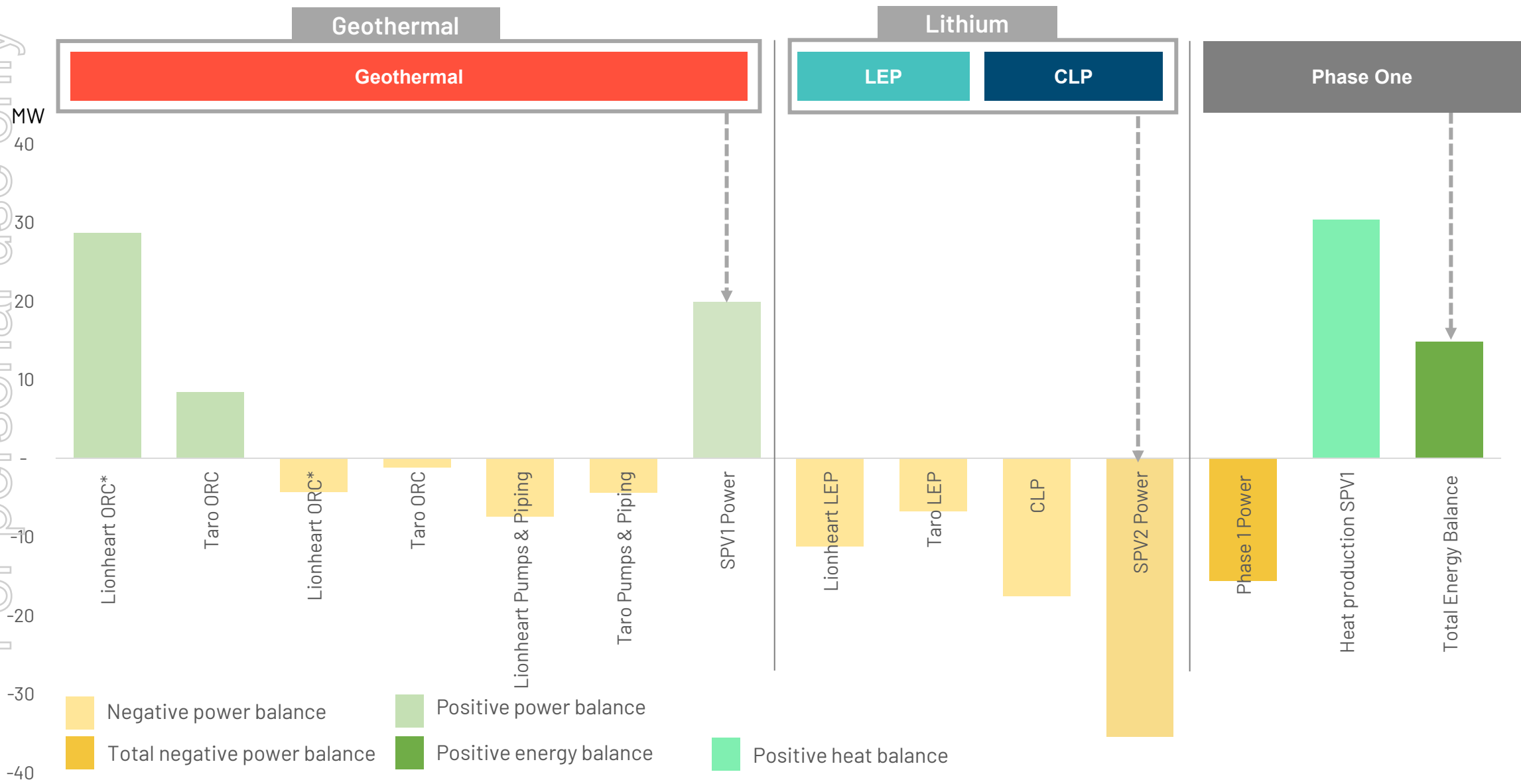


Gender-balanced, majority-independent Board of Directors

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APPENDIX 2: ENERGY BALANCE: NET POSITIVE PRODUCER OF RENEWABLE ENERGY¹

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¹Vulcan's Phase One is a net consumer of power, and a net producer of heat. The overall positive energy balance is a net effect of these two different types of energy.

