

EDC PROJECT REVIEW SUMMARY:

Vulcan Energy Resources Ltd – Phase 1 Lionheart Project

Project Description	Integrated Geothermal-Lithium project to use heat from renewable geothermal energy, lithium-rich brine from well sites, Direct Lithium Extraction (DLE) technology, and electrolysis to produce Lithium Hydroxide Monohydrate (LHM) to be used predominantly in Electric Vehicle batteries
Project Sponsors	Vulcan Energy Resources Limited (Vulcan)
Country	Germany
Project Category	A
Canadian Exporter(s)	ABB Inc. (ABB); Noram Electrolysis Systems Inc. (NESi); Sedgman Canada Limited and Sedgman Novopro Projects Inc (Sedgman).
Description of capital goods and/or services	Various goods and services under the Export Support and Global Corporate Partnership (GCP) mandates.
EDC Product	Structured Project Financing
Date of publication on EDC's website (dd/mm/yy)	15/11/2024
Date of Signing (dd/mm/yy)	02/12/2025

Project Categorization

Vulcan aims to develop the “Lionheart” Project in southwestern Germany’s Karlsruhe region. The proposed project is considered multi-sectoral as it includes mining, geothermal well drilling, and chemical processing.

The Project includes seven main components: (1) Develop 24 new wells across seven sites in the Upper Rhine Graben Brine Field, supplementing four already existing wells at Insheim and Landau; (2) Continue operations at the Insheim geothermal plant; decommission the Landau facility; (3) Construct a Geothermal Lithium Extraction Plant (GLEP) at Landau Industrial Park, integrating an Organic Rankine Cycle unit and Lithium Extraction Plant to produce geothermal energy and lithium chloride; (4) Install an Interconnected Pipeline and Power (ICPP) system to circulate cooled lithium brine and heated industrial water between wells and the GLEP; (5) Implement heat exchange at well sites, transferring energy from lithium brine to industrial water, with reinjection and recirculation of fluids; (6) Build a Central Lithium Plant (CLP) at Höchst Industrial Park in Frankfurt to refine lithium chloride into lithium hydroxide monohydrate; and (7) Transport lithium chloride by road from the GLEP to the CLP.

The project aims to produce Lithium Hydroxide Monohydrate (LHM) for electric vehicle batteries by harnessing renewable geothermal energy and lithium-rich brine from well sites. Vulcan’s process uses intermediate heat exchangers to efficiently transfer geothermal heat into a closed-loop industrial water system, which supplies hot water to district heating facilities and Organic Rankine Cycle (ORC) plants. After the heat is extracted, the cooled water is recirculated for reheating, ensuring continuous operation.

Meanwhile, the cooled lithium-rich brine is sent to the Lithium Extraction Plant (LEP), where lithium is extracted. The depleted brine is then reinjected into the reservoir, completing the cycle, while the resulting lithium chloride is transported to the Central Lithium Plant (CLP).

At the CLP, lithium chloride is converted into the final LHM product. This integrated system enhances efficiency and reliability by using clean industrial water for heating, eliminating scaling risks. Cooling the brine before pipeline transport and extraction further minimizes scaling, optimizing overall system performance.

Given the Project’s sector, size, and environmental and social risk profile the transaction is considered a Category A project. Category definitions can be found [here](#).

Summary of EDC’s Review

EDC reviewed the Project in accordance with its Environmental and Social Review Directive (ESRD) and the Equator Principles (EPs). The Project’s relevant environmental and social (E&S) information was also subject to a 60-Day *ex-ante* disclosure starting on November 15th, 2024, and included the Project’s full Environmental and Social Impact Assessment (ESIA) and corresponding annexes linked to a dedicated website.

An Independent Environmental and Social Consultant (IESC) was retained by the Lenders group to benchmark the Project against host country standards, the Equator Principles IV (EPIV), and the IFC Performance Standards 1 to 8 (IFC PS).

In parallel, EDC conducted a similar benchmarking exercise leveraging and contrasting the information produced by the IESC but also benchmarked the Project against all eight IFC Performance Standards (IFC PS), excepts for IFC PS7, which is deemed not applicable to the Project as there are no Indigenous communities in the Project’s area. Where gaps against international standards were identified, the Project Sponsors committed to address them via time-bound commitments in an Environmental and Social Action Plan (ESAP).

