

**DOCKETED**

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

**Carbon Negative Pathways for Production of Green Hydrogen and Renewable Natural Gas from Forest Biomass**

*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:

Matt Summers  
530-207-5996  
[matt.summers@westbiofuels.com](mailto:matt.summers@westbiofuels.com)

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

West Biofuels, 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?

This concept proposes to scale up a novel production pathway to produce green Hydrogen (H<sub>2</sub>) and renewable natural gas (RNG) and carbon dioxide (CO<sub>2</sub>) from forest and agricultural biomass. The process makes high-purity and pipeline-quality renewable gas using a combination of biomass gasification, syngas filtration, gas shifting, and separation. Its advantage over other processes is that it doesn’t require costly syngas cleaning and catalyst reactors. The concept is to validate the system at

pilot and/or commercial demonstration scale, optimize performance, and accelerate market penetration.

The project goals are to (1) reduce California's reliance on imported fossil natural gas, (2) lower green H<sub>2</sub> and RNG production costs, (3) prove negative CI scores are feasible for green H<sub>2</sub> and RNG with sequestration of CO<sub>2</sub>, and (4) mitigate wildfire risk and open burning through sustainable biomass utilization. This concept supports California's greenhouse gas (GHG) reduction goals by delivering ultra-low carbon intensity (CI) gas (5–8 g CO<sub>2</sub>e/MJ) with over 90% emissions reduction compared to fossil natural gas. If the pure CO<sub>2</sub> stream produced from the process is sequestered, the CI score would be negative.

**Why EPIC funding is needed:**

EPIC funds are essential to bridge the gap between successful pilot scale demonstrations and commercial deployment. Private investors often hesitate to support capital-intensive, non-commercialized technologies without public cost-sharing to reduce the risk of scale-up. EPIC funding will support system integration, long-duration operation, and performance verification under real-world conditions, which are critical steps to prove technical viability and unlock utility procurement.

4. In accordance with Senate Bill 96<sup>i</sup>, 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 concept directly supports SB 96 by addressing major technological and market barriers that currently limit California's progress toward 100% net-zero emissions:

**Technical Barrier:** Existing RNG pathways (e.g., anaerobic digestion, methanation) are expensive (\$13–\$30/MMBtu) and limited in feedstock availability. Our approach overcomes these limitations by eliminating the need for methanation and broadening feedstock options, enabling RNG and green H<sub>2</sub> cost of production at approximately \$12/MMBtu. In addition,

these products have the potential to have negative CI scores delivering carbon sequestration during production.

**Feedstock Utilization:** California has over 47 million bone-dry tons of available biomass, but only about 10 million tons are currently being used. This concept enables conversion of an underutilized, wildfire-prone biomass resource.

**Infrastructure Compatibility:** The system produces pipeline-quality renewable natural gas, allowing for direct injection into existing natural gas infrastructure with minimal modifications.

**Data Gaps Addressed:**

- High purity H<sub>2</sub> and RNG production from biomass gasification using non-methanation pathways
- Commercial-scale carbon intensity data including potential carbon sequestration of separated CO<sub>2</sub> stream
- Techno-economic performance under a variety of biomass feedstock supply scenarios

**End Users Who Benefit:**

- Gas utilities: for integrating low-carbon fuels and reducing procurement costs
- Transportation: enabling lower cost and lower CI score H<sub>2</sub> and RNG into the transportation fuel marketplace
- Policymakers & regulators: to inform Senate Bill 96, Senate Bill 1440, and renewable natural gas procurement programs
- Rural communities: through job creation and improved wildfire resilience
- Cost Targets: H<sub>2</sub> and RNG production cost of production: ≤\$12/MMBtu
- GHG reduction: ≥90% vs fossil natural gas potential for carbon negative production with sequestration of CO<sub>2</sub>

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,<sup>ii</sup> reliability,<sup>iii</sup> affordability,<sup>iv</sup> environmental sustainability,<sup>v</sup> and equity?<sup>vi</sup>

**If successful, the project will:**

- Lower H<sub>2</sub> and RNG procurement costs: A scalable pathway to deliver renewable natural gas at up to 50% lower cost than current methods.
- Increase performance: Achieve carbon intensity below 8 gCO<sub>2</sub>e/MJ—90% reduction compared to conventional natural gas. If CO<sub>2</sub> sequestration is successfully demonstrated, the CI score would be negative.
- Enhance affordability and reliability: Support in-state renewable natural gas production that reduces price volatility and dependence on out-of-state supply.
- Improve environmental sustainability: Reduce wildfire fuel loads and eliminate emissions from pile burning.
- Support equity: Generate rural employment and invest in wildfire-threatened rural communities.

**Potential at Scale:**

Converting just 30 million dry tons of biomass could produce about 170 billion cubic feet of RNG annually, which is equivalent to 8% of California's natural gas use. This would represent a transformational shift in the state's energy portfolio.

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

H<sub>2</sub> and RNG production cost (\$/MMBtu)

Methane purity (% mole)

Carbon intensity (gCO<sub>2</sub>e/MJ, verified via GREET)

GHG reduction (%) vs fossil natural gas

Biomass input (tons/day)

Number of jobs created

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.

Cost Comparison: Renewable natural gas from traditional renewable gas production typically costs from \$13/MMBtu to \$30/MMBtu (CEC, 2023).

Carbon Intensity Benchmarking: Biomass gasification with methanation results in CI values of ~13 gCO<sub>2</sub>e/MJ (CEC, 2023).

Biomass Availability: Over 47 million BDT of biomass available annually in CA (CEC, 2020 Bioenergy Action Plan).

Wildfire Prevention Co-Benefits: Forest management reduces PM2.5 emissions, improves watershed health, and protects utility infrastructure (CalFire, 2021).

Policy Need: SB 1440 (2018) required utilities to set concrete procurement goals for renewable natural gas. Senate Bill 96 (2023) further reinforced this direction by requiring the California Energy Commission to develop a statewide framework for decarbonizing the gas system.

8. The EPIC 5 Investment Plan must support at least one of five Strategic Goals:<sup>vii</sup>
- 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 concept directly supports Strategic Goal (d): Achieving 100% Net-Zero Carbon Emissions and the Coordinated Role of Gas:

- Provides a new pathway to decarbonize California's gas supply using local, carbon-neutral biomass feedstock
- Displaces fossil natural gas with ultra-low-CI renewable natural gas
- Enables grid-compatible gas with no need for new infrastructure
- Supports the coordinated transition of gas utilities to a low-carbon energy system

It also contributes to Strategic Goal (e): Climate Adaptation, by:

- Reducing wildfire risk through proactive biomass removal
- Enhancing community resilience and protecting utility infrastructure (power lines, water systems)

- Promoting rural development and land stewardship in vulnerable forest regions
- Reducing greenhouse gas emissions, particularly methane from decomposing biomass, thereby slowing climate change and easing long-term adaptation pressures

## 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>

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

[https://leginfo.legislature.ca.gov/faces/codes\\_displaySection.xhtml?lawCode=PRC&sectionNum=25711.5](https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=PRC&sectionNum=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>