

**Corporate Presentation July 2025** 

ASX/FSE: VUL

# DETERMINED FOR A BETTER TOMORROW

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**Technical information.** Vulcan has carried out a definitive feasibility study ("DFS") and bridging engineering study ("Bridging Study") for its Phase One Project, the results of which were announced to the ASX in the announcements Phase 1 DFS Results dated 13 February 2023 (DFS Announcement) and Positive Bridging Study Results on 16 November 2023 (Bridging Study Announcement). This presentation may include certain information relating to the DFS and the Bridging Study. The DFS and Bridging Study are based on the material assumptions and parameters outlined in their respective announcements. 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 or DFS will be achieved. This presentation may also include certain information relating to future phases of its Project. Vulcan has not yet carried out a definitive feasibility study for future phases of its Project.

**Funding strategy.** To achieve the range of outcomes indicated in the Bridging Study, 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 the Competent Person Statement slide in the Appendices.

Note(s): 1. This slide contains a summary of the applicable disclaimers, the full disclaimer in relation to this presentation is contained in Appendix 1.

#### **INVESTMENT HIGHLIGHTS**

#### Low cost, sustainable and optimally positioned for EU market



**Globally significant project** with an initial 30-year project life just from Phase One, and **29.1 Mt LCE Resource**<sup>1</sup>



**Low-cost, energy-generative lithium** project benefiting from naturally-heated brine and **proprietary A-DLE technology** in the Upper Rhine Valley Brine Field



**Fully integrated, carbon neutral, brine-to-battery** solution utilising proprietary A-DLE technology



Highly advanced project with strong public and strategic investor support while aligned with world-class partners



**Experienced leadership** expertise from O&G, chemicals and geothermal industries

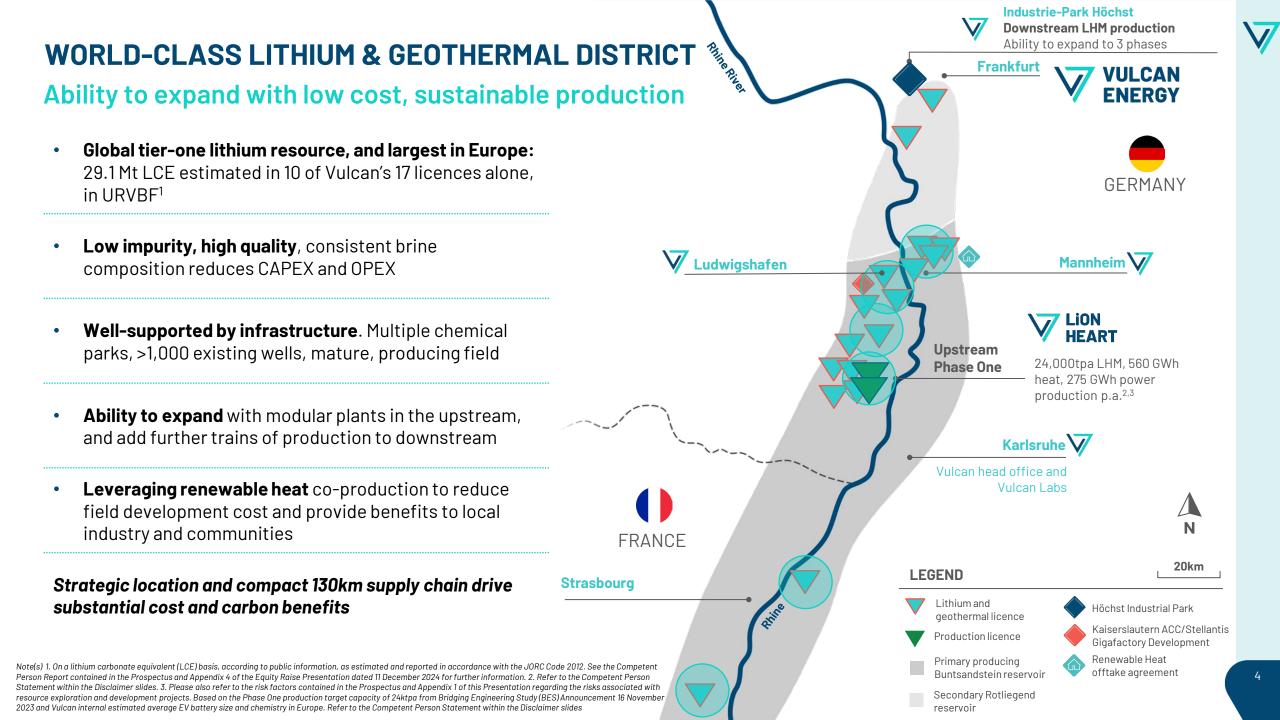


**Offtake agreements** with leading Europe-focused customers, and unique market opportunity in Europe, underpin Vulcan's unique value proposition



