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(Updated) Supporting a California Close loop Critical Mineral Supply Chain from Industrial Wastes for Clean Energy Manufacturing

Manara Materials proposes a project to advance environmentally friendly and zero waste technology to localize a critical mineral supply chain in California to support clean energy manufacturing and advanced manufacturing. The proposed concept project supports the creation of a close loop critical mineral supply chain in the state that revolves around promoting a California material recycling and refining workforce to make clean energy products for California and the world.

Additional submitted attachment is included below.



Electric Program Investment Charge 2026–2030 (EPIC 5) Research Concept Proposal Form

The California Energy Commission (CEC) is currently soliciting research concept ideas and other input for the Electric Program Investment Charge 2026–2030 (EPIC 5) Investment Plan. For those who would like to submit an idea for consideration, please complete this form and submit it to the CEC by **August 8, 2025**. More information about EPIC 5 is available below.

To submit the form, please visit the e-commenting link: <https://efiling.energy.ca.gov/EComment/ECommentSelectProceeding.aspx> and select the Docket **25-EPIC-01**. Enter your contact information and then use the “choose file” button at the bottom of the page to upload and submit the completed form. Thank you in advance for your input.

1. Please provide the name, email, and phone number of the best person to contact should the CEC have additional questions regarding the research concept:

Saad Youssefi – info@manaramaterials.com – (213) 321 9443

2. Please provide the name of the contact person’s organization or affiliation:

Manara Materials LLC

3. Please provide a brief description of the proposed concept that you would like the CEC to consider as part of the EPIC 5 Investment Plan. What is the purpose of the concept, and what would it seek to do? Why are EPIC funds needed to support the concept?

Manara Materials proposes a project to advance environmentally friendly and zero waste technology to localize a critical mineral supply chain in California to support clean energy manufacturing and advanced manufacturing. The proposed concept project supports the creation of a close loop critical mineral supply chain in the state that revolves around promoting a California material recycling and refining workforce to make clean energy products for California and the world.

For various reasons, there is limited critical mineral recycling and recovery in the State of California often related to permitting and other regulatory requirements. Manara materials encourages EPIC to explore novel approaches to material recycling that are low cost and environmentally friendly.

In the case of Manara Materials, the Company, supported by a CalSEED concept grant has demonstrated the economic and sustainable recovery of critical minerals, especially base metals, from industrial spent catalysts. Catalysts are substances with certain critical minerals used across different industries to speed up certain chemical reactions - including hydroprocessing catalysts used in petroleum refining, chemical processing, fertilizer, food production and energy production. In their deactivated state, these spent catalyst wastes still include a non-negligible concentration of critical materials like Vanadium, Nickel, Cobalt, Molybdenum, PGMs, and Aluminum etc.. These mentioned critical materials are used in batteries, clean energy, defense, steelmaking, aerospace, and electronics.

The company engaged with CalEPA and confirmed that the technology and process was environmentally-friendly and did not require special permits outside of local jurisdiction AHJ laws. To demonstrate the suitability of this feedstock as a source of battery grade material, Manara Materials economically recycled and refined the critical minerals into battery grade purity and synthesized into Lithium-ion and Sodium-ion pCAM and Cathode Active Material for the energy storage battery industry.

In the future, the Company's demonstrated technology can also directly apply to battery recycling through the recovery of critical minerals from black mass in an economic and sustainable way.

Promoting sustainable and economical advanced recycling technology and close loop technology through a combination of policy and economic incentives will have substantial long term benefits in workforce development and resiliency. Such technology can justify policy that encourages or even mandates local state border material recycling in order to localize a California mineral supply chain that can support battery manufacturing and advanced manufacturing jobs.

Manara is working on obtaining catalytic funding for a First Of A Kind (FOAK) technology demonstration project, which will help address technology risk concerns and attract investors.

4. In accordance with Senate Bill 96ⁱ, please describe how the proposed concept will "lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory energy goals." For example, what technical and/or market barriers or customer pain points would the proposed concept address that would lead to increased adoption of clean energy technology or innovation? Where possible, please provide specific cost and performance targets that need to be met for increased industry and consumer acceptance. For scientific analysis and tools, provide more information on what data and information gaps the proposed concept would help fill, and which specific parties or end users would benefit from the results, and for what purpose(s)?

The proposed concept will lead to technological advancement and breakthroughs by demonstrating novel innovative technolog(ies) that can recover critical minerals such as Nickel, Vanadium, Cobalt, Aluminum, and Molybdenum from industrial spent catalyst wastes and other alternative secondary sources, outside of mining.

Supporting such demonstration projects will address technical barriers and generate real-world field-level data to attract traditional infrastructure investors. The recovered critical minerals will be used in clean energy product development, including battery manufacturing, which will contribute to increased adoption of clean energy technology.

At this stage, Manara Materials has developed a technico-economic model to estimate our costs of processing a ton of spent catalyst industrial wastes in a lab setting and determined the profitability margins.

The objective of such funding is to showcase that we can manufacture competitive and lower cost Cathode Active Material from California's industrial wastes for California's clean energy manufacturing industry.

