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*Comment Received From: Gordon Dash
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Innovative uses for waste hydrogen

Additional submitted attachment is included below.



**ELECTRIC PROGRAM INVESTMENT CHARGE 2021-2025 (EPIC 4)
RESEARCH CONCEPT PROPOSAL FORM**

The CEC is currently soliciting research concept ideas and other stakeholder input for the EPIC 4 Investment Plan. For those who would like to submit an idea for consideration, we ask that you complete this form and submit it to the CEC by 5:00 p.m. on **July 2, 2021**.

To submit the form, please visit the e-commenting [link](https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-EPIC-01), <https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-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 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:

Gordon H. Dash III
gordon@dash2energy.com
281-703-9224

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

Dash2energy

3. Please provide a brief description of the proposed concept you would like the CEC to consider as part of the EPIC 4 Investment Plan. What is the purpose of the concept, and what would it seek to do?

Capturing waste hydrogen from industrial process for use in the transportation and/or energy storage applications. Specific applications include Chlor Alkali process from water treatment facilities, or excess hydrogen from oil refining.

4. In accordance with Senate Bill 96, 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 technologies? 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, what

data and information gaps would the proposed concept help fill, what specific stakeholders will use the results, and for what purpose(s)?

The funding will allow research on how to capture, clean, and dry hydrogen for use in zero emission fuel cell power generators. The market barrier will include demonstrating the cost associated with stationary power and the cost of collecting the hydrogen for power generation.

The cost to collect the hydrogen will need to be less than \$1/kg.

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 costs and/or increase performance to improve the overall value proposition of the technology? What is the potential of the technology at scale?

The outcome will be a commercial demonstration, and cost will decrease with knowledge of intergrating the fuel cell with the grid. The potential is to build the business case for why existing water treatment plants can switch their water purification process using electrolysis at a lower operating costs.

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

Evaluation will include quality of the hydrogen captured, which needs to be 99.9999% pure. The energy required to compress and store hydrogen, and the efficiency of PEM fuel cells to exceed 50%.

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

<https://cordis.europa.eu/article/id/300710-pem-power-plant-converts-byproduct-hydrogen-to-zeroemission-electricity>

https://www.energy.gov/sites/prod/files/2014/03/f12/waste_cox.pdf