APPENDIX 3: DLE/DLS PROJECTS AND ASSETS - REFERENCES

Livent	https://s22.q4cdn.com/453302215/files/doc_presentations/2022/2022.11-Livent-Investor-Presentation.pdf
LANKE Lithium	https://www.linkedin.com/pulse/from-catamarca-qinghai-commercial-scale-direct-lithium-alex-grant/ http://www.asianmetal.com/news/1665421/Lanke-lithium-plans-to-launch-commercial-production-of-battery-grade-lithium-carbonate
Zangge Lithium	https://www.linkedin.com/pulse/from-catamarca-qinghai-commercial-scale-direct-lithium-alex-grant/
Jintai Lithium	https://www.linkedin.com/pulse/from-catamarca-qinghai-commercial-scale-direct-lithium-alex-grant/
Eramet/Tsingshan	https://www.eramet.com/sites/default/files/2022-05/2022-05-Eramet%20Investor%20Presentation-May%202022.pdf
Standard Lithium	https://www.standardlithium.com/projects/arkansas-smackover
Rio Tinto	https://www.rinconmining.com/wp-content/uploads/2021/10/Rincon-FINAL-E-210921-FINAL.pdf
CTR	https://www.cthermal.com/projects
Berkshire Hathaway	https://www.ft.com/content/c9760a4e-1a76-11e9-9e64-d150b3105d21
Lake Resources/Lilac	https://lakeresources.com.au/wp-content/uploads/2023/01/lke_kachi-resource_11-jan-23.pdf
Compass Minerals	https://s22.q4cdn.com/834578860/files/doc_presentations/2022/12/DB-Lithium-Battery-Supply-Chain-Conf-v4-(12.02.22).pdf
E3 Metals	https://www.e3lithium.ca/_resources/presentations/corporate-presentation.pdf?v=0.084

APPENDIX 4: EUROPEAN LITHIUM PROJECTS PEER COMPARISON REFERENCES

COMPANY ¹	CODE	PROJECT	STAGE	RESOURCE CATEGORY	RESOURCES M TONNES	RESOURCE GRADE (LI2O)	CONTAINED MT LCE TONNES	INFORMATION SOURCE
European Metals	ASX: EMH	Cinovec	PFS Complete	Indicated & Inferred	708.2	0.43	7.39	Annual Report June 22
Rio Tinto	ASX: RIO	Jadar	PFS Complete	Indicated & Inferred	144	1.80	6.12	Annual Report Dec 21
Infinity Lithium	ASX: INF	San Jose	PFS Complete	Indicated & Inferred	111.2	0.61	1.68	Annual Report June 22
Savannah Resources	AIM: SAV	Barroso	DFS Underway	Measured, Indicated & Inferred	27.0	1.06	0.71	Corporate Presentation December 2022 - Company Website

Note 1: Data provided for lithium focused peers with comparable project size and stage and published resource information

APPENDIX 5: KEY RISKS TECHNOLOGY / EXECUTION / RESOURCE

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Risk Description	Mitigation
Technology: VULSORB™ industrial manufacturing capability still to be demonstrated.	Currently in discussions with a local toll manufacturer to manufacture VULSORB™, who is already supplying Vulcan for its Optimisation Plant. Similar to other sorbents which have also been tested in Vulcan's pilot plants, are commercially available and could be used instead.
Technology: VULSORB™ + pressurised operation has limited pilot scale testing so far.	If pressurised operation is not seen as successful, the Project can revert back to the proven atmospheric mode of operation, which has many thousands of hours of successful testwork.
Technology: Electrolysers – widely used in salts industry but not yet commercially used on lithium salts.	Extensive Demonstration Plant testwork conducted by NORAM and other companies on LiCl electrolysis over many years. Planned to be further backed up by operational tests in Electrolysis Optimisation Plant, using a commercial scale electrolyser, which is aimed to optimise process parameters and operating conditions.
Technology: Optimisation Plant operational data after design freeze in April could lead to change during Bridging or Execution Phase	Extensive pilot plant data already provides some risk mitigation. Expedite Optimisation Plant data during bridging and execution to optimise process parameters and operating conditions.
Execution: Delay in order of Long Lead Items (LLI) of Equipment packages and award of EPC/EPCm contracts and further supply chain issues	All LLI have been identified and clear schedule to be awarded and clear advancement of vendor data to support 3D model to achieve 60% model review ASAP. Bridging moving to E&P Phase rather than just Engineering and clearly identified LLI and award of EPCm, see Hatch updated Bridging phase scope and deliverables.
Execution: Some critical decisions by authorities on permitting pathway - risk of delay. There is no guarantee that Vulcan Group will be able to obtain all required approvals, licences and permits for lithium and geothermal renewable energy production in time or at all.	Proactive engagement with authorities, selection of sites outside of environmentally sensitive areas.
Execution: Brine production expansion drilling programme dependent on continued success of land purchase, permits and then significant ramp up in capability and capacity.	Proactive engagement with local stakeholders and authorities, focus on first areas in schedule
Execution: Bridging phase is front-end loaded with numerous intensive and parallel work streams including approvals, engineering, contracts and procurement, financing to meet early milestones and protect overall execution phase.	Project Directorate in place and on the ground, Integrated Level 2 schedule now developed showing key links between projects and what risk and workstream pushes what
Execution: Speed and ramp up of Project Execution teams to deliver projects	Vulcan group rolling out transition to Functional Organisation with Execution focus, Project Directorate and other key roles identified and recruitment ongoing
Execution: The target execution schedule (27 months from detail design to start of production) is a tight schedule	27 months is well benchmarked across other key Battery related projects in Europe and globally, key execution risks need mitigating early on and supported by early decision making
Economics: FX EUR/USD: all LHM offtakes are linked to a PRA with a USD index or a fixed price in USD	Commercial team to explore converting offtakes to EUR-linked pricing index when the European lithium market matures.
Economics: DFS CAPEX estimate is combination of Class 3 (+/-15%), accuracy and Order of Magnitude accuracy for the late Value Improvements.	DFS Phase took budgetary quotes at the top of the commodity cycle with high inflationary conditions. Key budgetary quotes related to HP mode equipment were re-budgeted by suppliers and included in DFS Cost Estimate. Contingency and Design Allowance are included where applicable. These opportunities are planned to be developed to the same detail and accuracy as the original estimate during Bridging and an Open Book Estimate (OBE) approach is planned to be used during Bridging to understand trends against DFS.
Resource: Brine flow rate risk	Due to field development plan simulation results, lower "per well" brine flow rate has been shown to be more optimal for lithium sweep, therefore more conservative brine flow rate assumptions have already been used, of 69l/s average (>100l/s in PFS). This is in line with the Vulcan's current geothermal wells and plant in operation. Use of 3D seismic targeting fault zones correctly and optimised for flow are expected to further reduce risk. Finally, measures such as side-track/double-completion drilling can be used to increase flow rates.
Resource: Unforeseen geological conditions impacting total resource	Integration of 3D seismic data into work plan. Expedite new production/re-injection well drilling to further reduce risk.
Resource: Seismicity events during ramp up of the field	Incorporate experience of the team in managing seismicity from Vulcan's existing geothermal operations, including extensive monitoring and "traffic light" system of warnings. Manage ramp-up sensibly and conduct best practice seismicity risk studies prior to commencing ramp up.

