



Corporate Presentation  
Q2 2025

ASX/FSE: VUL

**DETERMINED FOR A  
BETTER TOMORROW**



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**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 and 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.

**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): <sup>1</sup> This slide contains a summary of the applicable disclaimers, the full disclaimer in relation to this presentation is contained in Appendix 1.*

# EMPOWERING A CARBON NEUTRAL FUTURE

## High quality strategic shareholders

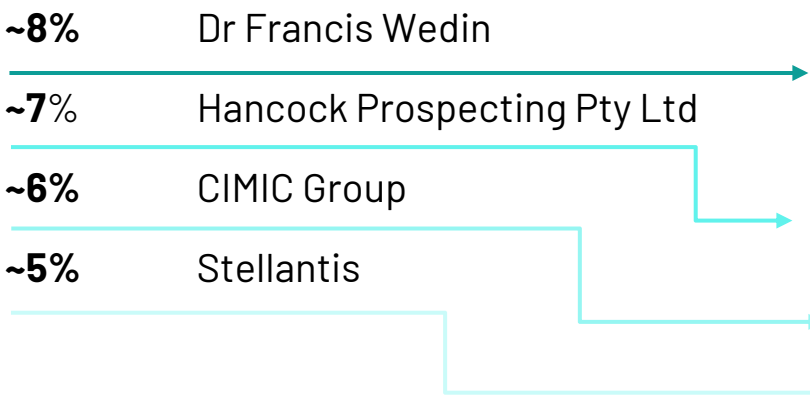
ASX/FSE Prime Standard / **VUL**

Shares on issue / **~218m**

Market Capitalisation<sup>1</sup> / **ca. €634m (A\$1.10bn)<sup>2</sup>**

Cash<sup>3</sup> / **€97m (~A\$162m)**

### High quality strategic shareholders



Note(s): 1. As at 31 March 2025 ASX closing price A\$5.06/sh, 2. Converted at €0.57/A\$1.00. 3. Cash as at 31 December 2024

# Vulcan values



CLIMATE CHAMPION

DETERMINED

INSPIRING





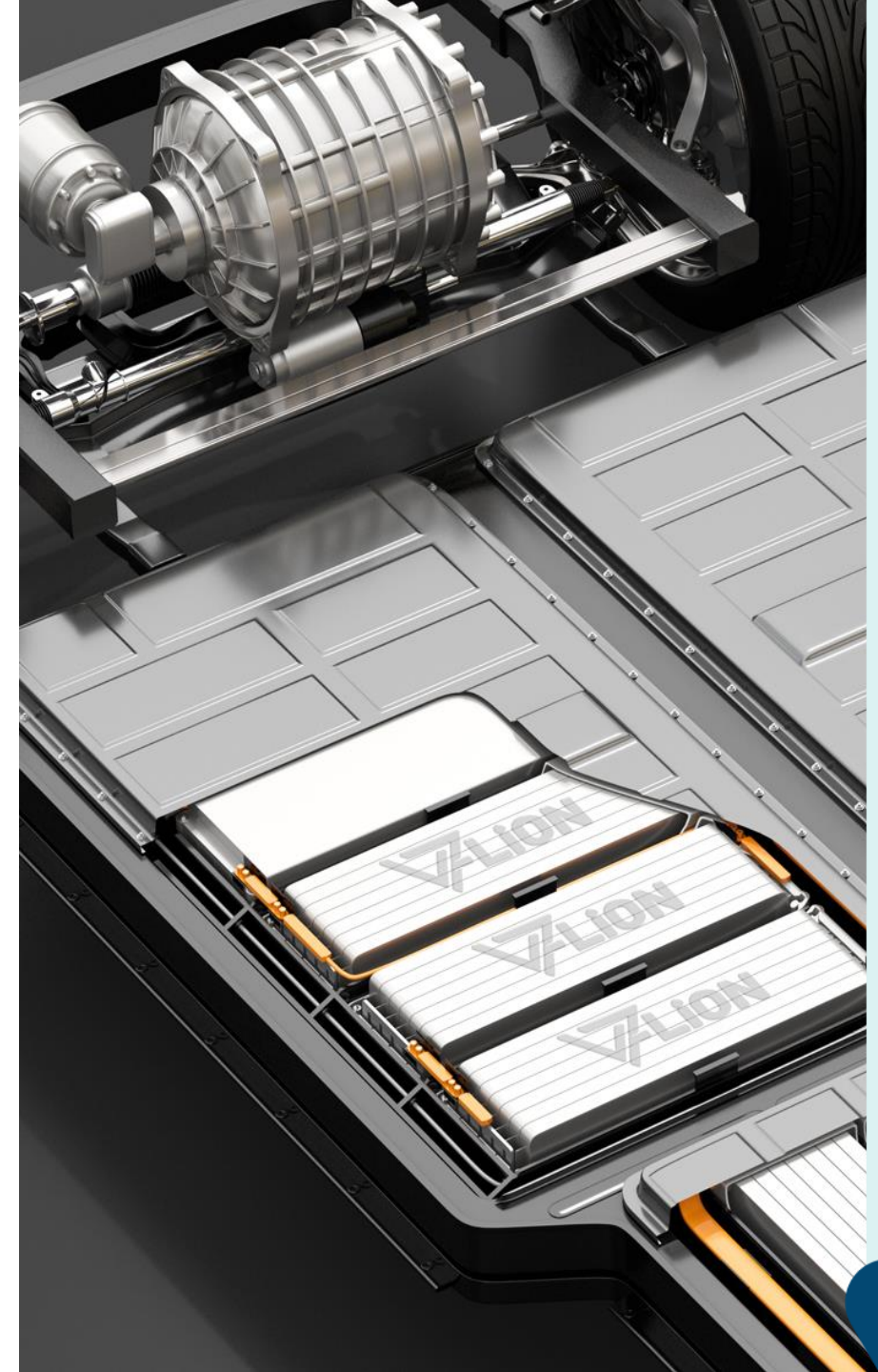
**PRODUCT | PROJECT | TECHNOLOGY**



## A premium industry-leading lithium product for battery electric vehicles

- V** is for Vulcan. We strive to be climate champions
- Li** is for high purity, sustainable\* and versatile, battery-grade lithium products
- O** is for zero fossil fuels directly used in our onsite process to produce lithium and the co-production of renewable energy for local communities
- N** is for no net greenhouse gas emissions across our project life

\*Minviro 2023 Life Cycle Assessment results reported in 2023 Sustainability Report. Please also refer to Appendix 2 of this Presentation.



# VULCAN<sup>TM</sup> 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>



RENAULT GROUP



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).



# EUROPEAN MARKET STRUCTURALLY SHORT OF LITHIUM

## Lithium supply in a structurally short market

Global supply for LHM looks challenged relative to growth rates in lithium battery production

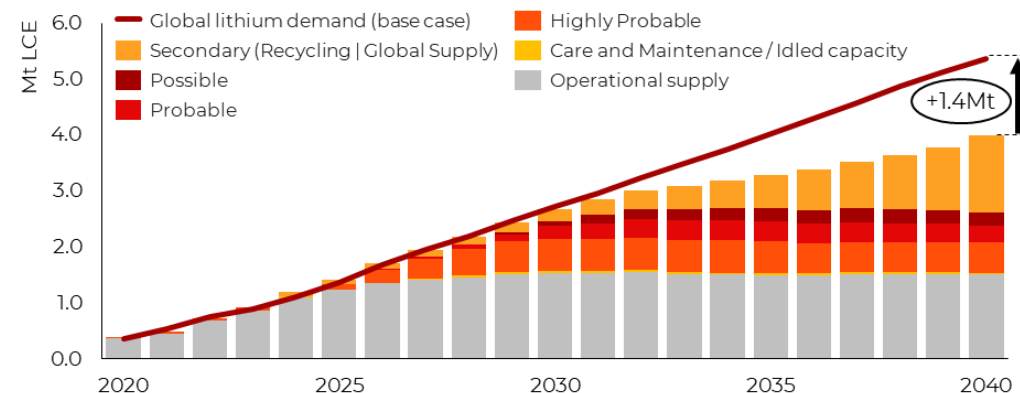
Supply/demand balance even more acute in Europe, which finds itself **structurally undersupplied**

