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California State Assembly

UTILITIES AND ENERGY



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CHAIR

JOINT HEARING WITH THE SELECT COMMITTEE ON CALIFORNIA'S LITHIUM ECONOMY

Tuesday, August 15th
1:30 p.m. – Capitol Room 447

INFORMATIONAL HEARING

Lithium Valley Commission Report

The federal government considers lithium to be one of 35 critical minerals vital to the nation's security and economic prosperity.¹ Global lithium demand is expected to grow substantially over the next decade, driven largely by increasing demand for lithium-ion batteries in electric vehicles and energy storage in the electricity sector. These technologies are key to California's clean energy and transportation goals as the state works to phase out gasoline-powered vehicles and fossil fuel-based electricity.

However, domestic supplies of lithium are sparse, with the majority of global production arising from Chile, Australia, and China.² Despite this production deficit, the United States has some of the largest lithium deposits globally, with California's Imperial Valley containing some of the largest lithium deposits in the world specifically underground near the Salton Sea.

The Salton Sea encompasses approximately 343 square miles, located between Riverside County on the north and Imperial County to the south, about 95 miles east of San Diego. The Sea was originally formed early in the last century from an industrial accident. Over the last several decades, water levels have declined and salinity concentrations have increased, resulting in many environmental and health concerns for the area and neighboring communities. On the southeast shore of the Sea exists a geothermal field, a geological area where fluids—in the form of very salty brine—interact with the earth's heat. When brought to the surface, that high-temperature, high-salinity brine turns to steam which can be used to

¹ USGS, Interior Releases 2018's Final List of 35 Minerals Deemed Critical to U.S National Security and the Economy, <https://www.usgs.gov/news/national-news-release/interior-releases-2018s-final-list-35-minerals-deemed-critical-us>

² Visual Capitalist, "Visualizing the World's Largest Lithium Producers"; <https://www.visualcapitalist.com/visualizing-the-worlds-largest-lithium-producers/>

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generate electricity. Currently, 11 geothermal power plants harness this process, operating at approximately 340 megawatts (MWs) at the southern shore of the Sea.

However, the Sea holds significantly more potential. The State Lands Commission has noted geologic evidence exists showing the geothermal resource extends northwest beneath the Sea, with the potential for the field at 2,000 MW.³ Development at the Salton Sea geothermal field has been slowed by the high up-front costs involved with brine-based geothermal power—which can cause pipelines and wells to become plugged with dissolved solids and necessitates more specialized hardware and equipment to accommodate—and the lack of electrical transmission capacity from this isolated region.

The “Lithium Valley” refers to the areas around the Salton Sea with this known geothermal activity, whose brine is rich in lithium. For decades, the geothermal brine after being used to generate electricity would simply be reinjected underground. The idea behind the Lithium Valley is to extract the lithium from the brine before injecting it back, providing an enormous commercial opportunity from the lithium mineral, and helping offset the cost of the geothermal electricity production.

Private developers, the local communities surrounding the Sea, the State of California, and the federal government have invested heavily—in time, resources, or both—in exploring this potential joint geothermal-lithium development. The new industry could be a major economic hub to the region, which faces high rates of unemployment and suffers health consequences from the Sea’s drying. In 2020, the Lithium Valley Commission was established, pursuant to AB 1657 (E. Garcia, Chapter 271, Statutes of 2020), to explore opportunities and challenges surrounding lithium recovery from geothermal brines around the Sea. In December 2022, the Commission submitted its report of findings and recommendations examining transmission planning, improved permitting, and how to secure funding for infrastructure investments and economic development incentives.

The purpose of this hearing is to examine the findings and recommendations of the Lithium Valley Commission report in order to better understand what is necessary to build a domestic lithium supply chain. There will also be updates of the federal and state efforts to build this emerging industry to reduce the United States reliance on foreign lithium suppliers. Additionally, lithium developers will provide updates on their projects and also share opportunities and challenges within their undertakings.