APPENDIX 6: KEY RISKS GENERAL

Risk Description	Mitigation
Markets: General demand for lithium hydroxide may decrease as a result of new market or technological developments and other factors. Any such factors resulting in a decrease in the general demand for lithium hydroxide may have a detrimental effect on Vulcan Group's business.	Vulcan closely monitors developments in the battery industry, and preferred battery chemistries. Vulcan notes that, whilst EU customers are investing in battery manufacturing which requires lithium hydroxide, other current battery types such as LFP use lithium carbonate, which Vulcan can switch the back-end of its process to making with relative simplicity. Future battery-types, such as solid state, use LiCl, which Vulcan produces as a precursor, giving flexibility.
Geopolitical: The Russian invasion of Ukraine, the sanctions imposed by numerous countries and international organizations in response thereto and countermeasures implemented by Russia have adversely affected, and may continue to adversely affect, the availability and price of equipment, components and energy, supply chains, international trade, financing conditions and the global economy at large, which has had, and may continue to have, a detrimental effect on Vulcan Group's business.	Vulcan has the ability to produce most of the power it needs and consume it internally, so is somewhat insulated from sharp price increases in power. Vulcan does not directly consume any fossil fuels, providing further mitigation. Vulcan will seek to work with suppliers to mitigate effects of equipment and materials price fluctuation, however there may still be supply chain interruptions and increases in the cost of equipment.
ESG: Vulcan Group may fail to achieve its sustainability ambitions or fail to maintain current or obtain potential future ESG ratings and sustainability-related certifications, each of which could have a material adverse effect on its business, assets, results of operations, financial condition, prospects and reputation.	Vulcan has appointed a Head of ESG and has a Board Director with very extensive ESG-related experience. Vulcan engages with expert third party consultants, including ERM and Baringa, to provide up to date advice on the changing ESG landscape, to ensure it maintains its status as an ESG-leader. In addition, Vulcan is ensuring that sustainability related topics are embedded within its engineering and procurement practices including setting executive individual and group KPI's with ESG baseline metrics.
Markets: Lithium prices are subject to unpredictable fluctuations, driven in part by changes in the balance of global supply and demand as well as international, economic and geopolitical trends and developments. Any decrease or significant volatility in the price of or demand for lithium could have a detrimental effect on Vulcan Group's business.	Vulcan has put in place a series of binding, take or pay lithium hydroxide offtake agreements for the first five years, and in one case the first ten years, of production. These offtake agreements are based on a basket of different mechanisms, providing some downside protection against lower prices. Vulcan is also targeting a very low OPEX, meaning it would be somewhat protected against lower prices.
Markets: Any decrease in the price or demand for geothermal energy may have a detrimental effect on Vulcan Group's business.	The portion of revenue derived from geothermal energy in Vulcan's financial model is very minor. In addition, Vulcan expects to sell power under a 20 year feed-in tariff under the German Renewable Energy Law. Finally, because Vulcan is a consumer as well as a seller of energy, the effect of lower prices would also be offset by lower OPEX costs.
Financial: Significant future funding will be required by Vulcan Group to support the further implementation of its Zero Carbon Lithium™ Project. If Vulcan Group is unable to obtain additional financing as needed on acceptable terms or at all, it may need to abandon its development plans or reduce and/or change their scope which may, in turn, adversely affect Vulcan Group's operations.	Vulcan is taking a multi-pronged approach to financing, which involves assessing the possibility for equity financing at a project level (geothermal, lithium extraction, lithium refining, or a combination), equity financing at a top-co level, debt financing and grant funding from public bodies. Vulcan is working with a multi-disciplinary team at BNP Paribas on a debt financing process, and has already attracted non-binding letters of intent from Export Credit Agencies in Europe. Vulcan is expecting support at a German Federal and European level. Additionally, Vulcan aims to be supported by its existing shareholders, including institutional investors and large corporates.
Technical: The resource estimates relating to Vulcan Group's current and future projects are subject to certain assumptions and interpretations which may prove to be inaccurate. Any material deviations may result in alterations to development plans which may, in turn, adversely affect Vulcan Group's operations.	Vulcan plans to regularly update its models as it gathers new data, including from the drilling of development wells in the Phase One areas, the sampling of brines from these wells, logging of core, and 3D seismic acquisition and processing. Resource estimates are planned to therefore be updated and refined accordingly, allowing Vulcan to progressively mitigate the risk as the project develops.
Financial: As it is envisaged to incur significant debt in the future, an increase in interest rates would likely increase Vulcan Group's costs for its future debt financing arrangements.	Because of its sustainability credentials, Vulcan expects to qualify for so-called "green financing", which can involve a reduced borrowing interested rate. This would provide some mitigation for rising interest rates. In addition, Vulcan is in discussions with European public funding institutions, including the lending arm of the EU and Export Credit Agencies.
Legal: Vulcan Group might be unable to adequately protect its intellectual property rights.	Vulcan has a granted utility patent and several patents pending, as well as granted and pending trademarks in a number of jurisdictions. Vulcan will continue to engage expert IP counsel to protect its rights going forward.

