

DOCKETED	
Docket Number:	25-EPIC-01
Project Title:	Electric Program Investment Charge 2026–2030 Investment Plan (EPIC 5)
TN #:	265406
Document Title:	Greenumerix Comments - Electrifying Transportation with Hydrogen
Description:	N/A
Filer:	System
Organization:	Greenumerix
Submitter Role:	Public
Submission Date:	8/8/2025 1:03:00 AM
Docketed Date:	8/8/2025

*Comment Received From: Greenumerix
Submitted On: 8/8/2025
Docket Number: 25-EPIC-01*

Electrifying Transportation with Hydrogen

Thank you for the opportunity to submit input. Document is attached.

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:

Rob Del Core
CEO
rob.delcore@greenumerix.com
858-386-8930

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

Greenumerix 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?

The proposed concept is to develop and demonstrate an all-in-one hydrogen fuel cell power “kit” that encompasses an innovative and disruptive powertrain integration approach in manufacturing and deploying hydrogen fuel cell class 8 trucks.

The purpose of this concept is to expedite adoption of hydrogen fuel cell trucks by all sizes of fleet operators and in particular among the small fleet and individual owner operators by:

- significantly reducing the total cost of ownership in deploying hydrogen fuel cell truck through substantial reduction of truck acquisition cost and removal of fuel cost risk in operating the trucks.**
- maximizing operation uptime of the hydrogen fuel cell truck through flexible truck operation mode, minimization of technology suppliers risks and reduction of truck service and maintenance downtime.**
- Shortening the deployment time of zero emission hydrogen fuel cell trucks by reducing the manufacturing time of fuel cell trucks**

Due to technical confidentiality, the full and detailed concept description cannot be provided in this concept comment stage. Greenumerix welcomes an opportunity to answer any clarification questions that CEC may have on the proposed concept.

Greenumerix has identified private investment funding to support the research, development and demonstration project, EPIC fund is needed to unlock the funding and allow this project to be kicked off as soon as possible to meet the target market needs. It also helps to stimulate additional private capital investment to support commercialization of the technology after the project completion and successful demonstration.

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 Hydrogen Fuel Cell Power “Kit” concept for class 8 trucks can remove the current major adoption barriers identified by fleet operators including high truck cost, high hydrogen fuel cost, long lead time and insufficient selection of fuel cell trucks, especially domestically produced fuel cell trucks. The proposed concept can remove all the identified barriers by:

- **Targeting to reduce 30% fuel cell truck acquisition cost compared to today’s available baseline hydrogen fuel cell truck costs.**
- **Targeting to reduce 50% to 70% production time of hydrogen fuel cell heavy duty trucks compared to today’s baseline.**
- **The proposed concept can significantly increase uptime of the truck regardless of the hydrogen fuel price fluctuations**
- **The proposed concept can significantly reduce downtime by 90% caused by service and maintenance.**
- **The proposed fuel cell power “kit” technology can be easily adopted by the truck OEMs.**
- **Facilitate quick and flexible adoption of hydrogen fuel cell trucks especially for small fleet and individual owner operators.**

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}

The anticipated outcomes of this research project include but are not limited to:

- **Encourage adoption and deployment of hydrogen fuel cell truck for long haul and drayage operations by:**
 - **reducing 30% fuel cell truck acquisition cost compared to today’s available baseline hydrogen fuel cell truck costs,**

- reducing 50% to 70% production/deployment time of hydrogen fuel cell heavy duty trucks compared to today's baseline and
 - removing cyclical hydrogen fuel cost as a barrier to adoption.
- This innovation will increase US-made and California-built fuel cell trucks selection and availability. Following the bankruptcy of Hyzon and Nikola, the fleet operators are complaining about the lack of sufficient selection of readily available commercial hydrogen fuel cell trucks. Also, none of today's commercially readily available fuel cell trucks are made in California.
 - Facilitate small fleet and individual owner operators to adopt hydrogen fuel cell trucks by reducing the total cost of ownership of a hydrogen fuel cell truck significantly and by reducing service and maintenance downtime by 90% which are the two major barriers for small operators.

The proposed innovation can be manufactured at scale at ease and in a cost-effective manner due to the innovative system integration approach which further encourages additional cost reduction.

