DOCKETED	
Docket Number:	16-OIR-06
Project Title:	Senate Bill 350 Disadvantaged Community Advisory Group
TN #:	248462
Document Title:	Item 6 - FY 2023-24 Gas RD Budget Plan - 1-20-23 DACAG Meeting
Description:	N/A
Filer:	Dorothy Murimi
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	1/20/2023 11:36:10 AM
Docketed Date:	1/20/2023

Gas R&D Program FY 2023-2024 Budget Plan

CEC Staff Presentation to DACAG

January 20, 2023

Introduction

- Research and development to support the transition to clean energy, greater reliability, lower costs, and increased safety for Californians.
  - Benefits California citizens.
  - Not adequately addressed by competitive or regulated entities.
- $24 million annual budget, funded by a surcharge on gas consumption in California.
  - Energy efficiency, renewable technologies, conservation, environmental issues, and transportation.
  - Supports state energy policy.

Initiative Themes: Decarbonization

FY 2023-24 Initiative Themes:

1. Hydrogen Leakage Mitigation
2. Building Decarbonization
3. Entrepreneur Development
4. Leveraging cost share opportunities

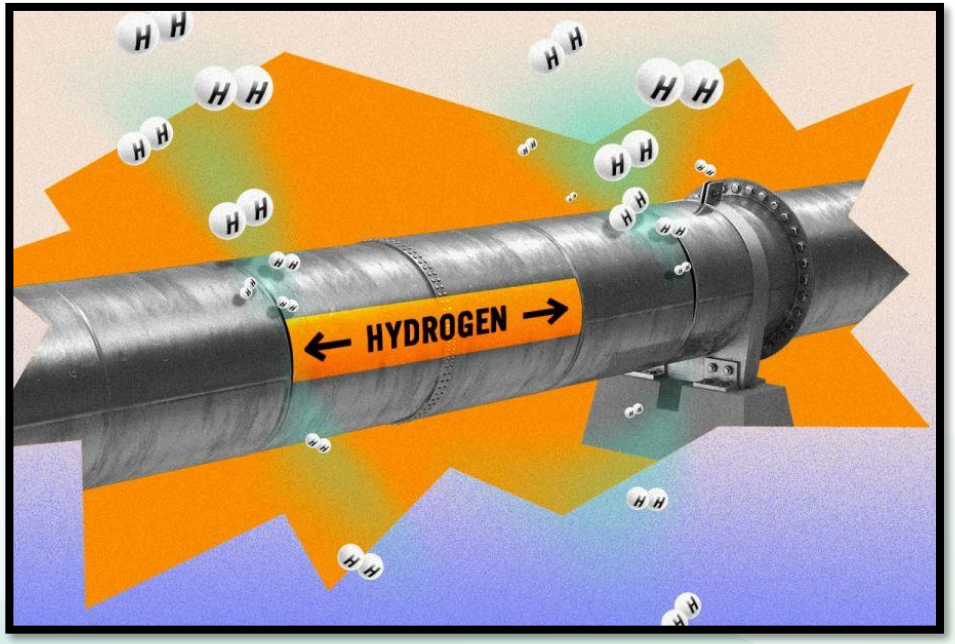
FY 2024-25 Initiative Themes:

1. Renewable Generation
2. Decommissioning
3. Gas System & Safety
4. Transportation

1. Hydrogen Leakage Mitigation

- **Purpose:** Advance hydrogen leakage and mitigation technologies to support responsible scale-up of the clean hydrogen supply chain.

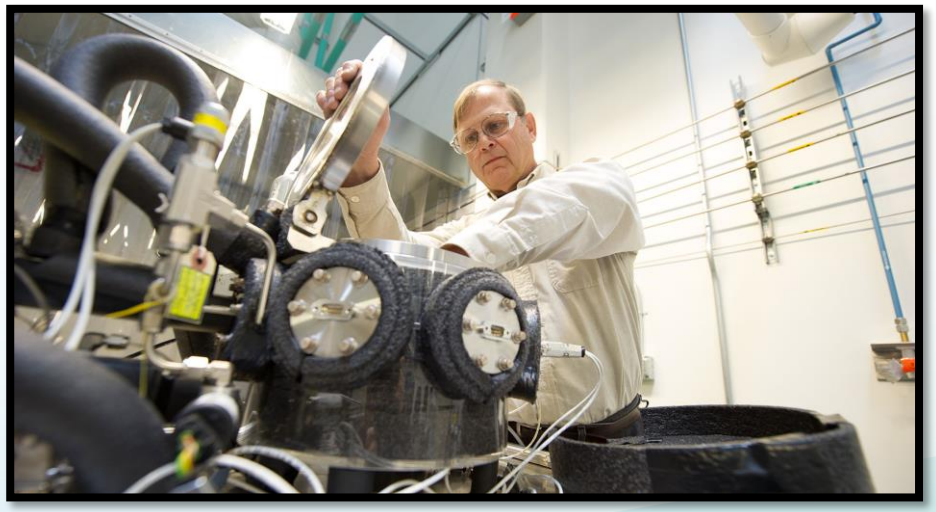
- **Background:**
  - Hydrogen requires novel technologies and methods for more sensitive monitoring and detection in emerging use cases.
  - Leakage has safety, indirect global warming, and economic impacts.
  - Data gaps on hydrogen leakage.