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APPENDIX 6: KEY RISKS GENERAL CONT.

Risk Description	Mitigation
<p>Technical: Battery raw materials and geothermal energy exploration and development are high-risk undertakings and there is no assurance that Vulcan Group's exploration activities will result in the commercial extraction of lithium or sustainable production of geothermal renewable energy.</p>	<p>Vulcan uses modern geothermal industry best practice by incorporating 3D seismic data and analysis and has a world class team, with considerable local geological expertise to advance its exploration and consequently its production to progress towards sustainable production.</p>
<p>Social acceptance: Vulcan's projects may face opposition from local residents and other stakeholders, which may result in delays, additional costs, discontinuation of construction or operations and uncertainty.</p>	<p>All large-scale infrastructure projects require strong community engagement to ensure any concerns are addressed. Vulcan takes this extremely seriously and has resourced an experienced public and stakeholder relations team with deep local knowledge. We use geothermal industry best practice, and we are commencing community engagement in the various areas where we intend to develop projects. Our current engagement to date, which clearly and transparently explains our process to develop renewable heat and power, combined with sustainable lithium extraction has informed our view that we will achieve stakeholder acceptance and manage delays.</p>
<p>Loss of key personnel: Vulcan may lose its directors or other key personnel or may be unable to recruit or retain qualified personnel for key positions. Without such directors or key personnel Vulcan Group may not be able to successfully manage, develop and operate its business</p>	<p>Vulcan strives to create a safe, attractive, rewarding and engaged workplace to retain and incentivise its staff, including regularly engaging with staff through surveys and external remuneration consultants in an attempt to maintain this environment.</p>