Findings:

- *The report recommends accelerating transmission planning; improving permitting; and securing funding for infrastructure investments and economic development incentives to support industry growth and job training.*
- *The development of new lithium extraction technologies presents an opportunity to prevent historically inequitable practices associated with the mining industry and support practices that align with environmental justice.⁴*

³ California State Lands Commission, “The Geysers and Salton Sea Geothermal Fields,” June 2015; <https://www.slc.ca.gov/wp-content/uploads/2018/10/07-TheGeysersandSaltonSeaFields.pdf>

⁴ R.J. Heffron; “The role of Justice in Developing Critical Minerals” *Ext. Ind. Soc.*, 7 (2020), pp. 855-863

- *Water, public health, employment, and infrastructure are the highest priority impacts for stakeholders involved in the development of lithium projects at the Salton Sea. Various stakeholders vocalized the importance for community engagement and transparency as this new industry develops.*
- *Several tribes are culturally affiliated with the Salton Sea region, including the Quechan Indian Nation and the Torres Martinez Desert Cahuilla Indians.⁵ While the proposed lithium developments are not located within Indigenous reservation territory, the Salton Sea and surrounding environment have significance for the people who historically occupied the land.*

Types of Lithium Brine Deposits. The three main families of lithium resources are brines, sediments, and pegmatites (or “hard rock”). The highest quality brines in the world are mainly found in South America’s “Lithium Triangle” of Argentina, Chile, and Bolivia, however, some brine production also takes place in Nevada and Qinghai, China.⁶ The most common pegmatite being mined today is spodumene, a mineral found in economic grades across Australia, Canada, North Carolina, and a handful of other jurisdictions.⁷ Today, around half of lithium used for industrial applications originate from brines in South America, while the other half comes from spodumene mined in Australia and processed in China.⁸

Direct Lithium Extraction (DLE). Commercial lithium extraction has historically occurred through mining hardrock minerals, or by concentrating continental brines through evaporation. Evaporation has lower energy consumption than ore-based lithium production,⁹ however, it requires a significant amount of land, and by design must take place in water-scarce areas so rainfall will not slow down the evaporation process.¹⁰ A promising alternative proposed at Lithium Valley is direct lithium extraction (DLE), a method of separating lithium from brine through chemical processing rather than relying on the slower process of natural evaporation. DLE enables lithium recovery from lower-concentration sources of brine, including mineral-rich geothermal fluids that are already brought to the surface for energy production. DLE has a smaller physical and water footprint than status quo production methods and can use energy from onsite geothermal power plants, resulting in lower carbon emissions. Three companies: BHE Renewables, a wholly owned subsidiary of Berkshire Hathaway Energy; Energy Source Minerals; and Controlled Thermal Resources plan to pursue lithium extraction as an addition to existing geothermal plants or by building a new geothermal and lithium extraction facility. Since 2017, the California Energy Commission (CEC) has awarded more than \$27 million in grants for the research and development of technologies that facilitate lithium recovery from geothermal-related projects that will help

⁵Margaret Slattery et al, Energy Research & Social Science, “What do frontline communities want to know about lithium extraction? Identifying research areas to support environmental justice in Lithium Valley, California.” Volume 99, May 2023

⁶ New Energy Nexus Report, “Building Lithium Valley: Opportunities and Challenges Ahead for Developing California’s Battery Manufacturing Ecosystem; Pg.12; September 2020

⁷ *Ibid*

⁸ *Ibid*

⁹ Margaret Slattery et al, Energy Research & Social Science, “What do frontline communities want to know about lithium extraction? Identifying research areas to support environmental justice in Lithium Valley, California.” Volume 99, May 2023

¹⁰ V.Flexer et al, Sci.Total Environ, “Lithium recovery from brines: a vital raw material for green energies with a potential environmental impact in its mining and processing”.Pg, 1188- 1204, 2018

California meet its 100% clean electricity goal and expand the state's emerging lithium industry. Recognizing this unique opportunity, the Legislature passed AB 1657 (E. Garcia, Chapter 271, Statutes of 2020) that established the Lithium Valley Commission at the CEC.