**Significant public funding backing** from EU and German governments, strategic project for Europe



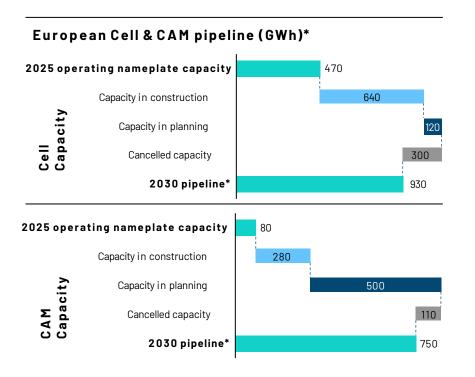


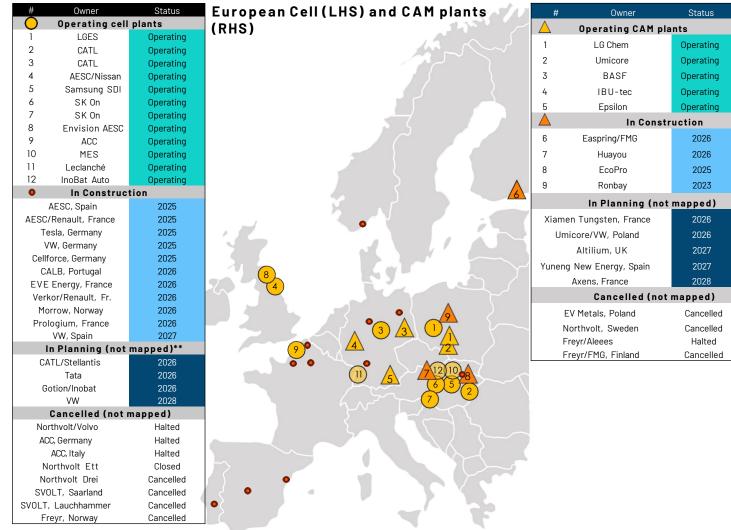
### **POWERING AHEAD: EUROPE'S BATTERY PROJECTS ON THE RISE**

#### No existing supply of lithium chemicals from Europe – Vulcan vital to secure local supply

The **European battery industry** is robust and **continues to grow at a rapid rate** 

The **cell project pipeline is equivalent to a doubling in GWh capacity by 2030**, almost all of which is in construction now (see below).





750 GWh by 2030 = ca. 523,000t LCE of demand p.a. just in Europe, with zero local supply. Vulcan's Phase One to supply 24,000 tonnes per annum, ca. 4% of this market

Source: Benchmark Mineral Intelligence

\* Not risk-weighted \*\* Projects at very early stages of planning, or of insignificant volume, have been excluded

#### **RESULT: EUROPEAN MARKET STRUCTURALLY SHORT OF LITHIUM**

#### Lithium supply in a structurally short market

Expected global supply shortfall for LHM relative to growth rates in lithium battery production

Supply/demand balance even more acute in Europe, which finds itself **structurally undersupplied** 

Favourable public policy positioning in Europe, including the newly introduced **Critical Raw Materials Act (CRMA)** 

Lionheart Project designated a Strategic Project under the European Commission's CRMA in March 2025, reflecting the Project's alignment with the objectives of the CRMA

Vulcan is experiencing growing interest for its product from European automakers beyond Phase One

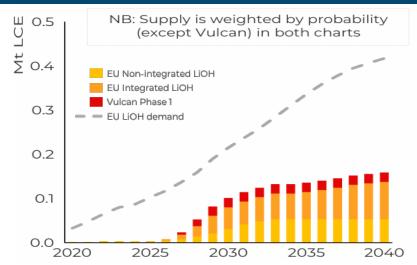
# Global Supply / Demand Balance

2025

#### European LiOH Supply vs. Demand

2020

0



2030

2035

2040

Vulcan's Lionheart produces both baseload geothermal energy and lithium hydroxide for electric vehicle (EV) batteries from the same deep brine source in the Upper Rhine Valley, Germany