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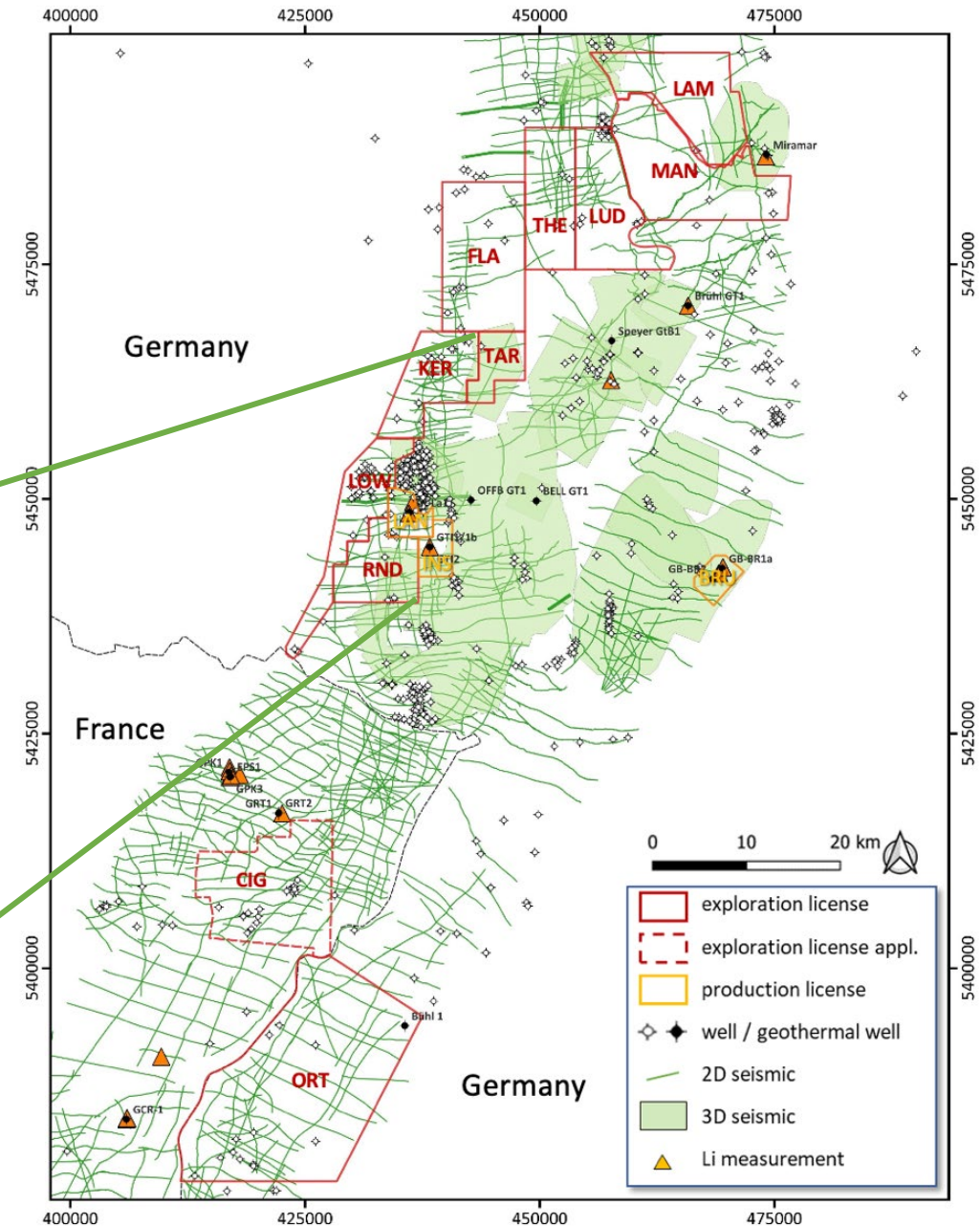
APPENDIX 7: PHASE ONE PRODUCTION STUDY AND RESERVES

- Detailed reservoir engineering and production simulation study conducted to achieve maximum “sweep” of lithium across the field. Planned well placement and brine flow rates optimised for sustainable lithium production over a long project life. Production simulation includes existing production wells within Phase One area and incorporates large database of well and seismic data. Simulation reviewed and audited by independent lithium brine specialists and O&G industry reservoir engineering experts². Phase One: 0.54Mt LCE Proven and Probable Reserves centered around production wells in core of the URVBF field.

Lionheart: INS, LAN, RND		
Reserves Classification	Lithium grade	Economic Reserves Volume at Wellhead Reference Point
	mg/l Li	tonnes LCE
Proved	181	196,353
Probable	181	153,546
TAR-KER		
		tonnes LCE
Probable	181	189,070

Phase One¹ Mineral Reserves Estimation

¹Phase 2 Reserves currently not updated since 2021 PFS, to be updated during current Phase 2 feasibility studies
²Refer to Competent Person Statement.



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APPENDIX 8: UPPER RHINE VALLEY BRINE FIELD: MINERAL RESOURCE

Licence	Reservoir	Classification	GRV km ³	Avg. NTG %	Avg. Phie %	Avg. Li mg/L	Elemental Li t	LCE ³ kt
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
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
	*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
Landau (South)	*MUS, BST, ROT	Measured	7.4	73	8	181	102,383	545
	BST	Indicated	1.2	90	11	181	22,220	118
Insheim	*MUS, BST, ROT	Measured	9	73	8	181	127,779	680
Rift (north)	*MUS, BST, ROT	Measured	10.1	73	8	181	134,132	714
	*MUS, BST, ROT	Indicated	11.9	73	8	181	178,000	946
Ortenau	*MUS, BST, ROT	Indicated	57	73	8	181	659,013	3,507
	BST	Inferred	105	73	8	181	1,883,212	10,024
Total LCE						mg/L		kt
		Measured				181		1,939
		Indicated				178		8,151
	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.

Note 4: To describe the resource in terms of industry standard, a conversion factor of 5.323 is used to convert elemental Li to Li₂CO₃, 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 used in the DFS with application of Vulcan's DLS 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.

Total URVBF Resource: Inferred 16.5Mt LCE @ 172mg/l Li, Indicated 8.2 Mt LCE @ 178 mg/l Li, Measured 1.94 Mt LCE @ 181 mg/l Li.