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

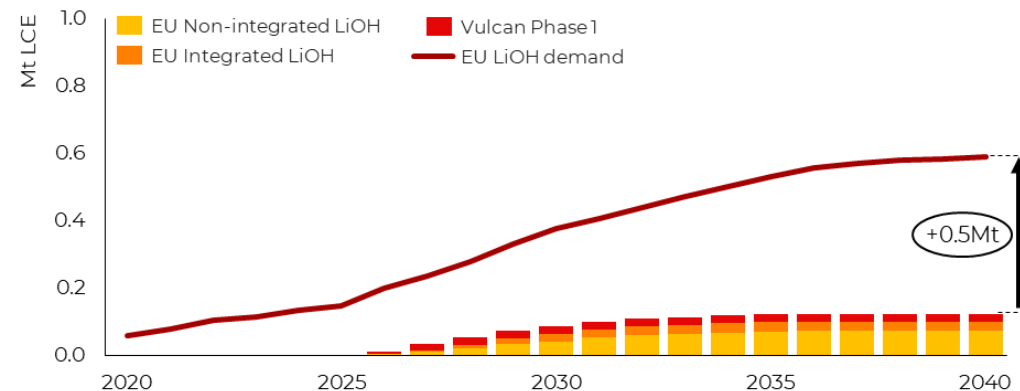
**Lionheart Project designated a Strategic Project under the European Commission's CRMA in March 2025**, reflecting the Project's alignment with the objectives of the CRMA

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

Global Supply / Demand Balance



European LiOH Supply vs. Demand



# PRODUCT FLEXIBILITY

## Well-positioned for the future



Vulcan's **high purity lithium chloride (LiCl)** precursor product is fully flexible, and can be converted according to customers' needs for the battery chemistries of the future:

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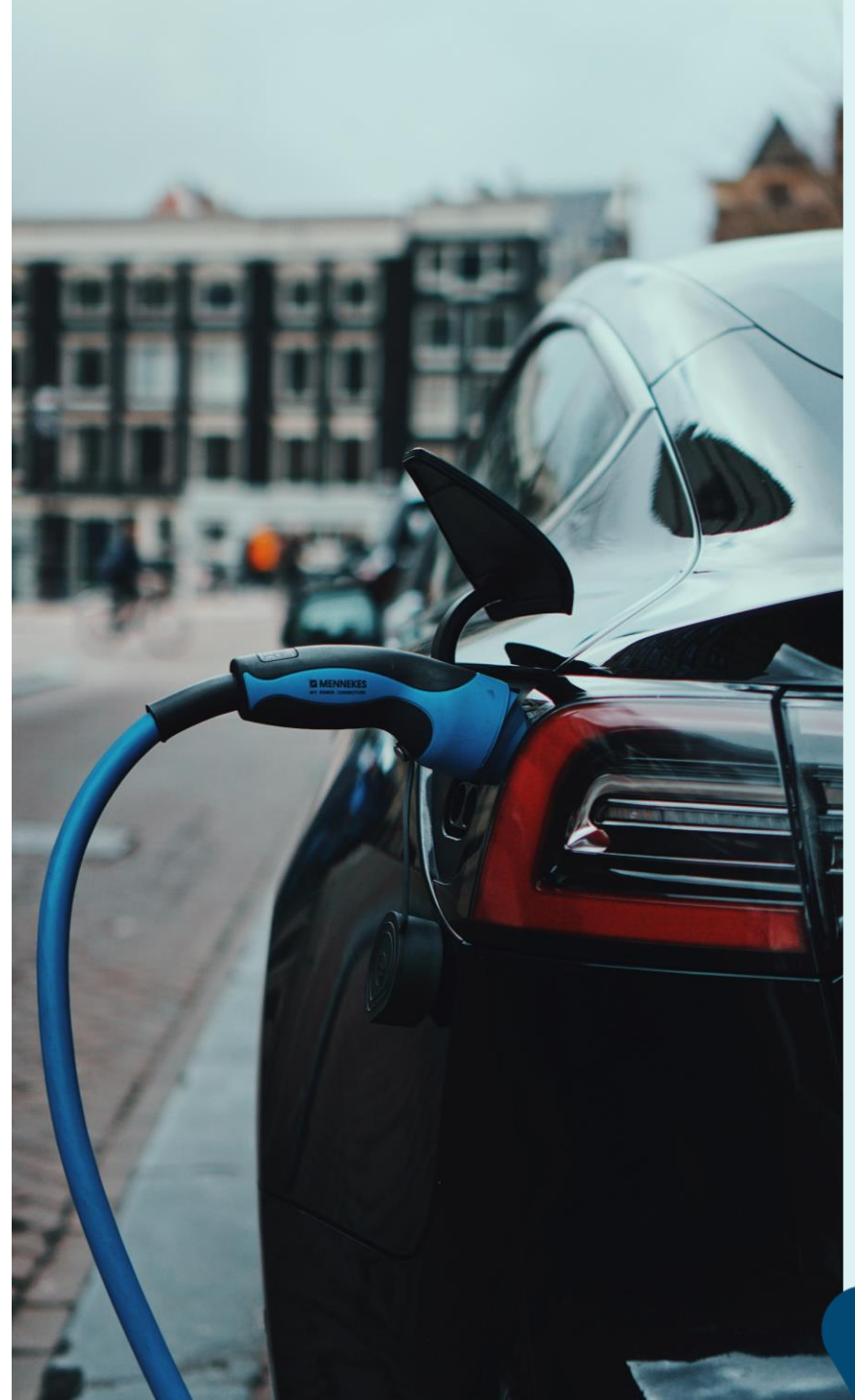
**Lithium hydroxide monohydrate (LHM)** can be produced for high-performance NMC batteries, favoured by European customers

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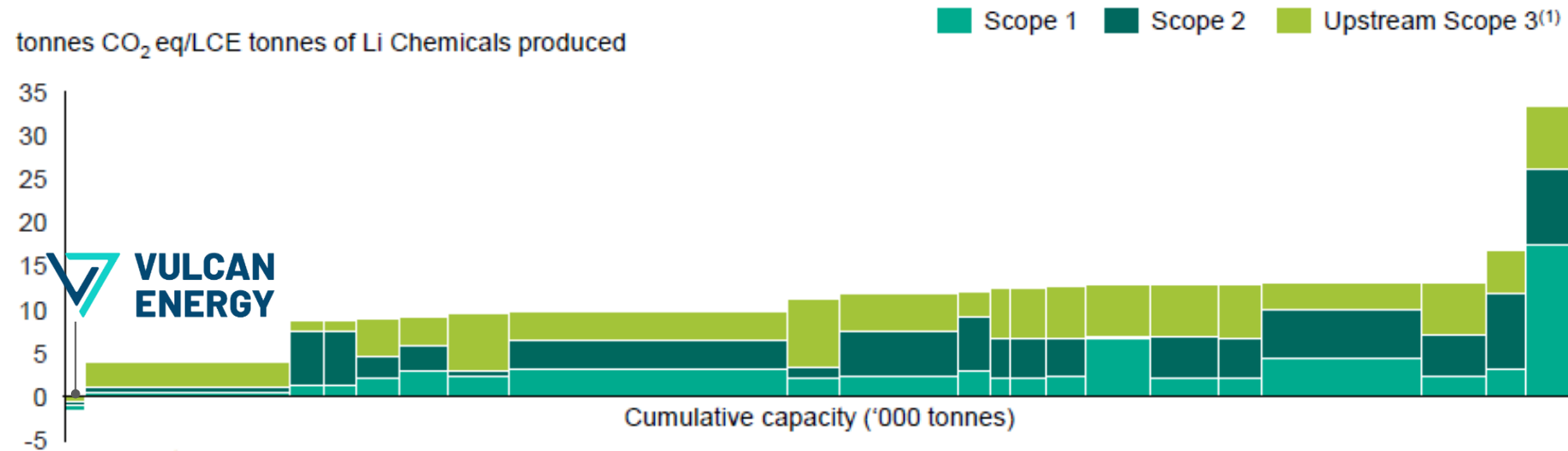
**Lithium carbonate (LC)**, suitable for LFP batteries, popular with Asian customers, can be produced directly from the LiCl

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**Lithium metal**, suitable for solid state batteries, which are expected to be produced commercially for electric vehicles within 5-10 years and dramatically increase performance and range



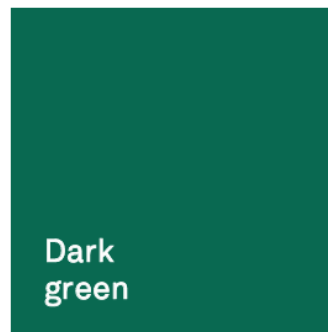
## GHG emissions intensity of lithium chemicals production in 2030



### 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>



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

**S&P Global**  
Ratings

Note(s): <sup>1</sup>Benchmark 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.