Source: Emerging Tech Brew

1. Hydrogen Leakage Mitigation Innovations

1. Conduct R&D to improve the sensitivity, accuracy, durability, scalability, and cost of hydrogen detection and quantification technologies.
2. Gather data to improve understanding of hydrogen leakage rates along the supply chain (e.g., production, delivery, storage, end-uses).
3. Develop hydrogen leakage prevention solutions for key points in the supply chain where leaks may be concentrated.



Source: NREL

Source: Columbia University

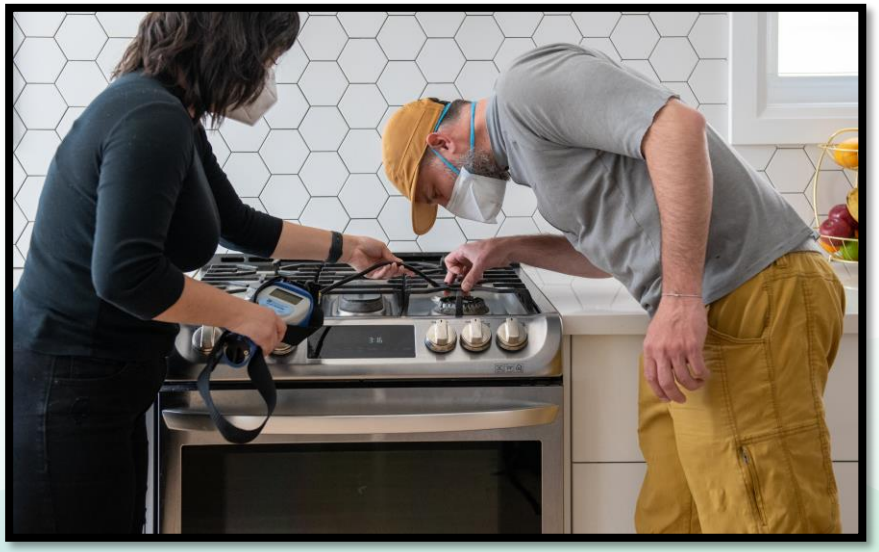
2. Building Decarbonization

- **Purpose**: Develop an air pollutant exposure assessment framework to shed light on the health implications of different cooking fuels in California residences.
- **Background**:
  - Cooking-related indoor air pollutant exposure data is extremely limited.
  - Previous CEC-funded research found that homes routinely exceeded health-based standards for NO_2 when fossil gas for cooking was used.
  - Responsive to CPUC Resolution G-3571.
  - Provides data to support healthy, equitable implementation of building decarbonization.

2. Building Decarbonization Innovations

1. Rigorous basis for quantitative exposure assessment: laboratory *and* field measurements.
2. Laboratory work will link cooking patterns to concentrations of health-damaging pollutants (e.g., $PM_{2.5}$, NO_2) in controlled settings.
3. Fieldwork needed to characterize factors that are strong determinants of exposures (e.g., appliance use patterns, ventilation).
4. Exposure framework will enable quantification of health benefits across diverse households.

Source: NREL



Source: PSE Healthy Energy

3. Entrepreneur Development

- **Purpose**: Provide entrepreneurs with support to develop their ideas into proofs-of-concept via California Sustainable Energy Entrepreneur Development (CalSEED) – Low Carbon Gas program development.
- **Background**:
  - Start-up companies can be strategic partners for large energy corporations but have riskier breakthrough concepts that are difficult to find funding for.
  - A minimum of 20% of award support must go to projects from underrepresented groups.
  - EPIC CalSEED supported over 90 startups; over $190M of follow-on funding.

3. Entrepreneur Development Innovations

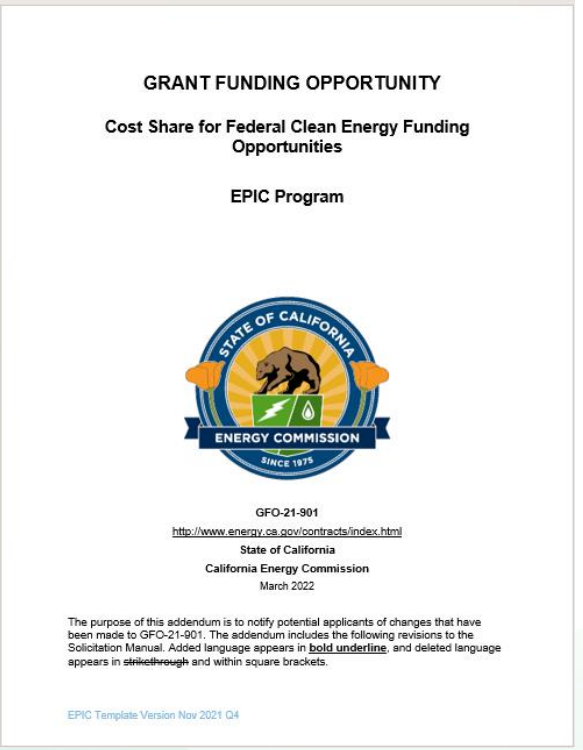
- Pathway for intellectual property to go from studies/lab scale to validated proofs-of-concept.
- Possible technology areas :
  - Industrial processes
  - Carbon capture
  - Medium- and Heavy-duty transportation using hydrogen
  - Hydrogen production and infrastructure