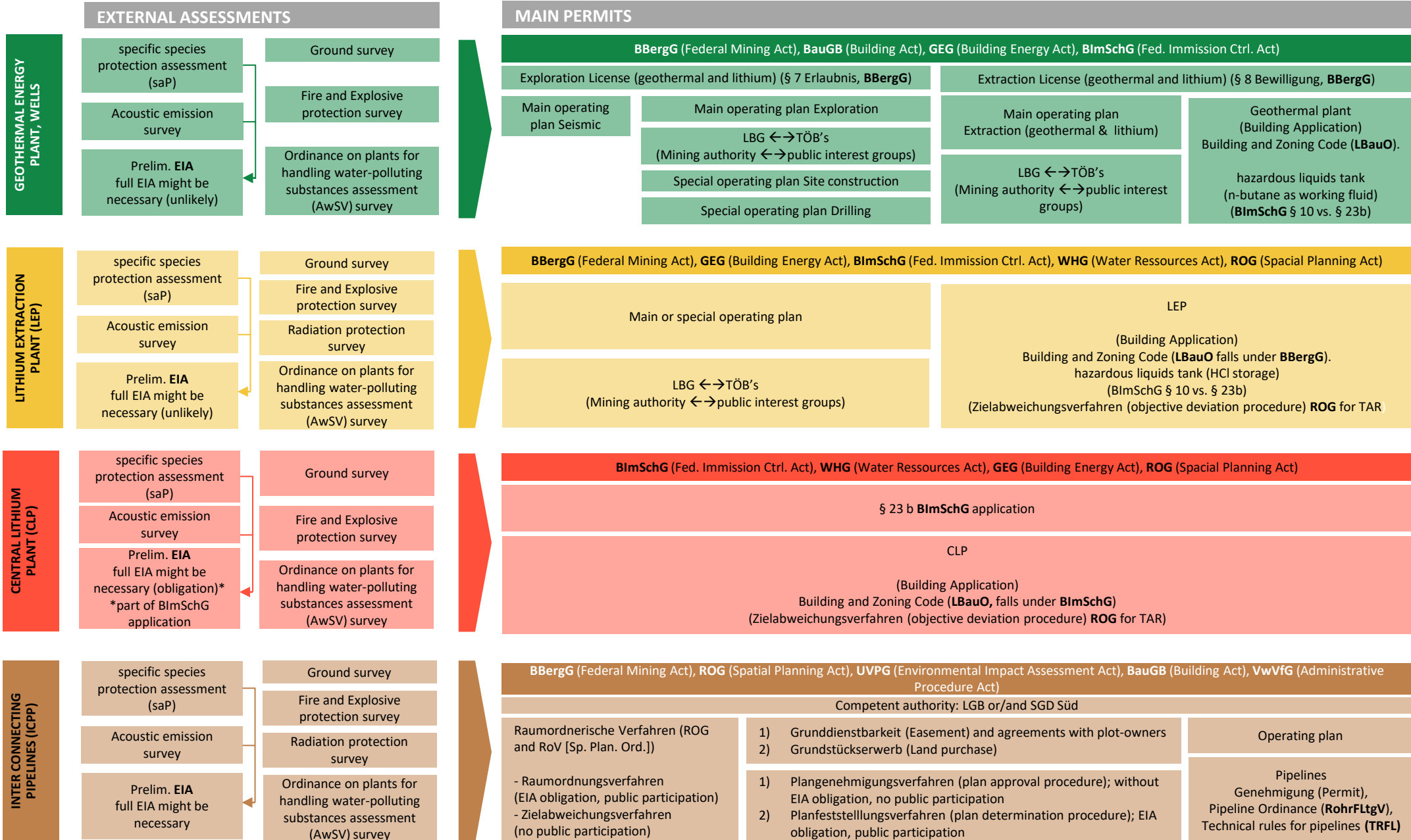
Total Phase One Resource (Measured and Indicated): 4.6 Mt LCE @ 181 mg/l Li

Total Resource (all classifications): 26.6 Mt LCE @ 175 mg/l Li

Refer to Competent Person Statement.