### Phase One targets:

Produce enough lithium for ca. **500,000 electric vehicles p.a.**<sup>2</sup>

Avoid 10Mt CO<sub>2</sub> eq. through **decarbonising** the lithium supply chain<sup>3</sup>

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

Consume only tiny amounts of water, due to recycling

# BASE LOAD RENEWABLE HEAT AND POWER

## Decarbonising local industry and communities



Commencing **baseload, renewable heat** supply

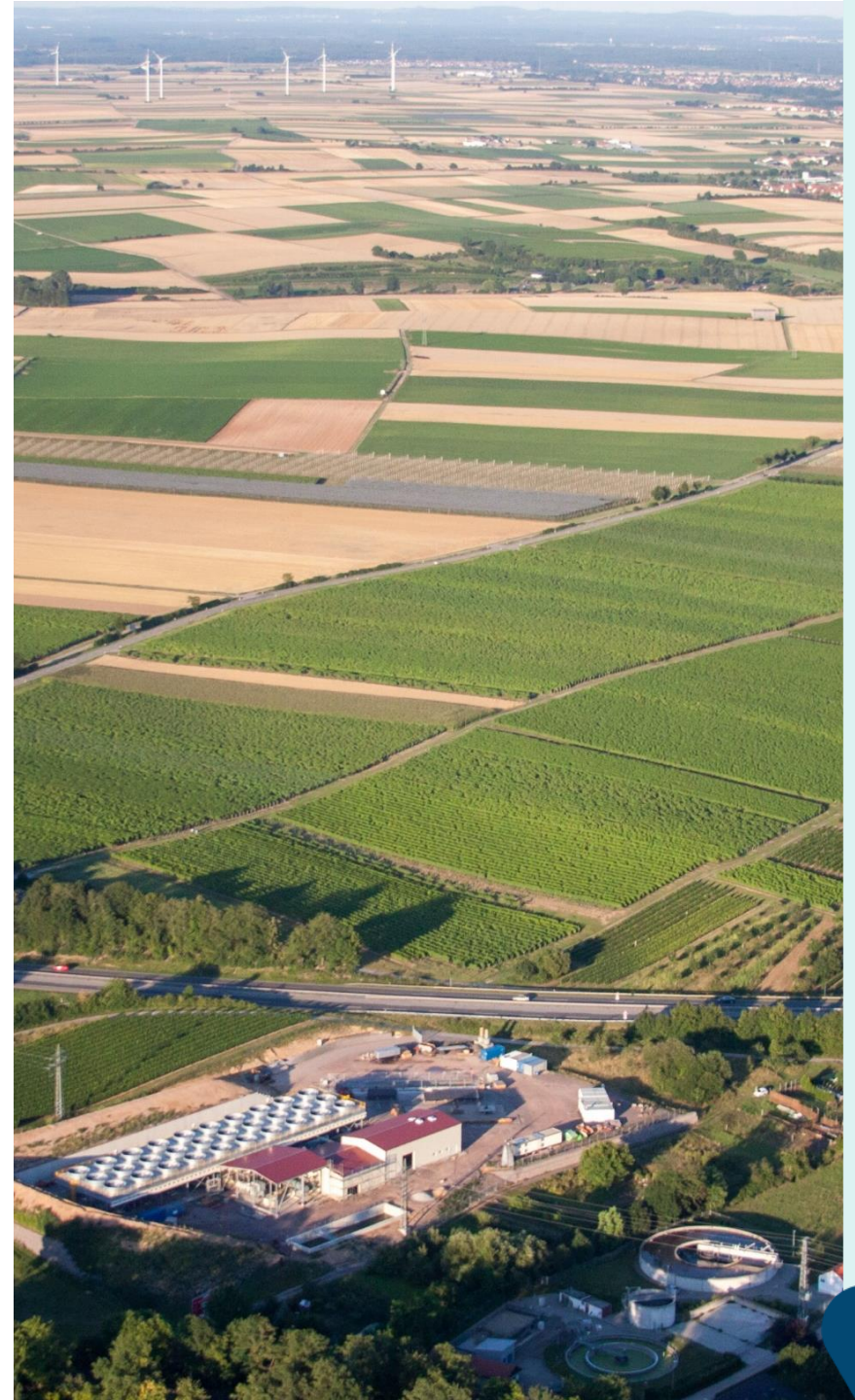
Providing stable, baseload green heat **for local communities**

**Decarbonising industrial heat** supply for large customers



Currently **producing stable, baseload renewable power** for the grid

**Building increased supply** of green power





**PRODUCT | PROJECT | TECHNOLOGY**

# AWARDING OF EU STRATEGIC PROJECT STATUS

On 25 March 2025, the EU Commission announced **47 Strategic Projects to increase the European Union's (EU) capacity to extract, process and recycle strategic raw materials and diversify EU supplies from third countries**

The awarding of Strategic Project status reflects **Phase One Lionheart Project's alignment with the objectives of the Critical Raw Materials Act (CRMA)**, which came into effect in May 2024 and is designed to secure a sustainable supply chain for critical raw materials, including lithium, across Europe

The Company's commitment to producing sustainable lithium is demonstrated through its advanced extraction and processing technologies, powered by geothermal renewable energy. **This integrated approach from Europe, for Europe formed the foundation of Vulcan's Strategic Project status application**

## Strategic Project status aims to offer:



### Strong financing opportunities

Strategic Project status unlocks **access to EU funds**, investment de-risking, and potential **state aid** – strengthening financial resilience



### Streamlined permitting

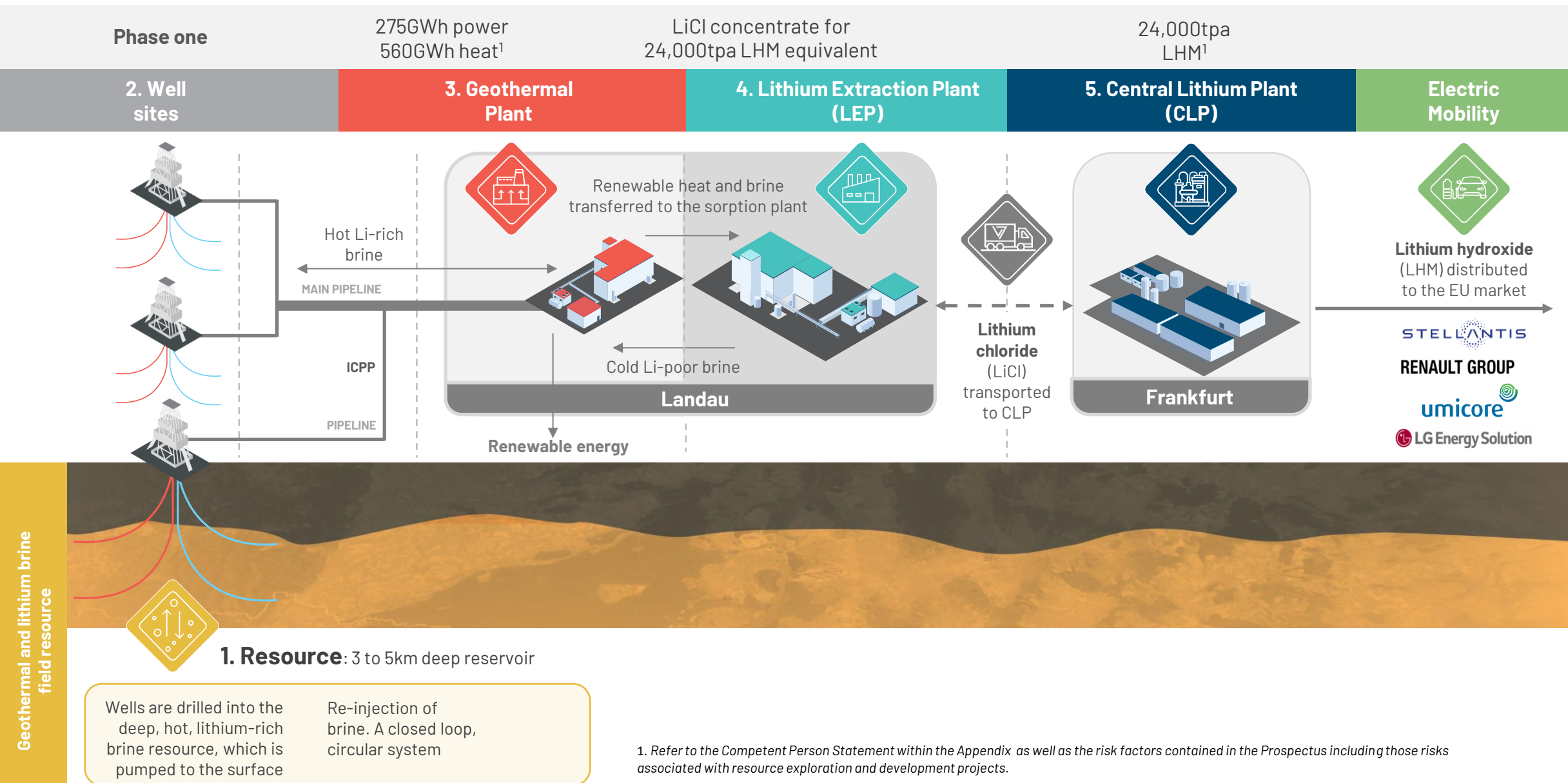
Strategic Projects enjoy **expedited permit-granting processes** with fixed time limits – 27 months for extraction projects and 15 months for processing projects – **rapid and predictable** project execution