Source: Hydrogen-Central

Source: Climaworks

4. Cross Cutting

- **Purpose**: Provide federal or private cost share for projects consistent with the Gas R&D Program.
- **Background**:
  - Federal and private grants often require 20 to 50 percent cost share.
  - Opportunities to leverage federal Infrastructure Investment Jobs Act and the Inflation Reduction Act of 2022 to attract California projects.
  - Modeled after Electric Program Investment Charge (EPIC) program's Federal Cost Share Solicitation.
    - Successful in leveraging > $100M in DOE funds.



GRANT FUNDING OPPORTUNITY

Cost Share for Federal Clean Energy Funding Opportunities

EPIC Program

GFO-21-901

http://www.energy.ca.gov/contracts/index.html

State of California

California Energy Commission

March 2022

The purpose of this addendum is to notify potential applicants of changes that have been made to GFO-21-901. The addendum includes the following revisions to the Solicitation Manual. Added language appears in **bold underline**, and deleted language appears in ~~strikethrough~~ and within square brackets.

EPIC Template Version Nov 2021 Q4

Source: CEC Website
(Example of EPIC Cost Share GFO)

4. Cross Cutting Innovations

- Opportunities to fund innovations in industrial decarbonization, transportation and other areas that are aligned with the Gas R&D program.
  - Regional Clean Hydrogen Hub - ARCH$_2$ ES (estimated $1B/award)
  - Regional Direct Air Capture Hub (estimated $3M to $500M/award)
  - Industrial Decarbonization and Environmental Reduction Demonstration to Deployment (estimated $35M-$500M/award)

Preliminary Research Concepts for FY 2024-2025 Budget Plan

Preliminary Research Concepts: ‘24-’25

1. Renewable Generation: Fuel-Flexible Power Generation

- *Purpose*: Increase flexibility of current power generation technologies to run on multiple or mixed fuels at variable quality and flow.
- *Innovation*: Develop technology (such as sensors or control systems) that can demonstrate reliable performance and engine tuning from the flexible fuel input blends.
- *Timing*: This initiative will build on the upcoming solicitation from previous Gas Program initiatives in FYs '21-'22 and '22-'23 that focuses on steady volumetric percentage of higher hydrogen blends.

Preliminary Research Concepts: ‘24-’25

2. Gas Decommissioning: Support Equitable, Safe, and Cost-Effective Decarbonization of California's Gas System.

- *Purpose*: Support decarbonization policy and related rulemakings.
- *Innovation*: Fund public interest research informed by extensive internal coordination and public engagement to identify the most critical gaps.
- *Timing*: Engagement to inform the FY 2024-25 initiative Q1 - Q4 2023, with goal of solicitation release in Q3 2024.

Preliminary Research Concepts: ‘24-’25

3. Gas System & Safety: Deploying Innovations to Detect and Reduce Fugitive Methane Emissions.

- *Purpose*: Increase market adoption of technologies that can easily detect and monitor methane leaks.
- *Innovation*: Advance sensors with more precise quantification and continuous monitoring capabilities to better characterize the size and location of leaks.
- *Timing*: Technologies for methane detection and monitoring are emerging, but their adoption must occur at a rapid speed to lessen the impacts of climate change in the near term.

Preliminary Research Concepts: ‘24-’25

4. Transportation: Innovative On-board H2 Storage and Fuel System Solutions.

- *Purpose*: Improve economics, capacity, and durability of hydrogen storage solutions on board heavy-duty vehicles.
- *Innovation*: Integrate advanced gaseous, liquid, cryo-compressed, or materials-based storage onto hydrogen fuel cell vehicles.
- *Timing*: The commercial market for heavy-duty fuel cell vehicles is nascent – there may be more vehicle integration opportunities as the market matures.

Connect with Us

- **Public workshop January 24, 2023.**
  - https://www.energy.ca.gov/event/workshop/2023-01/fy-2023-24-gas-rd-budget-plan-workshop
- **Comments can be provided to the PIER Gas Docket until January 31, 2023.**
  - https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=16-PIER-01
- Energize Innovation provides access to the CEC R&D project resource libraries, tools, and databases.
  - www.energizeinnovation.fund
- The Energy Commission can be found on most social media platforms, Facebook, YouTube, Twitter, and LinkedIn.