Lithium Valley Commission. The Lithium Valley Commission (LVC) was comprised of 14 individuals, representing state agencies and levels of government, the geothermal industry, community advocacy organizations, an environmental organization, and the tribal councils of two Indigenous communities. The commission's primary responsibilities were to review, investigate, and analyze opportunities and benefits for lithium recovery and use in the state and provide a report to the legislature on its findings and recommendations. Community engagement was a priority for the commission and public input was included in the final report submitted to the Legislature on December 1, 2022. The meetings were typically held monthly from 1:30–5:00 pm. Due to the COVID-19 pandemic, these meetings took place virtually using a webinar format, with an option for concurrent interpretation in Spanish. Beginning in May 2022, the meetings were modified to hybrid, with four locations offering the option to attend an in-person live stream. Usually, the meetings consisted of discussion and updates from the commissioners, followed by presentations on pre-defined topics by invited speakers, with opportunities for public comment following each agenda item. The meetings were then recorded, transcribed, and posted to the LVC's webpage.

High-priority topics. The local community's highest priority topics were water, public health and employment as illustrated by the number of questions asked. Meanwhile, the LVC's most frequently discussed topics were water, employment, and infrastructure.

- ***Water.*** For both groups, water was the most frequently mentioned environmental topic. However, the two groups discussed water in different contexts. Community members mainly asked about the source of water that would support DLE, the quantity of water consumed by the process and whether DLE would impact local water quality. On the other hand, the LVC mainly discussed water in the context of regional policy and management, such as water rights allocation and required permits. Where the LVC discussed consumption, it was primarily to highlight the sustainability of DLE more so than to explain its expected water consumption. Some developers indicated during the LVC meetings that they would recycle water during their process, but as the technology for both DLE and water recycling is still under development, it is difficult to estimate the reductions that could be achieved through recycling. It is worth noting that DLE will not use groundwater or water from the Salton Sea.
- ***Health.*** Participants in community forums asked about the impact of lithium and geothermal energy production on respiratory health, the byproducts generated by the process, whether the properties of lithium impact public health, and how health impacts would be monitored. Participants commented that public health was non-negotiable and not an acceptable trade for money or employment; as a public commenter stated during the LVC's community forum, "jobs don't fix the health issue." There is no available information about the potential health implications of DLE in the region, as the environmental impacts are still being quantified and have yet to be translated into human health impacts.
- ***Employment.*** The focus for community members was whether the industry would hire locally and what resources and training programs would be available to ensure

residents were qualified. Additional questions were about the safety and quality of jobs, how many jobs would be created, and whether undocumented residents would be eligible for employment and professional development opportunities. The LVC primarily discussed the workforce needs of the lithium and geothermal industry as well as the training and development of local capacity. Commissioners pointed to training programs through the local community college and labor union apprenticeship programs as potential avenues for workforce development. Both groups also brought up the local community's experience with previous industries. In community meetings, residents commented that previous industries had promised employment opportunities that were not realized.

- *Geography.* There was a lot of interest on the need to define “Lithium Valley,” and specify which communities would be eligible for benefits such as workforce development programs and tax revenue. Many participants suggested that the benefits should be concentrated in areas that will experience the greatest environmental burden.
- *Community Engagement.* Some questions include how the community could be involved and what voice they had in the process, and requests for accessible information and third-party research (i.e., studies that are not conducted by industry). Participants in multiple forums expressed a need for more information about the environmental impacts of DLE. They suggested several approaches to make the information more accessible, such as using graphics and analogies, and sharing information in a shorter format via different social media platforms. The LVC also held several in-person community forums during the evening to enable broader participation. Local community advocacy organizations (Comite Civico del Valle, Alianza Coachella Valley, and Leadership Counsel) participated in the LVC-related events and helped distribute information to residents. There will be additional opportunities to participate during the environmental permitting process, which includes a public review and comment period. This is an example of state-led participation among various established methods for pursuing just outcomes in planning processes.