### Recognition as a European Strategic Project

Priority treatment in regulatory processes and a **clear endorsement of Vulcan's role in EU supply security** – strengthening Vulcan's **credibility with offtakers, banks, and investors**

# BUILDING RENEWABLE ENERGY AND LITHIUM CHEMICALS PRODUCTION



# UNIQUELY POSITIONED

## Poised to capture the next phase of growth<sup>1</sup>

**Strong customer relationships:** Vulcan has offtake agreements with tier-one European counterparties covering majority of first 10 years of production<sup>2</sup>, reduces pricing and market risk

**Tier-one asset:** 30-year project life, large, scalable lithium resource, largest in EU<sup>3</sup> and globally significant

**Low impurities** in the brine: Upper Rhine Valley Brine Field (URVBF) brine has very low impurities, and requires zero chemical pre-treatment, lowers OPEX

**Cheap and renewable heat:** URVBF is naturally heated, which drives lithium production, and excess heat can be sold as power with Feed-in Tariff

**In-house technological A-DLE expertise:** Vulcan now the only ASX-listed company with an in-house A-DLE technology division apart from RIO/LTM

**Large project execution and operation expertise:** Vulcan has a leading combination of expertise from O&G, chemicals and geothermal industries

Note(s) 1. There are a number of risks and uncertainty (known and unknown) that are associated with resources exploration and development, which are included in the risk factors contained in the Prospectus. 2. Refer to section 8.16.3 of the Prospectus for further information regarding the terms of the Company's offtake agreements 3. On a lithium carbonate equivalent (LCE) basis, according to public information, as estimated and reported in accordance with the JORC Code 2012. See the Competent Person Report contained in the Prospectus and Appendix 4 of the Equity Raise Presentation dated 11 December 2024 for further information.



# INTEGRATED RENEWABLE ENERGY & LITHIUM<sup>1</sup>

## Phase One: Lionheart

**Integrated** renewable energy, lithium salts and lithium hydroxide production from sub-surface brines in the Rhine Valley. Targeting **24,000 tonnes p.a.**<sup>2</sup>. LHM production: enough for 500,000 electric vehicles every year<sup>6</sup>

Targeting **560 GWh renewable heat production** capacity: enough for 90,000 homes.<sup>4</sup>  
Targeting **275 GWh** renewable power production capacity. Net generator of energy

**First quartile target lithium production costs:** integrated heat and power, compact supply chain, drive low Li production costs. **€4,030/t** LHM

**Pricing stability:** offtakes with tier-one customers

**Product pre-qualification capability:** optimisation plants now in production

**Advanced and execution-ready:** specialised in-house expertise and strong execution team. Over €460m raised to date and shovel-ready

**Decarbonising the EV supply chain:** unique offering. Targeting **10Mt CO<sub>2</sub>** avoided in Phase One alone<sup>5</sup>

Note(s): 1. All figures from Bridging Engineering Study (BES) announcement 16 November 2023. Vulcan confirms that all the material technical assumptions underpinning the forecast financial information in the Bridging Study Announcement continue to apply and have not materially changed; 2. Refer to the Competent Person Statement within the Disclaimer slides 3. Converted at €0.60/US\$1.00. 4. Based on official feed-in numbers from grid operator and calculated with the latest local electricity mix emission factor; 5. Minviro and Vulcan internal estimates; 6. Based on the Phase One production target capacity of 24ktpa from Bridging Engineering Study (BES) Announcement 16th November 2023 and Vulcan internal estimated average EV battery size and chemistry in Europe. Refer to the Competent Person Statement within the Disclaimer slides



# WORLD-CLASS LITHIUM DISTRICT: LIONHEART

## Ability to expand with low cost, sustainable production

**Global tier-one lithium resource, and largest in Europe:** 27.7 Mt LCE estimated in 10 of Vulcan’s 17 licences alone, in URVBF<sup>1</sup>

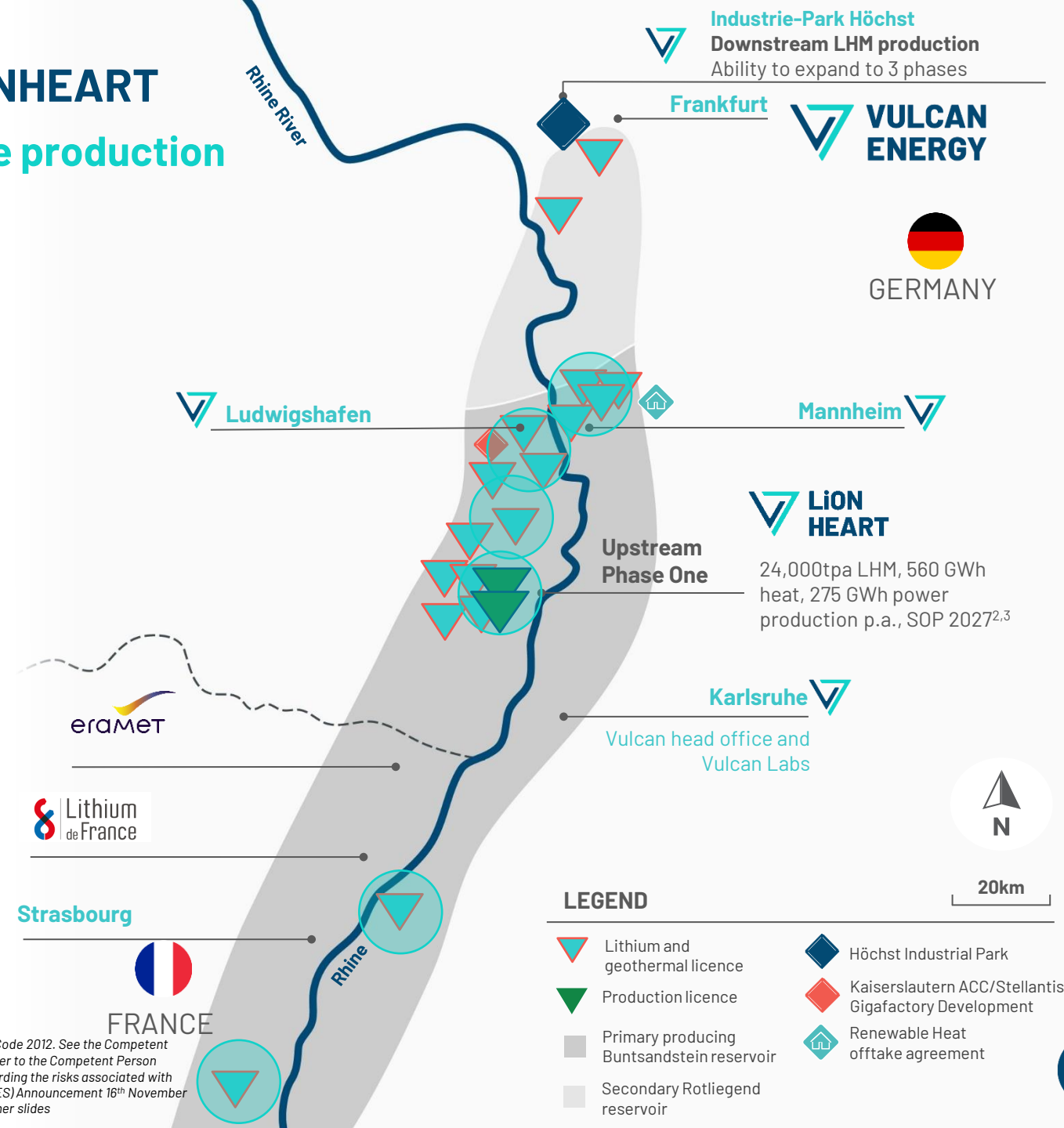
**Low impurity, high quality,** consistent brine composition reduces CAPEX and OPEX

