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Zelos Energy Comments on Lithium Valley Vision - Recommendation to Also Enable Non-Lithium Production

Zelos Energy is a San Leandro, California based startup. We develop low-cost, safe, and sustainable rechargeable alkaline batteries for applications including power backup and for pairing with solar and wind. We recommend including additional non-lithium critical minerals, such as zinc and manganese, in this project and in future CEC opportunities, as these materials (1) enable innovative next-generation batteries, (2) foster sensible energy storage diversification strategies, and (3) are abundant in the Salton Sea region. Our detailed letter is attached. Thank you for the opportunity to comment.

Additional submitted attachment is included below.



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November 8, 2024

Comment Letter, 24-OIIP-02, Informational Proceeding on Lithium Valley Vision

Dear California Energy Commission Colleagues,

Thank you for the opportunity to comment in response to the November 1, 2024 **Workshop on Lithium Valley** (Informational Proceeding on Lithium Valley Vision, Docket #: 24-OIIP-02).

Zēlos Energy, based in San Leandro, develops safe and affordable rechargeable alkaline batteries for uses including backup power and for pairing with solar or wind. We are pleased to be a 2020 CEC grant recipient to scale up our technology to benefit California ratepayers.

We wish to provide the following suggestion:

- Please include additional non-lithium critical minerals, such as zinc and manganese, in this project and in future CEC opportunities, as these materials (1) enable innovative next-generation batteries, (2) foster sensible energy storage diversification strategies, and (3) are abundant in the Salton Sea region.

In detail, we offer these comments as follows.

Lithium-ion batteries present significant challenges for California's clean energy future, including:

- A. Safety risks.** Over 5,000 fires occur annually in the US from Li-ion, per the Consumer Product Safety Commission. In California, there have been multiple recent incidents of extended closures of critical roadways from Li-ion fires in transit.
- B. Supply chain risks.** Li-ion depends heavily on problematic materials sourcing, such as child labor in developing countries. It also involves substantial supply chain reliance on strategic competitor nations subject to pricing and availability uncertainties.

By contrast, the Zēlos Energy rechargeable alkaline battery chemistry offers many advantages, and we urge you to allow the inclusion of minerals needed for our battery products in this project:

- A. Abundant and easy to source materials**
 - Zinc (Zn) and Manganese (Mn) readily available at low cost
- B. Long cycle life**
 - 1,300 cycles to 80% energy retention
- C. Low-cost**
 - 50% less expensive per cycle (LCOS) compared to lead-acid or lithium-ion
- D. Environmentally friendly**
 - ~5x lower carbon footprint vs lithium-ion or lead-acid
- E. Safe**



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- Non-flammable and non-toxic materials
- F. Manufacturable and scalable**
- No dry room required – can utilize existing standard equipment
- G. Great potential for technology expansion**
- Roadmap for 70%+ lower costs and higher energy density (200Wh/L)

It is important to support future energy storage beyond lithium-ion technologies.

- The DOE Office of Clean Energy Demonstrations is currently soliciting applications for a \$100M program specifically addressing non lithium-ion pilot projects. Please see the summary posting for more information: <https://www.energy.gov/oced/articles/oced-issues-notice-intent-100-million-non-lithium-long-duration-energy-storage-pilot>
- Stanford University is home to a new Aqueous Battery Consortium that is working on non lithium-ion chemistries. Please see <https://abc-hub.stanford.edu/about> for additional specifics.
- Limiting the project to one material presents the risk that the outputs, and CEC ratepayer-funded investments, will become outdated and will not best serve future technology advancement needs.
- We believe that including minerals other than lithium will provide an important economic and environmental diversification strategy to ensure long-term relevance and success in continuing California’s remarkable accomplishments as a national and global leader in clean energy.

The federal government has identified zinc and manganese as critical minerals, and CEC research indicates Salton Sea brine contains both zinc and manganese.

- The 2022 US Geological Survey List of Critical Minerals cites critical minerals including manganese and zinc as having a “significant role in our national security, economy, renewable energy development and infrastructure.” (Please refer to the USGS publication release, <https://www.usgs.gov/news/national-news-release/us-geological-survey-releases-2022-list-critical-minerals> and the Congressional Research Service April 2024 report, “Critical Mineral Resources: National Policy and Critical Minerals List” <https://crsreports.congress.gov/product/pdf/R/R47982/3>)
- The CEC March 2020 report “Selective Recovery of Lithium from Geothermal Brines,” <https://www.energy.ca.gov/sites/default/files/2021-05/CEC-500-2020-020.pdf> indicates high concentrations of manganese and zinc in Salton Sea brines. Please refer to Table 1, p. 6, showing such high amounts of Mn and Zn as follows:

Critical Mineral	Salton Sea Concentration (mg/L)	Ratio to Li concentration
Manganese	1200	5.7
Zinc	660	3.1
Lithium	211	1



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Thank you for your work on this project. We welcome your feedback, and we are open to any questions or requests for further information.

Sincerely,

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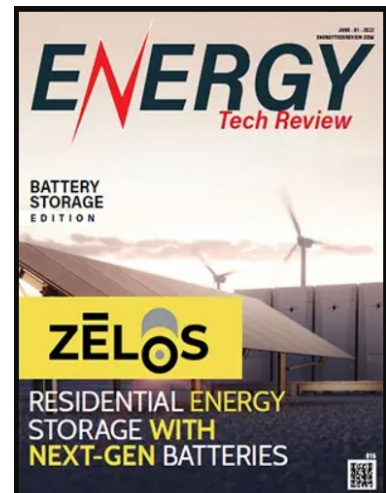
About Zēlos Energy Ltd.

Zēlos Energy is an innovative California rechargeable battery startup. We strive to develop the next generation of affordable, safe, and sustainable clean energy products. Our patented rechargeable alkaline battery technology provides safe, economical, and sustainable solutions for both consumer and industrial uses.

Products in development include deep cycle storage batteries, lead-acid replacement, and low-cost cylindrical formats – for uninterruptible power supply (UPS), energy storage solutions (ESS) for wind and solar, and military and marine uses.

Our completely non-toxic alkaline chemistry avoids the fire, safety, and supply chain risks of options such as lead-acid and lithium-ion.

We are headquartered in San Leandro, and our team has more than 100 years of combined experience.



In 2020, we were awarded a competitively-selected multi-year \$1.8 million California Energy Commission grant for R&D scale-up in alternatives to Li-ion.



For more information, please visit <https://www.zelos.energy/>