

Well-to-product integrated lithium solution



Meeting the battery demands of tomorrow—more sustainably



More lithium, domestically sourced

Consistently delivers a 85%–95% recovery rate, with up to 96% recovery from a 200-ppm brine as proven in our Clayton Valley project in Nevada.



Less production time

Cuts lithium production time down from over a year to just hours. Battery-grade lithium is produced on site and does not need to be shipped to China for processing.



Minimal environmental footprint

Utilizes less than 10% of the land footprint of traditional methods, reducing the physical impact to ecosystems and communities.



Responsible water resource management

Reduces water consumption by up to 95% compared with traditional methods: Spent brine is reinjected (after thorough testing) to minimize impact in high water stress and other sensitive environments.

Propelled by the surge in electric vehicles and renewable energy storage, global demand for lithium is expected to grow from 0.9 million metric tons in 2023 to 5.6 million metric tons by 2040. This growing demand requires the discovery of new sources of lithium, cutting-edge technology solutions adaptable to supply and demand cycles, and environmentally sustainable extraction practices.

Overview

Proven direct lithium extraction (DLE) solution

The SLB well-to-product integrated lithium solution combines SLB's technology and expertise in both subsurface and surface to deliver an optimized integrated process that maximizes lithium recovery and production volumes. The full process provides an efficient, effective, and more sustainable alternative to current methods to produce lithium from brines. Our innovative lithium extraction, concentration, and conversion technologies continuously recover, concentrate, and convert lithium in a controlled, closed environment for higher recovery rates, accelerated production, more responsible water management, and lower environmental impact.

Benefits

Subsurface modeling to understand project economics

Our 3D basin models and operators' 3D static acreage models, which incorporate geological and geophysical data, help build more holistic views of resource potential. From delineating the edges of the reservoir to determining its capacity, lithium concentration variances, and areas of higher permeability, understanding these characteristics determines the economic potential of a lithium brine resource before making any major capital investment.

Maximize production and long-term resource sustainability

Dynamic modeling of the reservoir can help with field development planning by simulating brine flows through the reservoir, spent brine reinjection effects, and more. The combination of static and dynamic modeling helps to optimize production of the resource and ensure its long-term sustainability.

Lithium extraction at a high recovery rate

Once a production system is optimally designed to align with subsurface modeling of the reservoir, our process begins by pretreating the brine for lithium extraction. It is then filtered through columns of active material that selectively adsorb lithium and chloride ions, and freshwater is then used to release the adsorbed lithium. For the vast majority of brine resources, this process is proven to recover 85%–95%, with up to 96% recovery from a 200-ppm brine as proven in our Clayton Valley project in Nevada.

Time to market

Once the lithium is extracted by the sorbent, critical posttreatment steps purify and concentrate the lithium-rich brine. These steps ensure that the quality and purity of the lithium meet the required specifications for the final conversion step into lithium carbonate or lithium hydroxide. During the concentration process, our energy-efficient desalination technology simultaneously recovers freshwater and concentrates the lithium chloride solution without using conventional energy-intensive thermal evaporators. This technology yields substantial savings in capital expenses, energy costs, and carbon emissions. Finally, we convert lithium chloride to lithium carbonate on site using proven commercial-scale conversion technologies, and does not need to be shipped to China for processing.



The SLB well-to-product integrated lithium solution demonstration plant—with the highest capacity in North America—starts a new era in more sustainable lithium production.

From extraction to conversion,
our process takes just days
instead of months.

Responsible management of water resources

More than 50% of today's lithium production is concentrated in areas with high water stress levels. Our water resource management reduces water consumption by up to 95% compared with traditional methods. Spent brine is tested and treated to ensure its composition and characteristics meet those of the feed water before reinjection.

Minimal environmental footprint

Our integrated process uses innovative technologies to extract lithium from brine efficiently, effectively, and continuously. The closed-loop system provides a physical space for operations that is less than 10% compared with the space needed for traditional evaporation methods. As a result, more of the surface environment is left in its natural state, preserving it for local ecosystems and communities.

Proven, more sustainable lithium production at scale

- In 2019, SLB partnered with Pure Energy Minerals in Clayton Valley to demonstrate our well-to-product integrated lithium solution at scale.
- In 2020, brine produced from a newly drilled well was converted to battery-grade lithium hydroxide at laboratory scale using our integrated workflow.
- In 2021, we partnered with Panasonic to validate and optimize our innovative lithium extraction and production process.
- In 2023, we commenced construction of our demonstration plant, including a mobile onsite lab and automated digital control system for quality control and system optimization. The plant was designed to represent a one-tenth size of a commercial production plant.
- In 2024, the demonstration plant started processing a brine containing an average 200 ppm of lithium at 60–90 galUS/min and successfully produced 10.5 metric tons of lithium carbonate equivalent (LCE).

By your side every step of the project

At SLB, we've been working with customers for 100 years to maximize the value of subsurface resources. This expertise and the experience of designing, engineering, implementing, testing, and operating our integrated workflows in a demonstration plant at scale has enabled us to develop a unique breadth of knowledge to support the lithium life cycle from exploration to production.

With our deep technical and scientific knowledge and our experience and learnings from the well-to-product integrated lithium solution demonstration project in Clayton Valley, we can help you derisk and accelerate your next project.

Put SLB expertise to work for you.

Email us: sne@slb.com
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