5. Please describe the anticipated outcomes if this research concept is successful, either fully or partially. For example, to what extent would the research reduce technology or ratepayer costs and/or increase performance to improve the overall value proposition of the technology?

What is the potential of the innovation at scale? How will the innovation lead to ratepayer benefits in alignment with EPIC's guiding principles to improve safety,ⁱⁱ reliability,ⁱⁱⁱ affordability,^{iv} environmental sustainability,^v and equity?^{vi}

If successful, the research concept will reduce technology costs and improve the overall value proposition of the technology. It will catalyze clean energy manufacturing jobs, reduce the cost of clean energy technology, while limiting health risks associated with air and water contamination to local lower-income communities disproportionately impacted by this waste.

The project will create quality family-sustaining jobs, advance equity, and focus on hiring local staff. The innovation has the potential to create an economic hub for critical mineral recovery and refining and battery materials synthesis in California, leading to significant job creation potential. The project will benefit ratepayers by improving environmental sustainability, affordability, and equity.

6. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed research concept.

The project will track the following metrics:

1. GHG savings
2. Hazardous waste treated and valued locally (lb)
3. Water savings from the proposed technology
4. Number of individuals trained and created
5. Community engagement metrics
6. Budgets and expenses carefully tracked

7. Please provide references to any information provided in the form that supports the research concept's merits. This can include references to cost targets, technical potential, market barriers, equity benefits, etc.

The document provides references to the technology's potential, market barriers, and equity benefits, including:

- The California Energy Commission's CalSEED financial and technical support

- In the US, there are only two RCRA permitted spent catalyst recycling facilities. Significant literature and presentation is available re both entities.
- The Electric Program Investment Charge (EPIC) funding for battery manufacturing Cathode Active Material (CAM) and precursor CAM (pCAM)

8. The EPIC 5 Investment Plan must support at least one of five Strategic Goals:^{vii}

- a. Transportation Electrification
- b. Distributed Energy Resource Integration
- c. Building Decarbonization
- d. Achieving 100 Percent Net-Zero Carbon Emissions and the Coordinated Role of Gas
- e. Climate Adaptation

Please describe in as much detail as possible how your proposed concept would support these goals.

The proposed concept supports the following Strategic Goals:

- Transportation Electrification and DER Integration: The recovered critical minerals will be used in battery manufacturing for clean electric transportation and distributed energy resource integration through energy storage products.
- Building Decarbonization: The project will contribute to reducing emissions from fossil fuel plants and increasing renewable energy integration in building.
- Achieving 100 Percent Net-Zero Carbon Emissions: The project will support the development of clean energy products and technologies that can help achieve net-zero carbon emissions by localizing a source of critical minerals for the clean energy. Afterall the energy transition is a metals transition.
- Climate adaptation: Critical mineral recycling plays a vital role in supporting climate adaptation by reducing the demand for primary mining of critical minerals, thereby minimizing environmental impacts and creating closed loop systems.

The project aligns with the EPIC guiding principles to improve safety, reliability, affordability, environmental sustainability, and equity.

About EPIC

The CEC is one of four EPIC administrators, funding research, development, and demonstrations of clean energy technologies and approaches that will benefit electricity ratepayers of California's three largest investor-owned electric utilities.

EPIC is funded by California utility customers under the auspices of the California Public Utilities Commission.

To learn more about EPIC, visit: <https://www.energy.ca.gov/programs-and-topics/programs/electric-program-investment-charge-epic-program>

EPIC 5 documents and event notices will be posted to:
<https://www.energy.ca.gov/proceeding/electric-program-investment-charge-2026-2030-investment-plan-epic-5>

Subscribe to the EPIC mailing list to stay informed about future opportunities to inform the development of EPIC 5:

<https://public.govdelivery.com/accounts/CNRA/signup/31897>

i See section (a) (1) of Public Resources Code 25711.5 at:

https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PRC§ionNum=25711.5.

ii EPIC innovations should improve the safety of operation of California's electric system in the face of climate change, wildfire, and emerging challenges.

iii EPIC innovations should increase the reliability of California's electric system while continuing to decarbonize California's electric power supply.

iv EPIC innovations should fund electric sector technologies and approaches that lower California electric rates and ratepayer costs and help enable the equitable adoption of clean energy technologies.

v EPIC innovations should continue to reduce greenhouse house gas emissions, criteria pollutant emissions, and the overall environmental impacts of California's electric system, including land and water use.

vi EPIC innovations should increasingly support, benefit, and engage disadvantaged vulnerable California communities (DVC). (D.20-08-046, Ordering Paragraph 1.) DVCs consist of communities in the 25 percent highest scoring census tracts according to the most recent version of the California Communities Environmental Health Screening Tool (CalEnviroScreen), as well as all California tribal lands, census tracts with median household incomes less than 60 percent of state median income, and census tracts that score in the highest 5 percent of Pollution Burden within CalEnviroScreen, but do not receive an overall CalEnviroScreen score due to unreliable public health and socioeconomic data.

vii In 2024 the CPUC adopted five Strategic Goals to guide development of the EPIC 5 Investment Plan. A description of the goals can be seen in Appendix A of CPUC Decision 24-03-007 available at:

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M527/K228/527228647.PDF>