APPENDIX 9: PERMITTING PROCESS

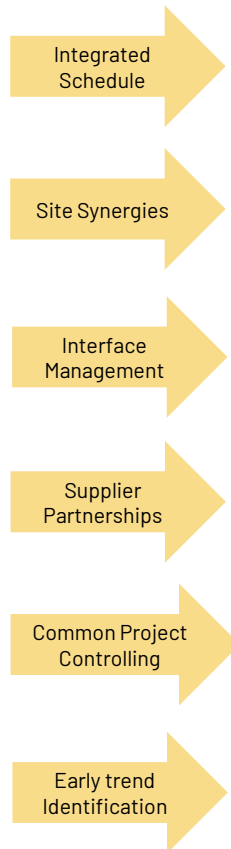
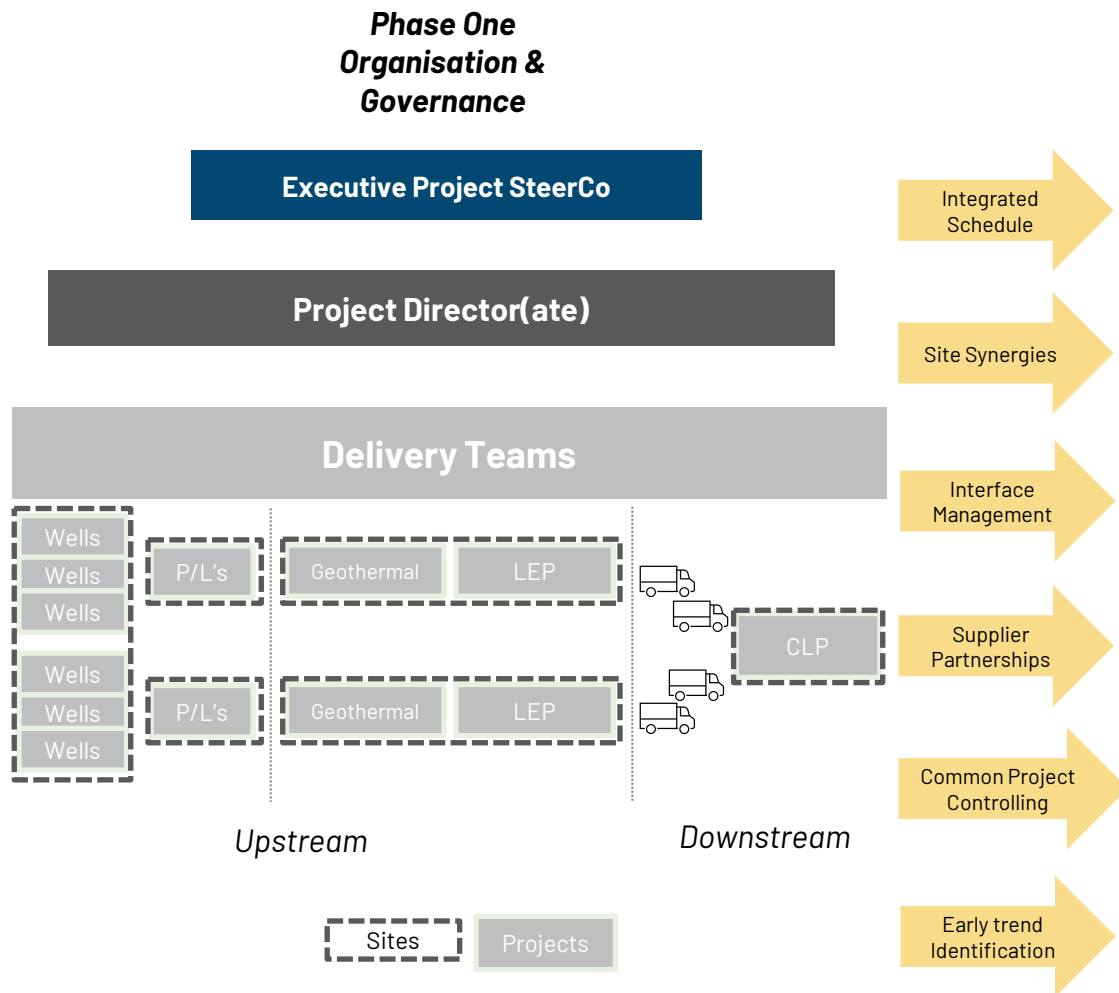
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APPENDIX 10: INTEGRATED PROJECT DELIVERY MODEL

Strategy moving towards project execution and delivery model

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Phase One Delivery Model	Phase One			
	Wells Site	ICPP	ORC ↔ LEP GLEP	CLP
Owner	Vulcan			
EPCM Contractor		EPC Contractor	EPC Contractor	EPCM Contractor
Engineering	Vulcan	EPC Contractor	EPC Contractor	EPCM Contractor
Procurement	Vulcan	EPC Contractor	EPC Contractor	Vulcan / EPCM Contractor
Const Mgmt	Vulcan	EPC Contractor	EPC Contractor	EPCM Contractor
Civil, Earthwork & Site Prep	Vulcan	EPC Contractor	Civil Contractor	EPCM Contractor
Concrete	Vulcan	EPC Contractor	EPC Contractor	EPCM Contractor
Structural Steel	Vulcan			
Mechanical / Equipment Setting	Vulcan			
Piping / Insulation	Vulcan	EPC Contractor	EPC Contractor	EPCM Contractor
EI&C Heat Tracing	Vulcan			
Field Erected Tanks				Field Erection Tank Package
Pre-Commissioning	Vulcan	EPC Contractor	EPC Contractor	EPCM Contractor
Commissioning		EPC Contractor	EPC Contractor	Vulcan (with EPCM Support)
Ramp up / Production	Vulcan			
Performance Testing		Vulcan		

