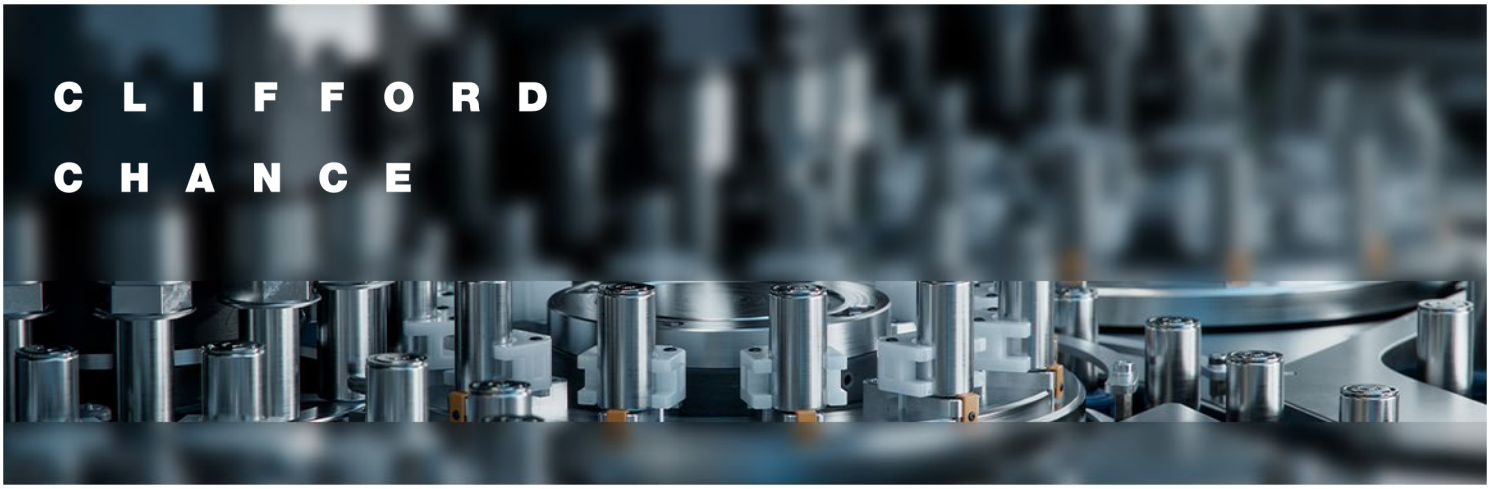

ENERGY TRANSITION: MEETING THE DEMANDS OF EV GLOBALISATION – WHAT ROLE CAN GEOTHERMAL LITHIUM FROM BRINE EXTRACTION PLAY?

The challenges of securing lithium, extracting it and converting it to battery grade products for the EV battery industry remain at the forefront of the auto industry's concerns as EV globalisation continues. Lithium from geothermal brine extraction projects are a small but important part of the battery metals value chain and in this briefing we look to outline a few important considerations for financiers, investors and developers looking at these projects.

Contract risks relating to offtake

The following are some of the key areas of concern around contractual and offtake issues that lenders and investors will need to focus on:

- Risks resulting from inconsistencies between feedstock/input and offtake contracts – for example a price escalation provision for change of law or tax in the brine supply agreements which the project cannot pass through to offtakers.
- Key supply and offtake contracts matching the debt tenor. In particular, for projects where lithium hydroxide (LiOH) or carbonate conversion is separate from brine extraction, lenders and investors will expect the source of brine supply to be secured for the duration.
- The ability of projects to move from one product to another to support different chemistries. Changes in EV battery chemistries and technical advances, for example the ongoing move from nickel, manganese and cobalt (NMC) to lithium iron phosphate (LFP), has had an impact on EV supply chains.
- The regulatory compliance obligations of OEMs, who are contractually pushing these down throughout their supply chains, top to bottom.
- Counterparty compliance reviews and audit rights, which are becoming key for OEMs across the value chain.
- Addressing and mitigating impacts of the geopolitical risks (including as to tariffs).

These are issues and concerns that we regularly advise on and can help you to mitigate successfully to get the deal done.

Permitting

Permitting requirements will of course vary according to the jurisdiction where the project is located. Within the EU procuring new mining permits can be a protracted process. One of the key permitting aspects in several EU jurisdictions is the need to apply for at least two separate permits – which may each include distinct requirements, in particular in terms of safety – for mining and for geothermal activities, with limited to no room for synergies as a matter of law in the permitting processes (for example merging applications or permits). However, the EU legislator aims to facilitate and accelerate certain permit-granting processes by way of the Critical Raw Materials Act (CRMA). Whereas the mining of raw lithium generally does not qualify as a Strategic Project, the processing of lithium to achieve battery grade could be considered a Strategic Project, for which ambitious deadlines in the permitting process apply (see Art. 11 CRMA).

In the EU, projects that have managed to get off the ground first have often benefited from existing permits and there have been examples where the geothermal permit, which has been requested and granted first, has allowed an acceleration of the mining permit. In fact, where permits relate to an existing site, it can speed things up, for example the Neptune Energy project in Germany which has been awarded mining and geothermal energy permits in an area that coincides with an existing natural gas field.