Lithium Valley Commission Recommendations. On November 17, 2022, the commission finalized its report and adopted 15 recommendations:

1. Establish a Lithium Valley priority permitting process that includes additional resources for agency action on applications for geothermal, DLE, and related manufacturing, production, or assembly projects identified by the state as essential to the development and growth of Lithium Valley.
2. Accelerate state planning for investment and upgrades in transmission for geothermal power plants in Imperial Valley to be online in 2024 and over the next decade.
3. Establish the Southeast California Economic Zone, which includes Imperial County and Eastern Coachella and Palo Verde Valleys. This regional economic zone should be recognized by federal, state, and local governments, and eligible to compete for funding and investments.

4. The State should increase funding—and identify alternative funding sources—for research and development, start-up companies, and expansion of lithium battery and battery component manufacturing and recycling, especially cathode production using lithium produced through environmentally preferable methods.
5. Federal, state, and local governments should foster collaboration across the supply chain of lithium related technologies by creating networks, meetings, and other forums that regularly bring business, research, Tribes, communities, and government agencies together to identify short- and long-term economic opportunities.
6. The State and County should establish a business service center in Imperial County to facilitate access to business development incentive programs to benefit residents of disadvantaged communities, Tribal members, small businesses, and entrepreneurs.
7. Support development of a circular lithium economy based in California, with environmentally responsible sourcing of raw materials, life cycle analysis, requirements for product design that support recovery, reuse and recycling of materials, and development of effective recovery infrastructure, built with the assistance of public-private coalitions and effective community engagement.
8. The State should fund a health impact analysis (e.g., assessment or study) for Eastern Coachella Valley, to be carried out by an academic institution or public agency, relating to increased development in the Salton Sea KGRA of geothermal power plants and DLE facilities and related processing, production, and manufacturing activities.
9. Provide resources for local and state agencies and Tribes to seek and leverage proactively existing federal funding opportunities to invest in infrastructure in the Salton Sea region, including funding made available through the Infrastructure Investment and Jobs Act of 2021 (H.R. 3684) and the Inflation Reduction Act of 2022 (H.R. 5376).
10. Require and fund the Imperial Irrigation District (IID) to conduct a water study of projected cumulative infrastructure development of geothermal power plants and DLE facilities and related water use, sources, local beneficial uses, and availability. The State or other entity should also evaluate water quality.
11. The State should fund (and identify additional funding sources), and the industry should inform, the creation of curriculums, courses, and certification programs in science, technology, engineering, and mathematics (STEM) at schools and colleges to advance critical knowledge and skills across all grade levels, with a focus on the infrastructure and communities closest to geothermal power plants and DLE facilities.
12. Federal, state, and local government should invest in repairs, improvements to critical infrastructure and housing needed to support the success of lithium recovery, lithium processing, and lithium-dependent product manufacturing and recycling in the Salton Sea region, with a focus on the infrastructure and communities closest to geothermal power plants and DLE facilities. Investment decisions should consider community

and Tribal priorities and include opportunities for participatory budgeting that includes public process and community and Tribal involvement.

13. Provide capacity building funds, such as grants, and other resources (e.g., childcare for parents to attend meetings) for Tribes and community members to engage with federal, state, and local permitting agencies.
14. Establish standards for state and local permitting agencies to provide communities and Tribes with plain language written communications about geothermal power plant and DLE facility applications, the permitting processes to review the applications, and post-approval monitoring and enforcement. Information provided should also include education about the materials and processes used in DLE and lithium processing facilities, the final and intermediate products created, and any waste streams that must be managed.
15. Develop best practice guidance for CEQA (California Environmental Quality Act) lead agencies when initiating communications and consultation with Tribes (e.g., making multiple attempts through different methods, such as mail, email, telephone); providing reasonable time for Tribal governments to evaluate written materials; and recognizing the specific cultural, historical, public health, and ecological context of the Salton Sea region.