Well-supported by infrastructure. Multiple chemical parks, >1,000 existing wells, mature, producing field

Ability to expand with modular plants in the upstream, and add further trains of production to downstream

Leveraging renewable heat co-production to reduce field development cost and provide benefits to local industry and communities

**Strategic location and compact 130km supply chain drive substantial cost/ carbon benefits**



Note(s) 1. On a lithium carbonate equivalent (LCE) basis, according to public information, as estimated and reported in accordance with the JORC Code 2012. See the Competent Person Report contained in the Prospectus and Appendix 4 of the Equity Raise Presentation dated 11 December 2024 for further information. 2. Refer to the Competent Person Statement within the Disclaimer slides. 3. Please also refer to the risk factors contained in the Prospectus and Appendix 1 of this Presentation regarding the risks associated with resource exploration and development projects. 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

# VULCAN'S PHASE ONE PROJECT: LIONHEART

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



**LION HEART**

**1** Vulcan's 100% owned Insheim Geothermal Power Plant and wells (operating)

**2** Operating well site and Lithium Extraction Optimisation Plant

**3** G-LEP - Option agreement signed to secure site

**4** Schleiberg - Vulcan's next production well site

# EUROPE'S FIRST FULLY DOMESTIC LITHIUM CHEMICALS SUPPLY CHAIN

Combined €60m investment by Vulcan in two Optimisation/Qualification Plants



LEOP: Vulcan's operational lithium extraction optimisation plant



CLEOP: Vulcan's operational lithium electrolysis optimisation plant

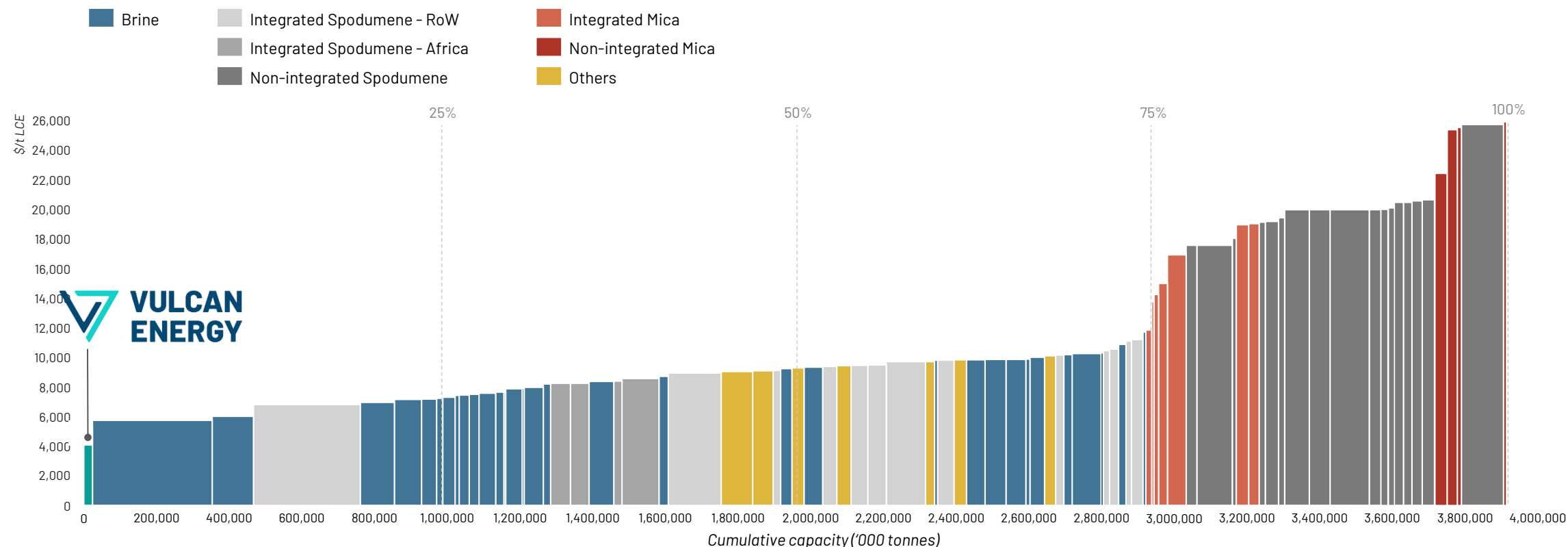
- **High quality** LiCl is being produced to spec since June 2024, **95% Extraction efficiency**
- **Onshored entire A-DLE technology** and production supply chain into Germany & France
- **Battery-quality LHM** material confirmed end of Dec 2024.
- CLEOP will start sending battery grade product to off takers for pre-qualification testing

**Operational readiness: train staff and optimise product in a pre-commercial environment  
fast tracking product qualification**

# 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

Global projected lithium hydroxide C1 cost curve



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.

Source: Benchmark Mineral Intelligence

# EPCM PARTNER VALIDATION EXERCISE COMPLETED

**Much 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

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**Process technology partnerships:** flowsheet integration and firm offers in place for optimised flowsheet, updated modular execution model, integration of multi-discipline delivery

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**ORC delivery partner:** final EPC lump-sum turnkey firm offer received including civils. Further increases cost certainty

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**De-risking:** pipelines (ICPP) engineering maturity improved, further cost certainty improvements on well sites, stable well costs

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Much improved scope definition since BES, reflected in reduced risk and uncertainty across the Phase One integrated project

**SEDGMAN**



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

## Strong support from public and private sector

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

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

Vulcan has also applied for significant public grant funding and **was awarded €100m (A\$162m) from the Federal Ministry of Economics and Climate Protection of Germany** in November 2024

CRMA Strategic Project status will allow a streamlined progression through a CRM financing board subgroup

**Vulcan's Green Financing Framework has been rated the highest possible rating - Dark Green - by S&P Global Ratings.** The Framework is aligned with International Capital Market Association and Loan Market Association principles and guidance

Updated Environmental and Social Impact Assessment (ESIA) published on 16 September 2024, a pre-requisite for Export Credit Agencies' Credit Committee approval

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.