APPENDIX 11: FINANCIAL DEFINITIONS

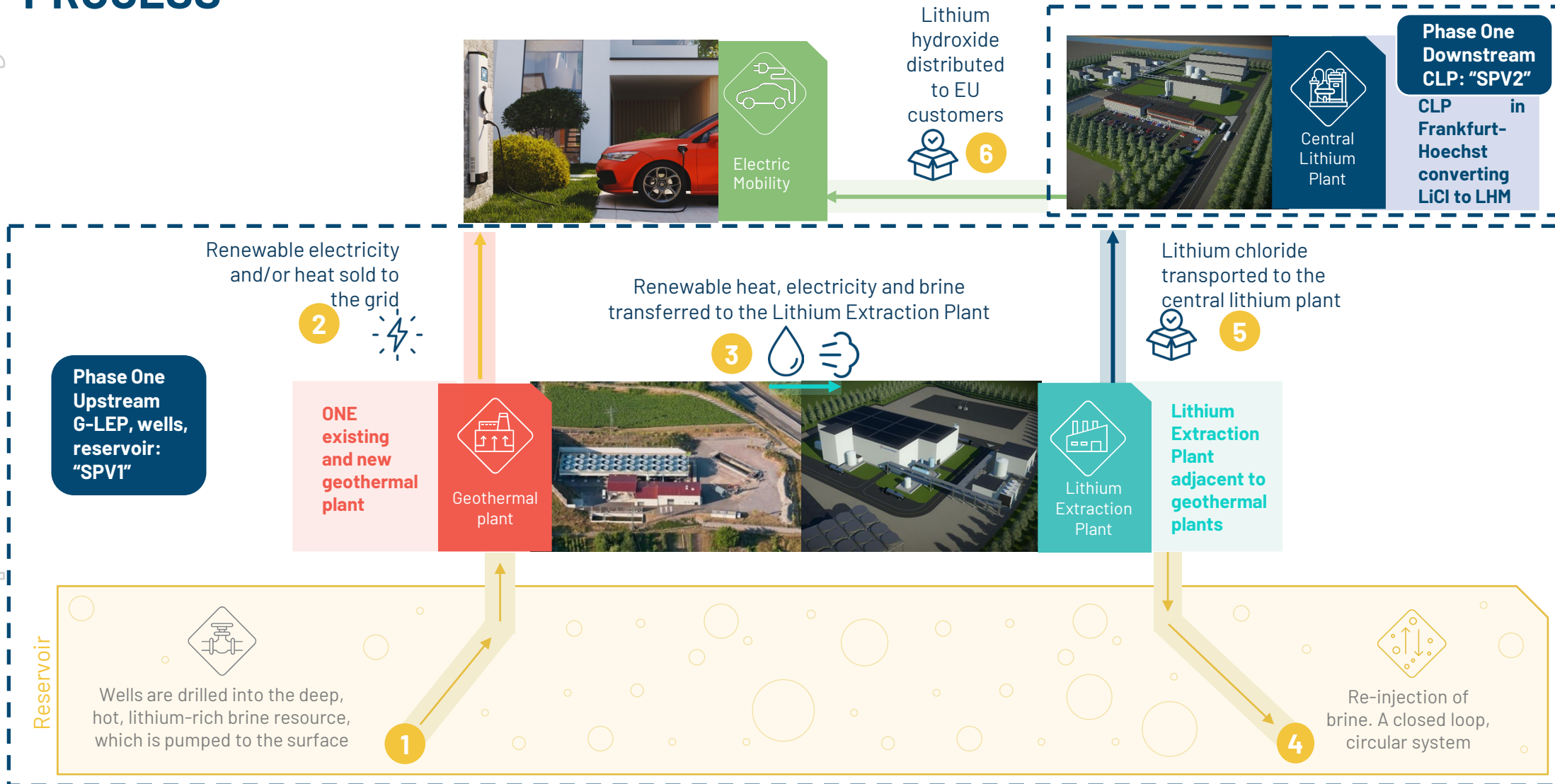
- CAPEX = Capital Expenditure in tangible and intangible assets
- EBIT = Earnings before interest and taxes
- EBITDA = Earnings before interest, taxes, depreciation and amortisation
- IRR = Internal Rate of Return
- Net Income (EAT) = Earnings after tax
- NPV = Net Present Value
- NPV_8 = Net Present Value using a discount rate of 8%
- OPEX = Operating expenditure including reagents, operating supplies, maintenance supplies, water, steam, nitrogen, energy, labour, trucking, services and other costs. Operating expenditure excludes corporate overhead costs for DFS Phase One purposes.
- Operating Margin = Profit on sales after costs of production, expressed as a percentage
- Payback = Period of time required for the return on an investment to repay the total initial investment

Note: These financial definitions are alternative performance measures that are not defined or specified under IFRS or AASC standards and for which there are no generally accepted reporting formats



APPENDIX 12: THE ZERO CARBON LITHIUM PROJECT: A CIRCULAR PROCESS

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Note: LEP = Lithium Extraction Plant, CLP = Central Lithium Plant

APPENDIX 13: COMPETENT PERSON STATEMENT

The information in this presentation that relates to estimates of Mineral Resources and Ore Reserves is extracted from the following ASX announcement:

- "Vulcan Zero Carbon Lithium™ Project Phase One DFS results and Resources-Reserves Update", released on 13 February 2023.

The above announcement is available to view on Vulcan's website at www.v-er.eu.

Vulcan confirms that, in respect of estimates of Mineral Resources and Ore Reserves included in this presentation:

- it is not aware of any new information or data that materially affects the information included in the original market announcement, and that all material assumptions and technical parameters underpinning the estimates in the original market announcement continue to apply and have not materially changed;
- the form and context in which the Competent Persons' findings are presented in this presentation have not been materially modified from the original market announcement; and
- all material assumptions underpinning the production targets (and the forecast financial information derived from such production targets) included in this presentation continue to apply and have not materially changed.