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Closing the Lithium Gap: Opportunities in Geothermal Co-Development

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Lithium (Li) is central to the global transition toward low carbon energy, driven largely by Li-ion batteries (LIBs) used in electric vehicles and grid scale storage. Forecasts indicate that demand will outpace supply, creating significant supply deficits by 2030 and beyond and requiring dozens of new resources to be developed [1]. This study evaluates the co-development of geothermal power and direct lithium extraction (DLE) from brine as a lower impact Li source to supplement increasing demand. Traditional Li resources, such as hard rock, salar, and clay-hosted deposits, often involve extensive land disturbance, freshwater consumption, and tailings storage requirements. This assessment compares advanced projects in the Salton Sea Geothermal Field (SSGF) in the United States and Europe's Upper Rhine Graben (URG), where Li extraction is being integrated with existing geothermal infrastructure [2]. Analysis demonstrates that Li concentrations, temperature gradient, and Mg/Li ratios strongly influence co-development project feasibility [3,4], while DLE technologies and energy sources largely determine lifecycle emissions and water consumption. Overall, geothermal Li offers a scalable pathway to substantially contribute to addressing (approximately 0.14 Mt LCE or 25-30% by 2030) projected supply deficits while reducing environmental footprints through co-production with renewable geothermal energy. Continued technological innovation, supportive policy, and transparent resource data will be essential for accelerating deployment and enabling geothermal resources to contribute meaningfully to resilient, lower carbon battery supply chains.

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