

# SEG 2022 Conference: Minerals For Our Future

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## Quantitative Assessment of Future Lithium Supply: Which Mining Projects and When?

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Whether primary lithium (Li) sources will be able to supply the rapidly growing needs of the electric mobility transition has recently caused considerable controversy. Existing assessments are hampered by a lack of consideration for the decision-making processes occurring at the level of individual mining projects. In the present contribution, we demonstrate how these processes, as well as associated uncertainties, can be incorporated into an assessment of the likely future evolution of the global Li market.

Our method uses Monte-Carlo simulations to achieve this goal. A global database of existing Li mining projects (all development stages, including case histories) is used to build models to estimate the likelihood of each project proceeding to the next development stage in any given year, depending on specific project characteristics such as location, deposit type and ore grade, as well as market conditions, i.e., Li price and demand. Iterative stochastic simulations are then run, in which projects are moved through the development pipeline according to these estimated likelihoods, year-by-year, up to 2050. New discoveries are also included in the model, to achieve realistic results over the relatively long timespan covered by the model. Simple functional models are used to estimate future Li demand, including uncertainty. The simulations generate a large set of equally probable scenarios (1,000 or more) of which projects enter production when, whether primary supply can meet demand in any given year, and what the likely mean Li price is for that year. Summarising the data from all scenarios provides an impression of the likely evolution of the Li market up to 2050. Besides this likely market evolution, the simulation outputs can be used further to assess the probable environmental impacts of future primary Li supply.