EDC has concluded that, based on the information provided to date and subject to the completion of the Environmental and Social Action Plan (ESAP) to address identified gaps, the Project is being designed to meet internationally recognized good practices, guidelines or standards. On this basis, the Project is considered to have met the requirements of the Environmental and Social Review Directive (ESRD) and the Equator Principles (EPs) for Category A projects.

Summary of Key Environmental and Social Risks and Mitigants

EDC due diligence determined that the Project Sponsors have demonstrated adequate capacity to manage their environmental and social risks and have suitably avoided and minimized impacts per the mitigation hierarchy. The following table summarizes key risks identified for the Project along with the most pertinent mitigations that were applied for each.

Key Risk	Key Mitigants
Potential for <u>E&S permits not being obtained</u> as E&S permitting is an ongoing and iterative process under German law.	<ul style="list-style-type: none"> The Project has prepared a dedicated Permitting Action Plan (PAP) that details each one of the German permitting process iterative steps (including permit correspondences, co-dependencies, risks, timelines, responsibilities, requirements, alternative analysis, etc.).
Potential <u>negative perception from stakeholders</u> due to perceived cumulative and transboundary impacts, visual impacts, road access and increased traffic, and induced seismicity.	<ul style="list-style-type: none"> The Project has conducted extensive additional standalone studies including cumulative and transboundary impacts, critical habitat assessments, ecosystem services assessment, climate change risk assessments, and a prescriptive stakeholder engagement plan and project information disclosure framework.
Potential for the <u>land acquisition process not being completed</u> , requiring project redesigns.	<ul style="list-style-type: none"> The Project has executed a land option agreement with the City of Landau (which has already secured control of key properties for the Project) as well as a dedicated reporting framework (supported by ongoing independent third-party review) on land acquisition progress.

Documentation Reviewed:

The following is an illustrative list of key documentation that was reviewed as part of the current confirmation of the ESRD.

1. SLR's Phase One Lionheart Project – IESC Review Update, July 2025
2. SLR's Environmental and Social Due Diligence Report, May 2025
3. RPM's Environmental and Social Due Diligence Report, Aug 2024
4. Vulcan Project's Environmental and Social Impact Assessment Report, Sep 2024
5. Vulcan Project's Non-Technical Summary (NTS) Report, Sep 2024
6. Vulcan Project's Stakeholder Engagement Plan (SEP), Sep 2024
7. Vulcan Project's Permitting Action Plan (PAP), Nov 2024
8. Vulcan Project's Bridging Study, Nov 2023
9. Vulcan's Special Operating Plan for Construction of the Schleidberg drilling site, Jul 2023
10. Landscape Conservation Support Plan according to s17 BNatSchG – construction of the Schleidberg drilling site, May 2023
11. Announcement of Rhineland-Palatinate State Office for Geology and Mining (LGB) on the result of the general preliminary examination in accordance with section 7 of the UVPG, Jan 2023.
12. Vulcan's E&S-related policies:
 - a. People and Performance Committee Charter
 - b. Anti-Bribery and Anti-Corruption Policy
 - c. Community Relations Policy
 - d. Continuous Disclosure Policy
 - e. Diversity Policy
 - f. Environmental Management Policy
 - g. Occupational Health and Safety Policy
 - h. Shareholder Communications Strategy
 - i. Sustainable Supplier Policy
 - j. Whistleblower Protection Policy
13. Q&A calls with Vulcan, Lenders, and RPM representatives.
14. ESG Advisory E&S site visit from June 29 to July 03, 2024.

Applicable International Finance Corporation (IFC) Environmental and Social Standards used by EDC (in addition to host country requirements):

- PS 1: Social and Environmental and Management Systems
- PS 2: Labour and Working Conditions
- PS 3: Pollution Prevention and Abatement
- PS 4: Community Health, Safety and Security
- PS 5: Land Acquisition and Involuntary Resettlement
- PS 6: Biodiversity Conservation and Sustainable Natural Resource Management of Living Natural Resources
- PS 8: Cultural Heritage