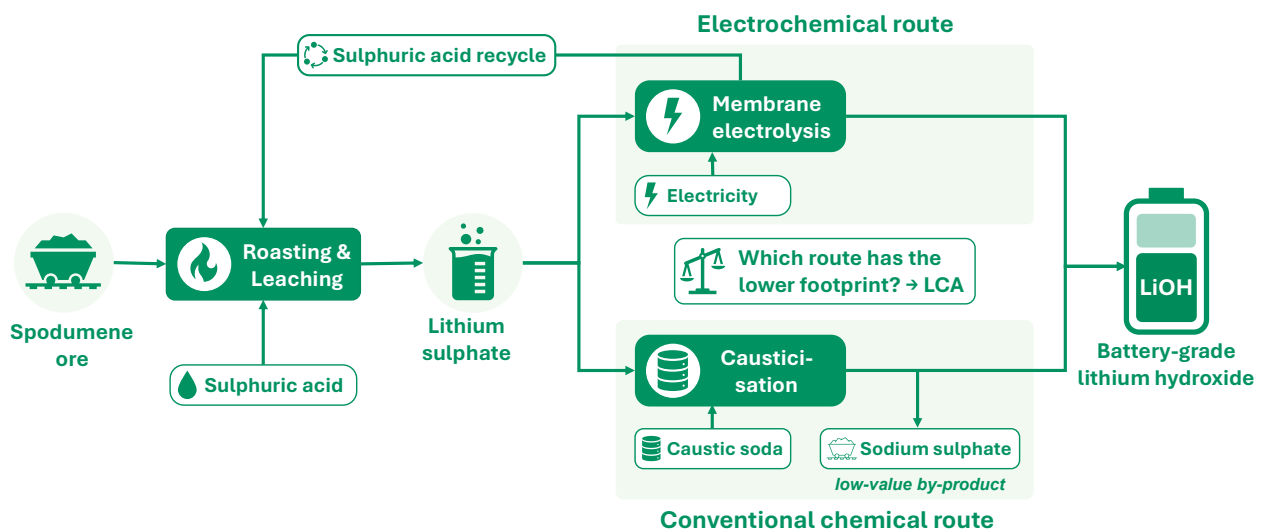


Trading reagents for electrons in lithium production

Lithium is essential for batteries, but producing battery-grade lithium hydroxide contributes noticeably to a battery's environmental footprint. It is commonly produced from hard-rock spodumene ore using sulphuric acid and caustic soda. This conventional route generates sodium sulphate as a by-product, for which the market is already oversupplied, so it must often be managed at extra cost.

An emerging alternative is membrane electrolysis, which uses electricity instead of caustic soda. This electrochemical route avoids the sodium sulphate by-product and produces sulphuric acid that can be reused in the process. Whether it is better for the environment depends largely on how much electricity it requires, the electricity mix, and how the by-products are accounted for.



In this research module, you will carry out a comparative life cycle assessment (LCA) of both routes. Your tasks:

- Review the literature and compile life cycle inventory data for both routes
- Conduct LCA calculations for both routes in openLCA or Brightway
- Analyse how the results depend on key parameters such as the electricity mix, reagent consumption, and the treatment of by-products

You will gain hands-on experience in LCA modelling using state-of-the-art tools and insight into battery raw-material supply chains.

Prior knowledge of LCA from Life Cycle Management (CLM2), Stoffkreisläufe und Ökobilanzen (URT2c), or a similar course covering LCA is required.

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