Budget Investments. In February 2022, Governor Newsom joined President Biden on a virtual roundtable to discuss new lithium investments that ensure environmental justice and equitable economic opportunities for impacted communities around the Salton Sea. Building on these efforts, Governor Newsom has implemented a Lithium Valley Vision of inclusive community-driven priorities that secures the health, environmental justice, and economic opportunities for its residents.¹¹

Lithium Extraction Tax. Central to creating an economic engine for the region, the 2022-2023 State Budget included a three-tiered flat-rate per metric ton excise tax by California's lithium producers.¹² The tax will be reviewed every year, and state officials have agreed to study potentially switching to a percentage-based tax. The health and environmental impact of lithium extraction on the surrounding communities is indefinite, and the cost of developing support infrastructure in Imperial County would be burdensome to a community that already has one of the state's highest rates of unemployment and asthma hospitalizations. A flat-rate tax structure ensures reliable revenue that would be directed to Salton Sea restoration, reducing the state's obligation to address the Salton Sea crisis. This type of tax structure also provides certainty by creating a reliable revenue stream to support the maintenance and operation of roads, bridges, and other critical infrastructure that would be utilized by this emerging industry. Conversely, some lithium industry representatives have warned that this tax may trigger missed deadlines to deliver lithium to automakers, and halt discussions with potential financiers.

¹¹ Office of Governor Newsom, "Governor Newsom Joins President Biden to Uplift California's Vision for an Inclusive, Sustainable, Clean Energy Economy in Lithium Valley" ; <https://www.gov.ca.gov/2022/02/22/governor-newsom-joins-president-biden-to-uplift-californias-vision-for-an-inclusive-sustainable-clean-energy-economy-in-lithium-valley/>

¹² SB 125 (Committee on Budget and Fiscal Review, Chapter, 125, Statutes of 2022)

Other notable budget investments include:

- \$5 million to the County of Imperial, with \$800,000 to support community engagement, for the county's Specific Plan and Programmatic Environmental Impact Report related to geothermal and lithium recovery in the Salton Sea region.
- \$80 million to expand San Diego State University, Brawley Center in Imperial Valley to develop a local workforce pipeline.
- \$250 million in financing opportunities from California I-Bank for transmission lines that support lithium and geothermal projects at the Salton Sea.
- \$45 million available over the next three years through the California Alternative Energy and Advanced Transportation Financing Authority (CAEAFTA) to incentivize projects that manufacture, process, or recover lithium through the sales and use tax exclusion (STE) program. Additional \$50 million in annual increase on the oversubscribed STE program administered by CAEAFTA until January 2026.
- \$90 million in R&D grants through the California Energy Commission to support development of lithium extraction technologies.

Governor Newsom Visits Lithium Valley. In March 2023, Governor Newsom visited Lithium Valley and met local elected officials, community groups, and other stakeholders to highlight the progress made from all the budget investments. The full vision of Lithium Valley expands beyond lithium recovery and positions California to become a global leader in battery production and EV manufacturing as well.

Conclusion. Lithium Valley offers an enormous opportunity including bringing new investments and job growth to Imperial County and the state while propelling California towards a clean energy future. However, uncertainty and concerns remain on how this new industry will impact Lithium Valley residents. The community desires transparency regarding the environmental and public health impacts and water consumption. However, it may be challenging given the nascency of DLE technology. To foster transparency while supporting this emerging industry requires creating opportunities for multilateral communication and collaboration between the federal and state government, industry, tribal governments, community members, and environmental advocacy organizations.