In the US, there are also onerous regulatory and permitting requirements for geothermal development projects at the federal, state, and local levels. For example, at the federal level, an environmental assessment may be required under the National Environmental Policy Act of 1969 (NEPA). Similar assessments may be required under state law depending on the siting of the project. For example, projects in California must comply with the California Environmental Quality Act (CEQA) while projects in Nevada are subject to the Nevada Utility Environmental Protection Act (UEPA). In recent years, there has been an increase in legislation at the federal and state levels aimed at streamlining the approval process for geothermal energy projects in the US, which could have a positive impact on the ability to obtain permits for lithium extraction. A few notable legislative actions include the Energy Act of 2020, which mandated the formation of centralized permitting offices for mining projects under the Bureau of Land Management (BLM) National Renewable Energy Coordination Office, and a September 2024 amendment to the Energy Policy Act of 2005 which permitted new categorical exclusions under NEPA for geothermal drilling. Additionally, in October 2024, California passed a law allowing county planning departments to serve as lead agencies for conducting geothermal project environmental reviews (previously solely conducted by the California Geologic Energy Management Division (CalGEM)). Furthermore, there are currently several energy-focused executive actions by the current administration related to geothermal projects and lithium extraction. Given the current administration's support for these industries, these actions may result in a positive impact for future and continued growth.

Currently, the Silver Peak mine, located in Clayton Valley, Nevada, is the only active raw lithium mine in the US. There are two lithium mines under construction in Nevada: Thacker Pass, in Humboldt County (which has received a $2.26 billion loan from the US Department of Energy's Loan Programs Office (LPO)), and Rhyolite Ridge in Esmeralda County (which has

received a $996 million loan from LPO). In addition, Project ATLiS, a project which will use geothermal brine to extract lithium in California and has received a conditional commitment from LPO for $1.36 billion, is under development. Lengthy permitting processes remain the most prevalent obstacle for these projects, but as noted above, this trend could shift in light of the goals of the current US federal administration. With over 50 existing geothermal projects in the US, and many old oil well sites that could be converted to geothermal wells, the potential to increase US lithium production by taking advantage of existing sites and permits could be significant.

Project and project on project risk

The interaction between different aspects of the project will present issues that participants should consider from the outset and work to employ mitigation strategies which are mutually acceptable to owners, lenders and delivery partners. Some of the key issues to consider are:

- Government subsidies and incentives (such as the US Inflation Reduction Act (IRA) for end customers or projects), together with the involvement of DFIs and ECAs, are all playing a significant role in securing resources, developing assets, and promoting growth in the industry. While these elements add to the complexity of project structuring, we have successfully advised clients in bringing together strong projects that are able to take advantage of all available subsidies and incentives.
- Recent shifts in chemistries, as discussed above, are impacting value chains with access rights to IP and process know-how becoming even more important and needing to be reflected in the documentation.
- A major geothermal brine lithium extraction and processing project will contain multiple significant and discrete 'subprojects' (e.g., well sites, power generation, pipelines, extraction facilities and processing/conversion facilities). It is unlikely that any one contractor will wrap (or be able economically to wrap) delivery of these assets on an EPC basis. As such, developers are potentially left with limited or inadequate recourse if, for example, one subproject is late, doesn't complete at all, or does not perform properly. Careful structuring and clear messaging to lenders and investors is needed to mitigate and manage these inherent risks. Without adequate mitigants, sponsors looking to secure project finance are likely to be required to underwrite some of these risks.
- EV value chain project participants will often further be exposed to project-on-project risk through their own supply chain. OEM offtakers will require LiOH or carbonate production by hard dates as part of their own EV supply chain needs and these anchor offtakers will expect to have strict termination rights if production is not there on time.

Ultimately, significant comfort will be derived from practical rather than purely legal mitigants, such as equity and offtake being with the same parties and vertical integration across projects. This should help to avoid having lenders look to sponsors for additional protection.

Individual package procurements

Where projects are comprised of multiple subprojects, certain individual subprojects may also be procured on a disaggregated or EPCM basis. This approach can bring benefits to owners, such as reduced upfront pricing, shorter programmes, and more control and flexibility over the final product.

However, disaggregation also brings certain inherent and inevitable challenges, such as interface risk between contract packages, reduced certainty in terms of outturn cost and COD, the lack of a single point performance or delivery wrap and reduced recourse in the event that issues do arise, given that caps and damages are calibrated against individual package contract prices, not against overall capex (or even subproject capex).

These issues require careful management and mitigation and sensitive handling, including with lenders. Disaggregation risk is not something which is typically capable of purely legal or contractual mitigation and must be analysed against a matrix of technical, commercial and practical mitigants as well.

Integration of process technology

Where no debt service undertaking or completion support is provided, lenders may put greater emphasis on the mitigation of process technology risks, with an expectation of a comprehensive flow-down of process technology risk to the appointed EPC contractor. It is important to work closely with sponsors and lenders technical advisers to accurately define the extent to which this risk is retained by the developer(s) in the procurement contracts and its consequences. This will typically entail a review of the definition of the blackbox technology and a thorough understanding of (i) the mechanisms that have been put in place to facilitate the wrap, such as tripartite structures and (ii) whether the license terms seek to impose any restrictions on the pool of available contractors or the terms of their contracts.

New technology risk

Where new technology is present, implementing technology risk management and mitigation measures that meet investability requirements is critical. We have seen examples of this in many innovative and first of a kind projects for example: in the US, where a technology risk mitigation package was required to secure DoE funding for the ACES Delta utility scale hydrogen production and cavern storage project; for power generation deals across the thermal and renewables sector in relation to new model turbines; and for offshore wind projects as they move into deeper waters with floating technology.

What's next?

It remains to be seen how the CMRA will be implemented in the various different EU jurisdictions. Project sponsors will be keen to see how governments approach implementation and we are already seeing signs of forum shopping. Those sponsors who have a track record of extraction and geothermal projects will have a technological head start, enabling them to bring projects to fruition.

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