#### A SNAPSHOT Lionheart Phase One in figures<sup>1</sup>

| <b>€3.5bn</b><br>Pre-tax NPV   | <b>21.7%</b><br>Pre-tax IRR                                 | <b>€756m</b><br>Average revenues p.a.                                   |
|--|---|---|
| 24kt LHM<br>275GWh power<br>560GWh heat<br>Phase One capacity p.a.           | <b>29.1 Mt LCE</b><br>Largest lithium resource in<br>Europe | <b>30 years</b><br>Of proven reserves and<br>probable minerals reserves |
| €4,030/t<br>Lithium hydroxide<br>production costs, lowest in<br>the industry | <b>€1.4bn</b><br>capex                                      | <b>77%</b><br>Average EBITDA margin                                     |





Lithium



Technology

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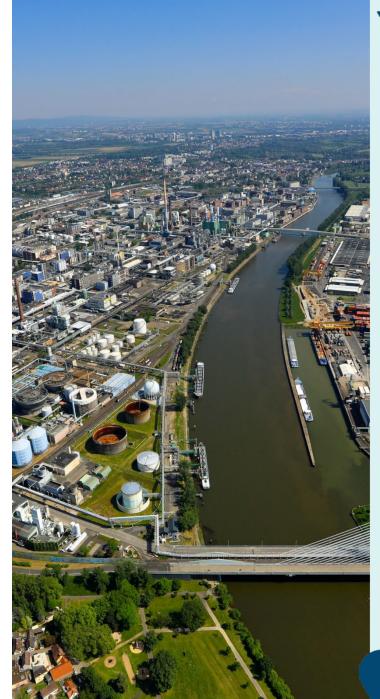
## **RECENT KEY LIONHEART PROJECT ACHIEVEMENTS**

#### A transformational period for the Project

- Production of battery-quality lithium hydroxide monohydrate (LHM)
- Vulcan awarded EU Strategic Project status under the Critical Raw Materials Act
- Commenced the **first new production well** for Phase One
- **Main heat offtake agreement** signed with energy supplier, EnergieSüdwest AG (ESW)
- ✓ Vulcan awarded €100m grant by Germany's Federal Ministry of Economics and Climate Protection for the HEAT4LANDAU Project<sup>1</sup>



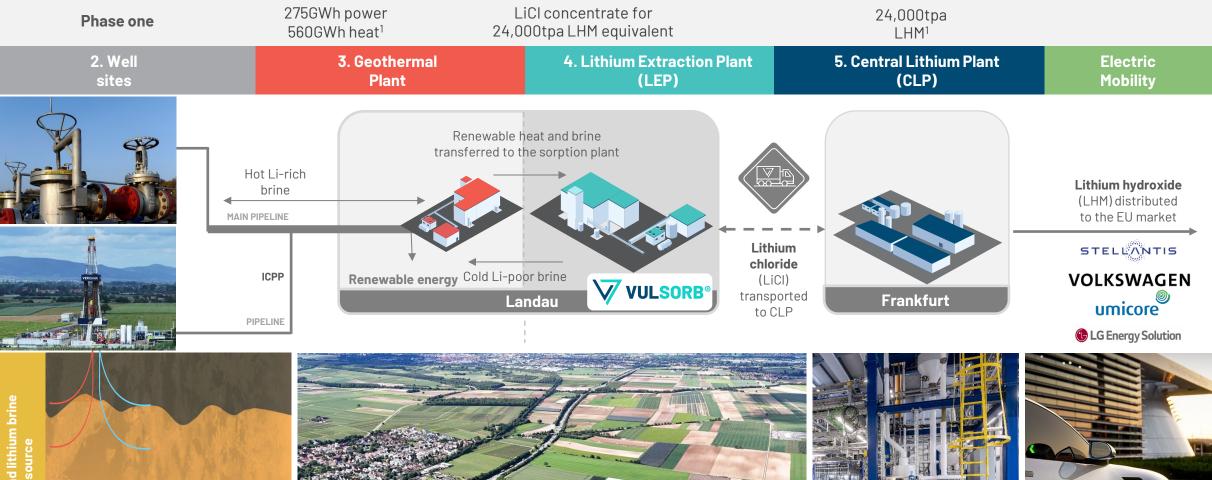
- ✓ EIB Board approved participation in Phase One financing, of up to €500m
- €879m conditional debt commitment letter signed with EFA and a syndicate of seven commercial banks
- ✓ Raw Materials Fund entered the Phase One investment process, targeting €150m equity investment, subject to due diligence.
- 1. Funded by the European Union NextGenerationEU. The expressed views and opinions expressed are solely those of the author(s) and do not necessarily reflect the views of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them