## Structuring banks



## Major ECA/ EIB support



## Financial advisor



# KEY MILESTONES ACHIEVED IN 2024

## Transformational period for Phase One Lionheart Project

First LiCl production from upstream optimisation plant



Start of production at downstream lithium hydroxide optimisation plant



Vulcan awarded €100m (A\$162m) from the Federal Ministry of Economics and Climate Protection for its HEAT4LANDAU Project



Vulcan and BASF partner to reduce CO2 emissions at world's largest integrated chemical complex



Evolution of Company Board including appointment of Felicity Gooding as Group Chief Financial Officer and Executive Director



EIB Board approves participation in Phase One financing potentially amounting to up to €500m (~A\$819m)



Successful \$164m Placement to fund start of project execution



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

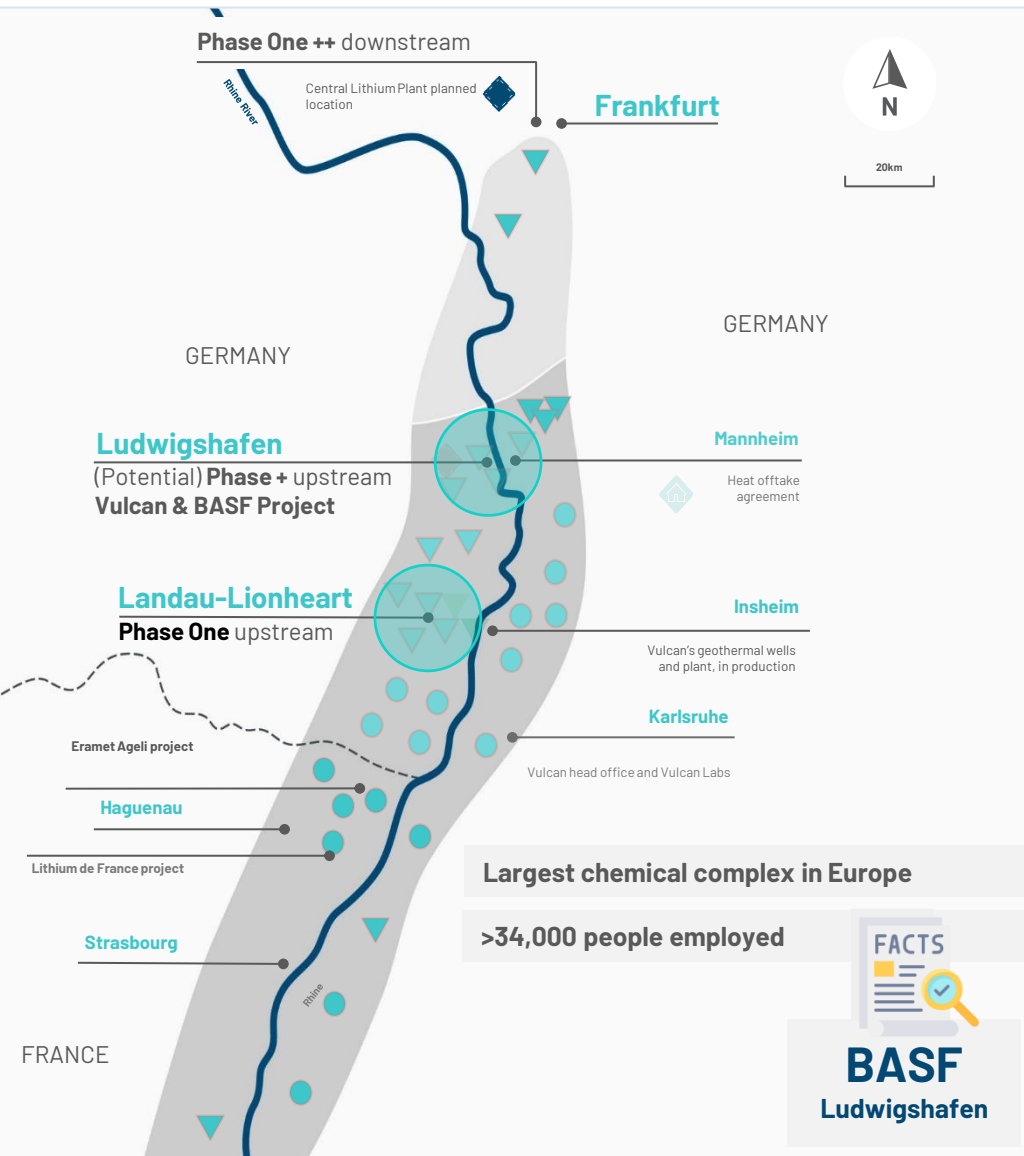




**RECENT HIGHLIGHT:** MOBILISATION OF RIG  
IN MARCH 2025 FOR NEW PHASE ONE  
PRODUCTION WELLS

# PHASE + 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



- Future heat offtaker 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

**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 battery-grade lithium hydroxide

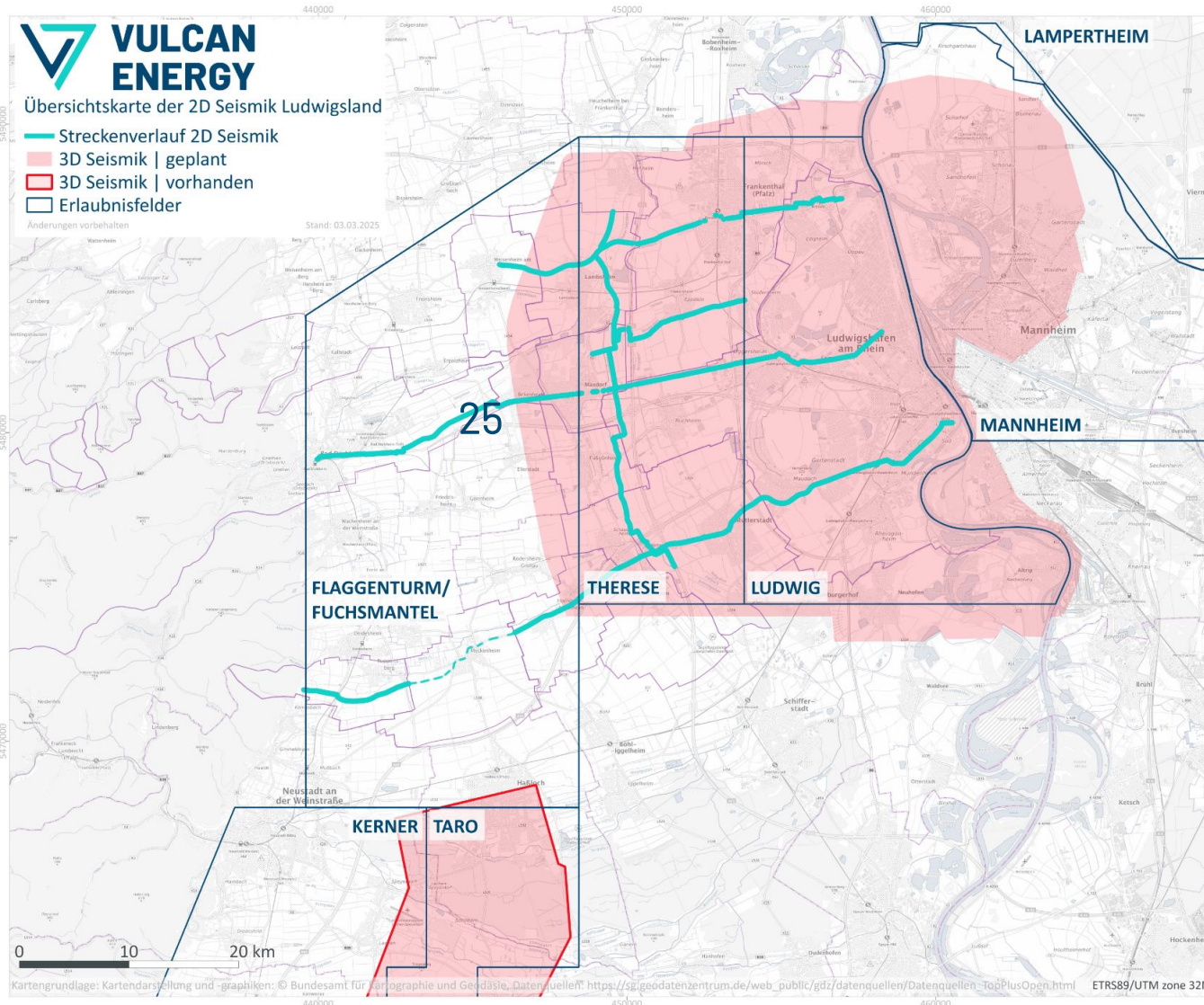
**Community heating:** Opportunity for district heating of nearby communities, including partnerships with local energy providers in Ludwigshafen and Frankenthal

**Next steps:** 2D and 3D seismic surveys (2025–2026) will identify optimal well sites, with BASF funding up to €5m. Subject to positive results and public funding, Vulcan and BASF to drill additional wells to produce heat and lithium, sharing costs.