The proposed innovation supports EPIC's guiding principles of reliability, affordability, environmental sustainability and equity:

- **Reliability:** Electrifying class 8 trucks operation with battery technology alone places excessive load on the grid. By encouraging adoption of proven fuel cell trucks help to diversify fuel uses, minimize electricity demand and reduce the reliance on the grid in powering large fleet of battery electric trucks while decarbonizing goods movement industry. This will improve grid resiliency and maintain truck operation continuity during times of emergencies such as excessive heat waves and natural disasters.
- **Affordability:** Deploying fuel cell trucks minimizes the overall electricity demand required to charge battery electric trucks, it can potentially remove the upward pressure on the electricity rates during this energy transition and thus protect the interests of the ratepayers.
- **Environmental sustainability:** According to EPA 2022 data, on-road medium and heavy duty diesel trucks account for 25% of the transportation emissions. By deploying zero emission fuel cell class

8 and drayage trucks, it reduces greenhouse house gas emissions and criteria pollutant emissions.

- **Equity:** Heavy duty trucks are known to travel frequently through communities in 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 the latest CalEnviroScreen. For example, drayage trucks frequent the San Pedro Bay Ports area, which are surrounded by underprivileged communities. In addition, the significant cost reduction as a result of the proposed concept makes hydrogen fuel cell truck affordable not only for large fleets operators but also for small fleet and individual owners operators with today's incentives, it allows small operators to also benefit and participate during this energy transition.

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

The proposed metrics or indicators are summarized below:

- **Percent cost reduction and path towards diesel truck parity**
- **Quantify reductions in GHG and criteria pollutant emissions on annual basis during the demonstration period**
- **Quantify the potential diesel displacement**
- **Percentage reduction in integration and deployment time**
- **Percent improvement in truck operation uptime compared to other current state-of-the-art hydrogen fuel cell trucks**
- **Quantify the hydrogen fuel consumption given a base line demonstration route compared to the current state of the art hydrogen fuel cell truck.**
- **Measure the total hydrogen fuel offtake utilizing California ARCHES hydrogen supply network.**
- **Qualify the ease of operation through driver's feedback.**

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.

References

ARCHES, *Transportation White Paper October 2024.*

- [https://archesh2.org/wp-content/uploads/2024/10/ARCHES Transportation White Paper-2.pdf](https://archesh2.org/wp-content/uploads/2024/10/ARCHES_Transportation_White_Paper-2.pdf)
- The White Paper describes the need for diesel cost parity for fuel cell trucks and fleet customer preferences for fuel cell electric vehicles once cost comes down and infrastructure is available.

ARCHES, *Ports White Paper August 2025.*

- <https://archesh2.org/wp-content/uploads/2025/08/ARCHES-Ports-White-Paper.pdf>

San Pedro Bay Ports Clean Air Action Plan, *Stakeholder Meeting Presentations, August 5, 2025.*

- <https://cleanairactionplan.org/about-the-plan/stakeholder-advisory-group/>
- Justifies and quantifies the immediate size of the current opportunity for deploying the proposed concept.

CALSTART, *Zeroing in on Zero-Emission Trucks, January 2024*

- https://calstart.org/wp-content/uploads/2024/01/ZIO-ZET-2024_010924_Final.pdf

DOE, *Million Mile Fuel Cell Truck (website)*

- <https://millionmilefuelcelltruck.org/>
- Specifies fuel cell durability targets of 30,000 hours and 1,000,000 miles for heavy duty fuel cell trucks representing a 4 to 5x improvement in durability. This serves as a target for demonstration in this project.

USEPA, *Transportation Sector Emissions Trends*

- <https://www.epa.gov/ghgemissions/transportation-sector-emissions?#trends>
- Describes the emissions contribution by the trucking industry.

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 Strategic Goal of Transportation Electrification in the EPIC 5 Investment Plan. This concept project electrifies a major trucking transportation segment which is heavy duty class 8 trucks in the goods movement industry, including both drayage and regional trucks. The distinctive technical merits of this proposed innovative hydrogen fuel cell power “kit” concept, if successful, will significantly expedite the mass adoption and deployment of zero emission hydrogen fueled electric trucks among all sizes of fleet operators.

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>