<sup>o</sup>roject achievements

### **INTEGRATED BRINE-TO-BATTERY SOLUTION**

#### Renewable energy driving sustainable lithium production



#### 1. Resource: 3km deep reservoir

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





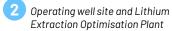


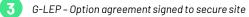
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#### **VULCAN'S PHASE ONE PROJECT: LIONHEART**

#### Low cost, sustainable integrated lithium and energy production from Europe, for Europe









### EUROPE'S FIRST DOMESTIC RESOURCE TO LHM SUPPLY CHAIN IS PROVEN

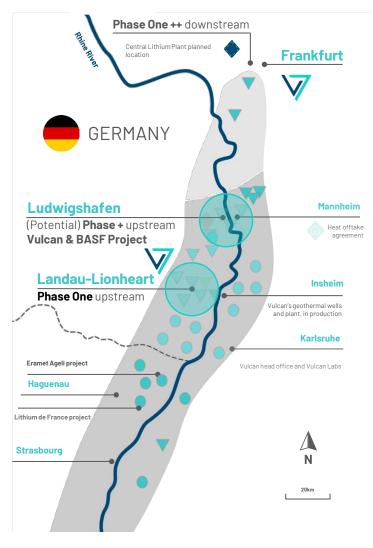
#### LEOP and CLEOP offer a strategically-located, integrated lithium extraction and refining solution

#### CLEOP - Operational Central Lithium Electrolysis Optimisation Plant



#### LEOP – Operational Lithium Extraction Optimisation Plant





#### **CLEOP**

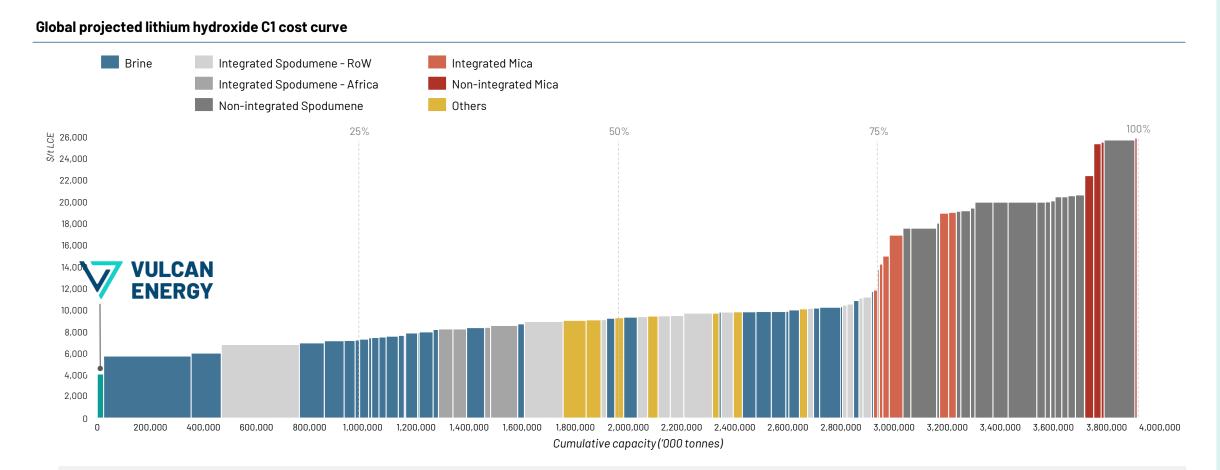
- **Production began in November 2024**, with battery quality LHM confirmed in January 2025
- Current production at ~200kg LHM per month using Vulcan's integrated supply chain, confirmed high purity and consistent product quality (~1 tonne of battery-quality LHM produced to date)
- **Qualifying strategy further developed** with support from industry experts
- First samples sent to partners to commence qualification testing



- **Production of LiCl began in April 2024**, using Adsorption-Type DLE
- 95% Extraction efficiency being achieved using Vulcan proprietary A-DLE technology - VULSORB®, confirming ability to deliver on business case
- LEOP is sending upstream product (LiCl 40% wt conc.) to CLEOP to make battery grade LHM
- Onshored entire A-DLE technology and production supply chain into Germany & France (major project derisk with other projects impacted by China Technology Export Controls)

## **VULCAN WILL BE TARGETING THE LOWEST QUARTILE OF THE LITHIUM COST CURVE**

Powered by low cost, highly efficient A-DLE production that leverages renewable heat



Vulcan's C1 costs are estimated at €4,030/t LHM, which sits in the lowest cost quartile for highly competitive supply – driven by A-DLE lithium recoveries and low-cost energy.

