

Initiative Title: 4. Decarbonization Pathways for California’s Economy

SO #5: Innovative Approaches for
Difficult-to-Decarbonize Sectors

INITIATIVE DESCRIPTION

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- Evaluates methane pyrolysis as a customer-focused clean fuel pathway producing hydrogen and solid carbon for sectors that cannot easily electrify.
- This initiative has direct correlation to this SO by accelerating an innovative pathway to lifecycle cost-parity for difficult-to-decarbonize commercial and industrial processes cutting air pollutants in the Disadvantaged and Vulnerable Communities.
- Customer-sited or localized production is proposed specifically to avoid the large-scale hydrogen transport and delivery infrastructure that has limited other pathways, provide alternative fuel options in the era of high diesel prices.

PROPOSED INITIATIVE BUDGET	\$5,500,000
% OF TOTAL BUDGET (excl. admin & overhead)	35.9%
# OF RESEARCH TOPIC AREAS	1

ALIGNMENT SUMMARY

STRATEGIC OBJECTIVE ALIGNMENT

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The EPIC program will accelerate innovative approaches, strategies, and business models to achieve lifecycle cost-parity for difficult-to-decarbonize commercial and industrial buildings and processes, with a specific focus on strategies that lead to the reduction of NOx, PM, and other surface-level pollutants impacting Disadvantaged and Vulnerable Communities.

SO 5 Alignment: Field-validation of whether pyrolysis can safely and cost-effectively deliver low-carbon fuel to California's difficult-to-decarbonize sectors
This will accelerate innovative approaches, strategies, and business models to achieve lifecycle cost-parity for difficult-to decarbonize commercial and industrial buildings and processes, with a specific focus on strategies that lead to the reduction of NOx, PM, and other surface-level pollutants impacting DACs.

CPUC ALIGNMENT

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- CPUC long-term gas planning & net-zero analysis leaves unresolved how customers and sectors that cannot practically electrify will decarbonize, & what role low-carbon fuels should play
- Field data on hydrogen production cost, lifecycle greenhouse gas emissions, methane leakage, solid carbon handling, safety, & local air quality that does not exist today, will help the CPUC evaluate methane pyrolysis in future planning, programs, & regulatory decisions
- The field data required, must be real-world demonstration to validate performance, costs & potential to overcome clean fuels barriers before broader deployment

RTA #7: Decarbonizing Natural Gas for Multiple Use Cases

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WHAT PROBLEM ARE WE SOLVING?

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Medium- and heavy-duty transportation, and industrial processes face practical barriers to direct electrification and lack affordable low-carbon alternatives. Alternative fuels are needed to replace high record diesel prices. Pyrolysis produces hydrogen and solid carbon near the point of use, but its cost, emissions, and safety profile are unvalidated in a utility setting, leaving DAC customers vulnerable to higher-emitting fuels.

Decarbonization Pathways for
California's Economy

START	Q4 Y2027
OUTPUTS	2030
MARKET READY	2030

ALIGNMENT SUMMARY

WHAT IS THE DISTINCT RESEARCH APPROACH?

- In field demonstration of pyrolysis producing hydrogen and solid carbon for customers fuel cell, fleet, and industrial use cases
- Evaluates customer-sited or localized production to avoid large-scale hydrogen transport and delivery infrastructure
- Distinct in assessing safety, permitting, solid carbon handling, and local air quality alongside production economics

HOW WILL YOU KNOW YOU ARE SUCCESSFUL?

- Validated hydrogen production cost and lifecycle greenhouse gas performance under real customer use cases (p. 28 Strategic Priority)
- Evidence on methane leakage mitigation, solid carbon handling, and community air quality effects (p. 29 Strategic Priority)
- Validated low-carbon fuel pathway, measured by hydrogen production cost, lifecycle greenhouse gas emissions, and reduction in diesel or higher-emitting fuel use (p. 29 Strategic Priority)

HOW WILL YOU COORDINATE?

- EPIC Administrators: share data/information on low-carbon hydrogen production, customer-sited clean fuel applications, and customer use cases in difficult-to-decarbonize sectors (p. 30 Coordination)
- Gas RD&D administrators: technical assumptions, project design, production pathway, safety, and the role of gas infrastructure (p. 30 Coordination)
- Past efforts include CEC EPIC 1 Project and CEC Clean Hydrogen Program (p. 54 Leveraging Past RD&D)