<sup>1</sup> See ASX announcement Vulcan and BASF announce partnership agreement dated 21 November 2024 for further information.

# BASF JOINT PROJECT FIRST PHASE ALREADY COMPLETED

## Ludwigsland seismic surveys



- 2D seismic survey concluded in March 2025
- 70 km of 2D seismic measured
- Will assist with optimisation of 3D survey
- Next steps will be planning and execution of new brine wells for geothermal renewable heat and lithium production.



**PRODUCT | PROJECT | TECHNOLOGY**

## Defined by low cost, scalable, high-purity, and sustainable lithium production from brines using adsorption-type direct lithium extraction (A-DLE) technology

As the lithium market matures into its next phase of growth, major global companies like Rio Tinto and ExxonMobil are entering into lithium brine.<sup>1,2</sup>

A-DLE is a preferred method of lithium production, due to its **faster time to market, low cost of production, scalability, product purity**, and **sustainability** credentials.

The market share for A-DLE currently sits at 10% of lithium production but is **forecast to grow by 280% over the next 10 years**, representing a compound annual growth rate of 13%.<sup>3</sup>

With the expected recovery of lithium prices and favourable policy headwinds, **global lithium production is expected to enter a new round of capacity expansion, from which Vulcan stands to benefit**, as one of only a few western lithium companies with in-house A-DLE expertise.



### Direct Lithium Extraction: A Game-Changer for Mining Brines<sup>4</sup>

By Chloe Williment  
October 30, 2024

THE AUSTRALIAN<sup>5</sup>

### DLE: The technologies moving the needle on lithium production<sup>5</sup>

By Jessica Cummins  
22 January 2025



### Rise of DLE will open up new sources of lithium supply this decade<sup>6</sup>

23 July 2024



### Rio Tinto commits to buy Arcadium Lithium for \$6.7 billion<sup>7</sup>

9 October 2024



### Equinor takes stake in Standard Lithium Smackover direct lithium extraction projects<sup>8</sup>

9 May 2024

<sup>1</sup> Rio Tinto, Rio Tinto completes acquisition of Arcadium Lithium, dated 6 March 2025, < <https://www.riotinto.com/en/news/releases/2025/rio-tinto-completes-acquisition-of-arcadium-lithium> >.

<sup>2</sup> ExxonMobil, ExxonMobil Drilling First Lithium Well in Arkansas, announced 31 November 2023, < <https://investor.exxonmobil.com/news-events/press-releases/detail/1152/exxonmobil-drilling-first-lithium-well-in-arkansas-aims-to> >.

<sup>3</sup> Benchmark Minerals Intelligence, Lenders' Market Report Part 2: Market & Supply Chain Overview, dated 7 October 2024.

<sup>4</sup> EV Magazine, Direct Lithium Extraction: A Game-Changer for Mining Brines, dated 30 October 2024, < <https://evmagazine.com/articles/direct-lithium-extraction-a-game-changer-for-the> >.

<sup>5</sup> The Australian, DLE: The technologies moving the needle on lithium production, dated 22 January 2025, < <https://www.theaustralian.com.au/business/stockhead/news/dle-the-technologies-moving-the-needle-on-lithium-production/news-story/69be75e2d753c7f078ee25faf0cb5ab4?btr=4a7a85412cc25b5820c27eb1b82846be> >.

<sup>6</sup> Benchmark Source, Equinor takes stake in Standard Lithium Smackover direct lithium extraction projects, dated 9 May 2024, < <https://source.benchmarkminerals.com/article/equinor-takes-stake-in-standard-lithium-smackover-direct-lithium-extraction-projects> >.

<sup>7</sup> Benchmark Source, Rio Tinto commits to buy Arcadium Lithium for \$6.7 billion, dated 9 October 2024, < <https://source.benchmarkminerals.com/article/rio-tinto-commits-to-buy-arcadium-lithium-for-6-7-billion> >.

<sup>8</sup> Benchmark Source, Rise of DLE will open up new sources of lithium supply this decade, 23 July 2024, < <https://source.benchmarkminerals.com/article/rise-of-dle-will-open-up-new-sources-of-lithium-supply-this-decade> >.

**Superior extraction rate:** > 95%.

**High adsorption capacity:** ~3 g/l, porous structure of the extraction material enable high surface area and adsorption capacity

Main inputs for operation: heat and salinity, naturally occurring in many brines. **Lowers cost and CO<sub>2</sub> footprint of operation:** no acid/base required for loading/unloading

**Highly selective:** adsorbent chemical structure is selective towards the lithium ions due to its small radius; ions such as magnesium, sodium and calcium cannot enter

**Tuned structure:** allows high performance in a wide range of operational temperature - from room temperature to over 70°C

**Western supply chain:** technology is 100%-owned by Vulcan; manufactured in Germany and France

**Limited field of competitors:** only western players with comparable technology position are Rio Tinto / Arcadium and Eramet; other suppliers are from China

**Applicable to all brine types:** VULSORB® has been successfully tested with salars, oil field brines and geothermal brines. Being licensed to developers in the Americas (north and south)










## Granular particles

Particle size range	450 – 1,050
Temperature	up to 75°C
Adsorption capacity	3 g/l







# VULSORB® WELL-POSITIONED WESTERN A-DLE SUPPLY CHAIN

## China dominates A-DLE technology; limited western options

### Global lithium projects that use, or plan to use, proprietary A-DLE technology






Company	Project	Project location	A-DLE adsorbent provider	Origin of adsorbent
Rio Tinto	Fénix / Rincon		Proprietary <sup>1,2</sup>	
Eramet	Centenario-Ratones		Proprietary <sup>1</sup>	
Vulcan Energy	Lionheart (Phase One)		Proprietary  <b>VULSORB®</b>	

### Selection of global lithium projects that use, or plan to use, A-DLE adsorbents from third-party providers

Company	Project	Project location	A-DLE adsorbent provider	Origin of adsorbent
Tibet Summit Resources	Sal de Los Angeles		SunResin <sup>1</sup>	
Lanke Lithium	Yiliping Lake		SunResin <sup>1</sup>	
Zangge Lithium	Chalkhan Lake		SunResin <sup>1</sup>	
Jintai Lithium	Mahai Lake		SunResin <sup>1</sup>	
Tibet National	Qinghai		SunResin <sup>1</sup>	
Yiwei Lithium	Qinghai Salt Lake		SunResin <sup>1</sup>	
Various juniors	e.g. Cleantech, Anson etc.		SunResin <sup>1</sup>	
Equinor / Standard Lithium	South West Arkansas (Smackover) <sup>3</sup>		Lanshen / Koch <sup>4</sup>	
ExxonMobil	Exxon Lithium Brine (Smackover) <sup>5</sup>		n.q.	n.q.
EAU Lithium	Salar de Coipasa / Pastos Grandes		Vulcan Energy <sup>6</sup>  <b>VULSORB®</b>	
Rosatom (via Uranium One Group)	Uyuni		Rosatom (via Uranium One) <sup>7</sup>	

### Main global A-DLE technology providers

#### Company and origin of technology

	SunResin <sup>1</sup>
	Lanshen (via Koch Technology Solutions) <sup>1,8</sup>
	Vulcan Energy  <b>VULSORB®</b>
	Rosatom <sup>7</sup> & Axion <sup>9</sup>

**+ Vulcan is tracking dozens of other A-DLE project developers**

n.q. = not quantified / information is not publicly available.

<sup>1</sup> Goldman Sachs, Direct Lithium Extraction: A potential game changing technology, dated 27 April 2023, < <https://www.goldmansachs.com/pdfs/insights/pages/gs-research/direct-lithium-extraction/report.pdf> >.

<sup>2</sup> Rio Tinto to invest \$2.5 billion to expand Rincon lithium project capacity, dated 12 December 2024, < <https://www.riotinto.com/en/news/releases/2024/rio-tinto-to-invest-2.5-billion-to-expand-rincon-lithium-project-capacity-to-60000-tonnes-per-year> >.

<sup>3</sup> Standard Lithium, Arkansas Smackover Project, < <https://www.standardlithium.com/projects/arkansas-smackover> >.