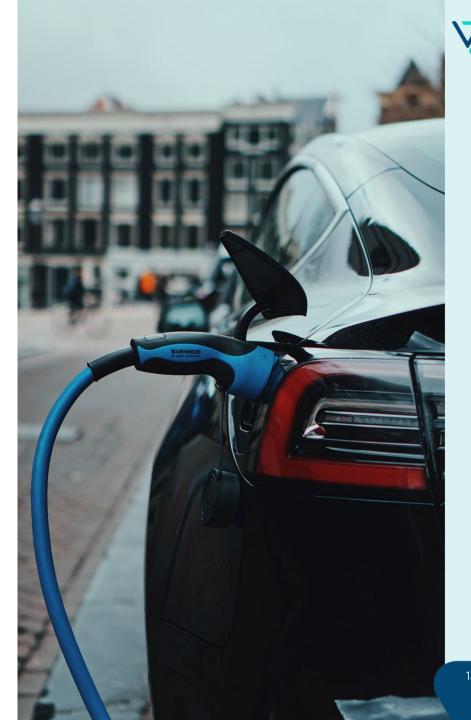
# VION" - SUPPLYING THE EUROPEAN AUTO INDUSTRY

#### Fully contracted lithium production drives pricing stability<sup>1</sup>

- Low counterparty risk: high quality European-focused offtake partners
- **Long term relationships:** all offtake agreements binding, take-or-pay, with agreed pricing mechanisms, 5-10 years in duration
- **Pricing stability<sup>2</sup>:** pricing mechanisms are a basket of fixed, floor-ceiling and fully floating prices during payback period
- Aligned interests: largest offtake partner Stellantis is also Vulcan's fourth largest shareholder through a €50m investment<sup>3</sup>



Note(s): 1. Refer to section 8.16.3 of the Prospectus dated 18 December 2024 (Prospectus), for further information regarding the terms of the Company's lithium offtake agreements, including conditions precedent and termination rights and the dates for commencement of commercial delivery. 2. Refer ASX announcement 16 November 2023 Bridging Engineering Study (BES). 3. ASX Announcement 31 May 2023 4. Commercial delivery originally scheduled to start in 2026, however Vulcan expects to defer this to align with the targeted start of commercial production as part of planned discussions with Umicore. 5. Commercial delivery originally scheduled to start in 2026, but expected to be deferred to a future phase of production beyond Phase One (with timing yet to be defined).



#### **EPCM PARTNER VALIDATION EXERCISE COMPLETED** Improved scope definition leading to reduced uncertainty and risk during execution, all with no material change to CAPEX

- **EPCM/ integrator:** review of scope, cost and schedule, validating the BES, with no material increase in capital requirement allowing finalisation of preparations for EPCM award
- **Process technology partnerships:** flowsheet integration and firm offers in place for optimised flowsheet, updated modular execution model, integration of multi-discipline delivery
- **ORC delivery partner:** final EPC lump-sum turnkey firm offer received including civils. Further increases cost certainty
- **De-risking:** pipelines (ICPP) engineering maturity improved, further cost certainty improvements on well sites, stable well costs
- Much improved scope definition since BES, reflected in reduced risk and uncertainty across the Phase One integrated project





#### PHASE ONE FINANCING<sup>1</sup>

November 2024

Awarded €100m (A\$162m) from the Federal Ministry of Economics and

Federal Ministry

for Economic Affairs

and Climate Action

Climate Protection of Germany

#### Vulcan continues to see strong support from the public and private sector



#### Total Project funding package ~€2.2bn including capex ~€1.4bn

#### December 2024

European Investment Bank Board approval received for up to €500m financing



#### European Investment Bank

#### December 2024

€879m (~A\$1.45bn) conditional debt commitment letter signed in with Export Finance Australia and a commercial lending group of seven banks







#### Targeted FID H2 2025



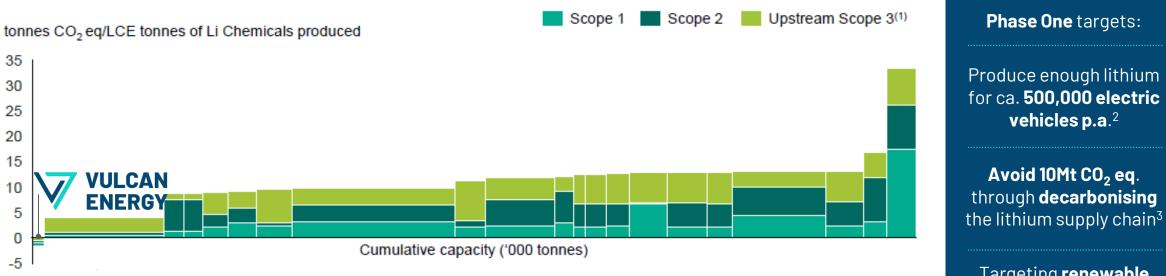
"The Vulcan team continues towards FID in H2 2025 with several positive private and public sector discussions ongoing" – Cris Moreno



Note(s): 1. Refer to ASX announcement titled Vulcan Launches AUD164m Placement and Share Purchase Plan dated 11 December 2024 and section 8.1.3.5 of the Prospectus for further details regarding the Company's financing strategy for its Phase One Project. See also risk factors in Appendix 1 of this Presentation, and the risk factors in the Prospectus and the Equity Raise Presentation in relation to the future funding requirements. As at the date of the Presentation, the Company has not yet entered into binding agreements for its required debt and equity financing for its Phase One Project, and accordingly there is no certainty as to the availability of terms of such financing. See the Company's announcement \$1.45bn conditional debt commitment letter for Phase One of 18 December 2024 for further information.

# LION" A CLEAR LEADER IN SUSTAINABILITY

GHG emissions intensity of lithium chemicals production in 2030



**Environmental and Social Impact Assessment** 

(ESIA) updated and published: confirmed no impact greater than minor post mitigation, and several positive impacts to people and planet

Green Financing Framework complete and awarded Dark Green status from S&P Global Ratings, the highest rating ever received by a Metals and Mining company globally<sup>5</sup>

# Dark green

Activities that correspond to the long-term vision of a low-carbon climate resilient future.

# S&P Global Ratings

Targeting **renewable** heat for ca. 90,000 people<sup>4</sup>

Consume only tiny amounts of water, due to recycling

Note(s): 1Benchmark Minerals Intelligence - Upstream Scope 3 emissions include the production and transportation of raw materials, fuels, machinery and equipment, and waste treatment.<sup>2</sup> Based on the Phase One production target capacity of 24ktpa from Bridging Engineering Study (BES) Announcement 16<sup>th</sup> November 2023 and Vulcan internal estimated average EV battery size and chemistry in Europe. Refer to the Competent Person Statement within the Disclaimer slides, <sup>3</sup> Minviro and internal estimates combined, using Innovation Fund methodology; <sup>4</sup> Based on official feed-in numbers from grid operator and calculated with the latest local electricity mix emission factor; <sup>5</sup>See ASX announcement of 8 October 2024.

# PIPELINE PROGRESS: DECARBONISING THE WORLD'S LARGEST CHEMICAL SITE<sup>1</sup>

A blueprint for Vulcan's future phase developments to support Europe's energy transition



- Owner of lithium production
- Co-develops geothermal project
- Operator of integrated heat and lithium facilities

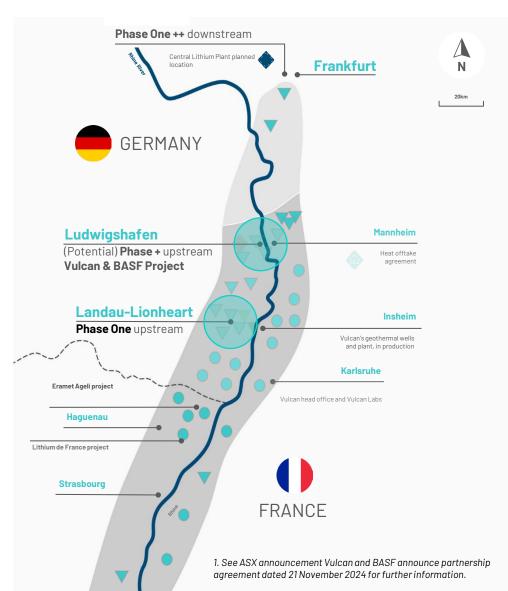
**D • BASF** 

We create chemistry

- Future heat offtake partner co-develops geothermal project
- Examine provision of construction area for lithium extraction plant
- Local stakeholder engagement
- **Renewable heat project:** Jointly develop geothermal heat system at BASF's Ludwigshafen complex targeting 2,000–2,500 GWh/year