<sup>4</sup> Standard Lithium, Standard Lithium Successfully Commissions First Commercial-Scale DLE Column in North America, dated 24 April 2024, < <https://www.standardlithium.com/investors/news-events/press-releases/detail/170/standard-lithium-successfully-commissions-first> >.

<sup>5</sup> ExxonMobil drilling first lithium well in Arkansas, aims to be a leading supplier for electric vehicles by 2030, dated 13 November 2024, < [https://corporate.exxonmobil.com/news/news-releases/2023/1113\\_exxonmobil-drilling-first-lithium-well-in-Arkansas](https://corporate.exxonmobil.com/news/news-releases/2023/1113_exxonmobil-drilling-first-lithium-well-in-Arkansas) >..

<sup>6</sup> EAU Lithium, Brine samples enroute to Vulcan in Germany for testing with Vulsorb technology, < <https://eau.investorhub.com/activity-updates/brine-samples-enroute-to-vulcan-in-germany-for-testing-with-vulsorb-technology> >.

<sup>7</sup> Global Flow Control, Uranium One to Develop Bolivia's First DLE Plant, dated 12 September 2024, < <https://globalflowcontrol.com/newsroom/uranium-one-to-develop-bolivia-first-direct-lithium-extraction-dle-plant/> >.

<sup>8</sup> Koch's adsorbent originates from China following its long-term agreement with Lanshen, < <https://www.kochtechsolutions.com/2023/10/02/koch-technology-solutions-reaches-lithium-selective-sorption-media-exclusivity-agreement-with-xian-lanshen-new-material-technology-co-ltd/> >.

<sup>9</sup> bnamericas, Revolutionizing lithium production: Russian firm's breakthrough DLE technology explored, dated 21 November 2023, < <https://www.bnamericas.com/en/interviews/the-proposal-of-russian-company-axion-for-direct-extraction-of-lithium-in-chile> >.

## Tier One European Rig Contractor, Drilling, Well Engineering, Well Construction and Well Delivery for geothermal renewable energy projects

### Strategic asset for Vulcan

- VERCANA owns **two electric drill rigs, ca. €60m invested by Vulcan to date**
- **Strategic asset** for Vulcan as land rig market is significantly affected by downturn
- Rising demand from **geothermal/ E&P companies**

### Managed by a highly experienced team

- **Highly experienced well construction team**, with the full scale well delivery process and drilling operations with **25+ years of experience from supervisor to management level**
- **85 employees** as of November 2024

### Ready to deliver Phase One Project

- Setup of the organisation is complete **to run all required workload for service delivery to Vulcan Phase One Project**
- The close out of the final Intercompany Contract **between VERCANA and Phase One SPV**, is in final form





OUTLOOK

# KEY TARGETS FOR 2025

## Focus on maintaining strong momentum

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



EU Strategic Project status



Decision(s) on government funding approval processes

Commencement of well execution

Finalising project financing package<sup>1</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 growth of the business, including VULSORB® technology licencing

*Note(s): Refer to page 21 of this presentation for further information on Phase One financing.*



# STRONG POLICY TAILWINDS

## European and German policy initiatives

EU Battery Passport<sup>1</sup> – adopted July 2023



Critical Raw Materials Act (CRMA)<sup>2</sup> – entered into force 23 May 2024



Net Zero Industry Act (NZIA)<sup>3</sup> – entered into force 29 June 2024



Strategic Project Status<sup>4</sup> – awarded 26 March 2025



A competitive compass for EU<sup>5</sup> – 29 January 2025 (including)



– Clean Industrial Deal initiative – Affordable energy Q1 2025



– Sustainable Transport Investment Plan – Q3, 2025

– Industrial Decarbonisation Accelerator Act – Q4, 2025

Germany's Geothermal Acceleration Law<sup>6</sup>, European Geothermal Strategy – 2025

Note(s) 1. Implementing the EU digital battery passport <https://circulareconomy.europa.eu/platform/sites/default/files/2024-03/1qp5rxiz-CEPS-InDepthAnalysis-2024-05-Implementing-the-EU-digital-battery-passport.pdf> 2. Critical raw Materials Act [https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/critical-raw-materials-act\\_en](https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/critical-raw-materials-act_en) 3. NZIA [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/green-deal-industrial-plan/net-zero-industry-act\\_en.html](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/green-deal-industrial-plan/net-zero-industry-act_en.html) 4. <https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/strategic-projects-under-crma> 5. A competitive compass for the EU: Brussels, 29.1.2025 [https://commission.europa.eu/document/download/10017eb1-4722-4333-add2-e0ed18105a34\\_en](https://commission.europa.eu/document/download/10017eb1-4722-4333-add2-e0ed18105a34_en) 6. Geothermal Acceleration Act <https://www.bmwk.de/Redaktion/DE/Pressemitteilungen/2024/09/20240904-umsetzung-der-waermewende>.



# LEVERAGING POLICY: VULCAN & THE CLEAN INDUSTRIAL DEAL

## EU incentives for green leaders: funding and supply chain benefits



### Clean Industrial Deal

The screenshot shows the European Commission's website for the Clean Industrial Deal. The header includes the European Commission logo, a language selector (EN), and a search bar. The navigation menu lists: Home, About us, Our priorities, News and media, Topics, and Get involved. The breadcrumb trail reads: Home > Topics > EU competitiveness > Clean Industrial Deal. The main heading is "Clean Industrial Deal" followed by the subtitle "A plan for EU competitiveness and decarbonisation". The text describes the need for support due to high energy costs and global competition, outlining concrete actions like lowering energy prices and creating jobs. A video player is embedded, showing an industrial facility with a yellow play button. Below the video, two bullet points highlight key areas: energy-intensive industries and the clean-tech sector.

European Commission

EN

Home About us Our priorities News and media Topics Get involved

Home > Topics > EU competitiveness > Clean Industrial Deal

## Clean Industrial Deal

### A plan for EU competitiveness and decarbonisation

Faced with high energy costs and fierce global competition, European industries need urgent support. The Clean Industrial Deal outlines concrete actions to turn decarbonisation into a driver of growth for European industries. This includes lowering energy prices, creating quality jobs and the right conditions for companies to thrive.

The Deal presents measures to boost every stage of production, with a focus on:

- **energy-intensive industries** such as steel, metals, and chemicals, that urgently need support to decarbonise, switch to clean energy, and tackle high costs, unfair global competition, and complex regulations
- **the clean-tech sector** which is at the heart of future competitiveness and necessary for industrial transformation, circularity, and decarbonisation.



### Potential relevance to Vulcan



€100bn Green Industry Support – unlocking new financing opportunities to accelerate investment in sustainable projects across Europe



Faster project approvals for future phases – less bureaucracy means streamlined execution for green tech projects like Vulcan's phased development



Joint procurement platform strengthens demand for locally sourced lithium – reinforcing Vulcan's role in Europe's clean energy transition

# HIGHLY EXPERIENCED LEADERSHIP

## Outstanding major project, technical and finance experience at the Executive and Board level

### Vulcan Executive Leadership



**Dr Francis Wedin**  
Executive Chair, Founder



**Cris Moreno**  
Managing Director and CEO



**Felicity Gooding**  
Executive Director and Group  
Chief Financial Officer

### Development

### Execution

### Production



**Thorsten Weimann**  
Chief Development Officer



**Carsten Bachg**  
Chief Operations Officer



**Dr Christian Tragut**  
Vice President Production



**Dr Stefan Brand**  
Chief Technology Officer



**Christian Freitag**  
Chief Commercial Officer



**Samantha Langley**  
Head of Sustainability



**Doris Prokosch**  
Chief People Officer



**Marc Cleuziou**  
Vice President Execution



**Marcus Süllmann**  
Vice President Finance - Germany

### Vulcan Board



**Angus Barker**  
Lead Non-Executive Director,  
Deputy Chair Director



**Josephine Bush**  
Non-Executive Director



**Dr Günter Hilken**  
Non-Executive Director



**Dr Heidi Grön**  
Non-Executive Director



**Dr Horst Kreuter**  
Chief Representative Germany,  
Co-Founder, Board Advisor

Special advisory to the Board



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<http://v-er.eu>

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# APPENDIX 1: DISCLAIMER CONT.

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**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.

**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.

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## 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 EURO3 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.