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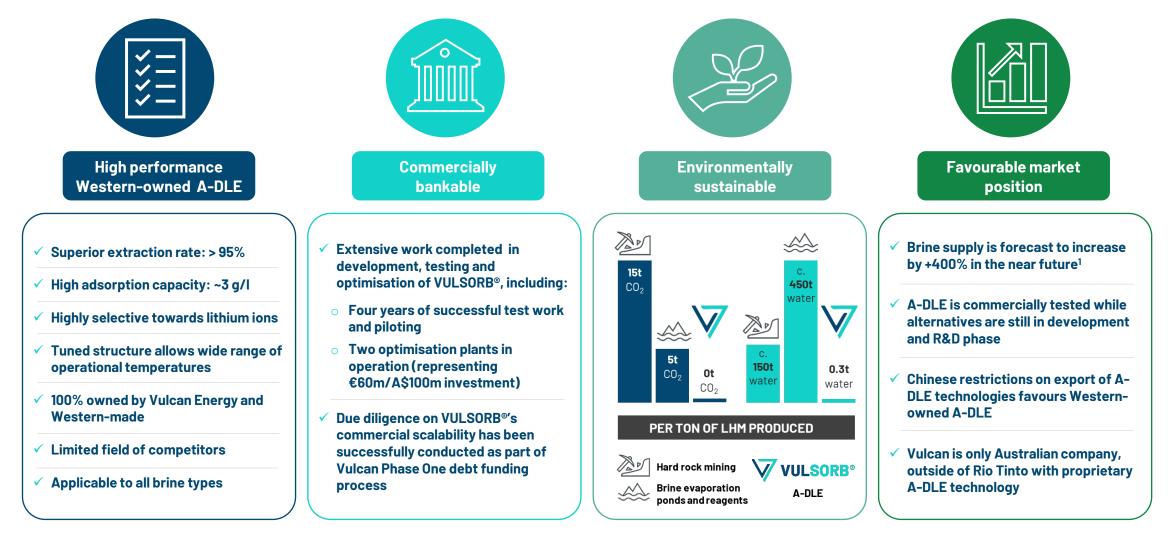
- **Lithium plant**: Intention for Vulcan to construct and operate a Lithium Extraction Plant at the Ludwigshafen site. Produced lithium then further processed at Vulcan's Central Lithium Plant to produce batteryquality lithium hydroxide
- **CAPEX saving opportunities for Phase +:** maximise project-level investment and public funding for renewable heating component; remove need for power plant due to large heat demand; utilise existing infrastructure and sites in upstream and downstream
- **Update:** 1<sup>st</sup> stage of partnership, 2D seismic programme, successfully completed. Next stage, 3D seismic planning ongoing.



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## **VULSORB®- THE KEY TO UNLOCK LOW-COST WESTERN A-DLE LITHIUM GLOBALLY**

Opportunity to grow VULSORB<sup>®</sup> technology business - a high-performance bankable A-DLE technology offering several sustainability benefits in a growing lithium brine market



1. Supply curve derived with reference to publicly available project data and adjusting for in-house view of project production and expansion timelines

2. VULSORB® applied to Vulcan's Phase One Lionheart project. Results will vary with other projects

#### **KEY TARGETS FOR 2025**

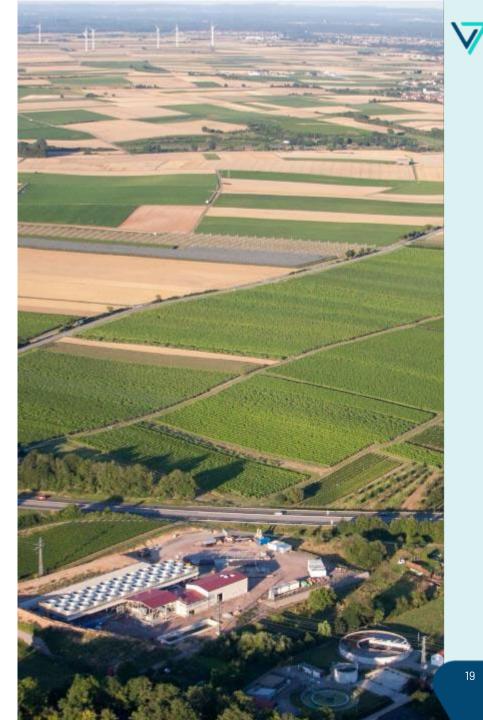
#### Focus on maintaining strong momentum

Production of battery quality Lithium Hydroxide Monohydrate (LHM) at CLEOP

- EU Strategic Project status
- Commencement of well execution
- Decision on lithium-related grant<sup>1</sup>
- Final decision on German Raw Materials fund equity participation
- Finalising project financing package<sup>2</sup>
- Awarding/ signing of major contracts
- Start of commercial construction of Phase One
- Start LHM qualification process
- Progress on future phases, including at Ludwigshafen with BASF

Further business growth including licencing of VULSORB® technology

Note(s): (1). The Company is very advanced on a process for a significant amount of public grant funding for the lithium side of the Project, has had positive feedback, and expects a final positive decision on the availability of the funding in the coming weeks. However, until such final positive decision is made, the Company cannot be certain that such funding will be available. (2). Refer to page 16 of this presentation for further information on Phase One financing.



# MAY 2025: START OF NEW PHASE ONE PRODUCTION WELLS NEAR LANDAU, GERMANY

@VulcanEnergyRes

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#### **BOARD OF DIRECTORS**

#### Major project, technical and finance experience at Board and Executive level

#### **Executive Directors**



**Dr Francis Wedin** Executive Chair, Founder

#### **Non-Executive Directors**



Cris Moreno Managing Director and Group CEO



Felicity Gooding Executive Director and Group CFO



Angus Baker Lead Independent Director, Deputy Chair



Josephine Bush Non-Executive Director



Dr Heidi Grön Non-Executive Director



Dr Günter Hilken Non-Executive Director

# APPENDICES

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#### **APPENDIX 1: DISCLAIMER CONT.**

**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. For example, the SEC now recognises estimates of "measured mineral resources", indicated mineral resources" and "inferred mineral reso

**Competent Person statement.** The information in this presentation that relates to estimates of Mineral Resources and Ore Reserves is extracted from the Bridging Study Announcement which is available to view on Vulcan's website at <a href="http://v-er.eu">http://v-er.eu</a> Vulcan confirms, that in respect of any estimates of Mineral Resources and Ore Reserves included in this announcement (1) 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; (2) the form and context in which the Competent Persons' findings are presented in this announcement have not been materially modified from the original market announcement; and the forecast financial information derived from such production targets) included in this announcement continue to apply and have not materially changed.

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 G under the U.S. Securities Exchange Act of 1934. The 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 information, readers are cautioned not to place any undue reliance on any non-IFRS financial information (and non-IFRS financial information (and non-IFRS financial information (and non-IFRS financial information (or 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 measures). Similarly, non-GAAP financial measures do not have a standardised meaning prescribed by Australian Accounting Standards or International Reporting Standards and therefore may not be comparable to similarly titled 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 do not have a standardised meaning prescribed by Australian Accounting Standards or International Financial Reporting

**Funding Strategy.** To achieve the range of outcomes indicated in the DFS and the Bridging Study, 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.

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.

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.

#### **APPENDIX 2: LCA ASSUMPTIONS**

All foreground data for the ISO compliant Life Cycle Assessment (LCA) is sourced from Vulcan's 2023 Bridging Engineering Study. The process design is assumed to be fully electrified. No fossil fuels are directly burned on site in the lithium production process. All background data is sourced from Ecoinvent Database 3.9.1. Electricity used at the geothermal plants and central lithium plants is assumed for 50% to be sourced from the German average grid market mix, and for 50% from additional wind electricity purchased via "green" PPA. Vulcan is in discussions to source any power it needs from 100% renewable sources, so considers the 50% average grid mix to be a conservative assumption. All electricity that is produced at the geothermal plants is assumed in the LCA to be exported to the German electrical grid. All saleable thermal energy that is produced from the geothermal brine is exported for regional district heating, with waste heat used in the process to extract the lithium. When used for regional district heating, it is assumed that it replaces average use of natural gas in the area. Only transport of intermediate products is accounted for, being transport of lithium chloride concentrate from the lithium extraction plant to the central lithium plant, and transport of recycling streams from the central lithium plant to the lithium extraction plant. Overland transport assumes transport in a 16-32 metric tonne EUR03 compliant internal combustion engine lorry. Electric transportation is being explored but not included in the LCA. The LCA is conducted using preoperational average data points. This means the LCA results represent a static point in time based on the 2023 Bridging Engineering Study. The LCA was a cradle to gate study, meaning the downstream use phase of the lithium hydroxide monohydrate product was not studied.