



# **Item 12: Staff's Gas Research and Development Program 2023 Annual Report**

October 18, 2023 Business Meeting

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# Overview

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- **Purpose:** Provide Legislature, CPUC, and the public a summary of CEC's Gas R&D Program, its impact, and ratepayer benefits
- **Program Overview**
- **Benefits Metrics**
- **Investment Areas & Total Investment**
- **Featured Projects**



# Benefits to Californians

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- **\$318M +** invested across **301** projects
- Recipients attracted **\$6.1B +** in private investment → **~20x initial investment**
- **23+ projects** informed codes, standards, proceedings, or protocols
- **\$65M +** per year in energy cost savings
- **47+ technologies** or products commercialized
- **~72%** invested in and benefiting **disadvantaged or low-income communities, or both** since 2016



# Investment Areas & Total Investment\*

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- **Building Decarbonization:** \$57 million
- **Gas System Decarbonization:** \$30 million
- **Industrial and Agricultural Innovation:** \$72 million
- **Transportation:** \$63 million
- **Resiliency, Health, and Safety:** \$85 million
- **Entrepreneurial Ecosystem:** \$11 million\*\*

\*Time frame for totals by investment area is from program inception in 2004.

\*\*This includes the Energy Innovation Small Grant Program.



# Gas System Decarbonization: Setting California Communities on the Path to Electrification

- **480%:** The potential increase in gas rates by 2050 without cost mitigation efforts.
- **360:** The number of meters included in the project.
- **~\$12,000:** Net benefit of strategic gas decommissioning per customer.

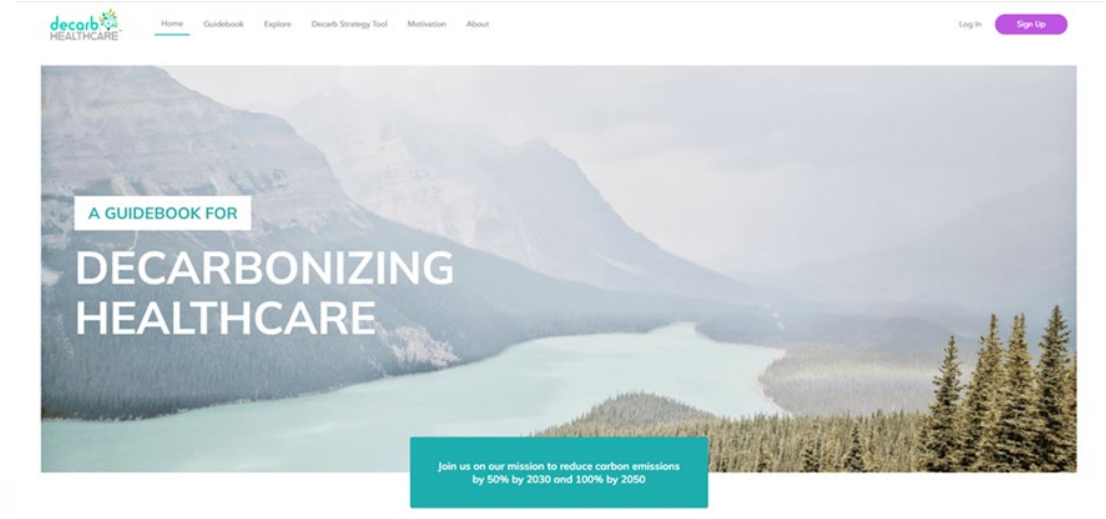


E3 and Community Engagement  
Source: Gridworks



# Building Decarbonization: Helping to Scale Hospital Decarbonization

- **339:** Hospitals in California in 2022.
- **30%:** Increase in healthcare-related GHG emissions in the U.S. over a 10-year period.
- **25+:** Technology areas covered by the free guidebook.

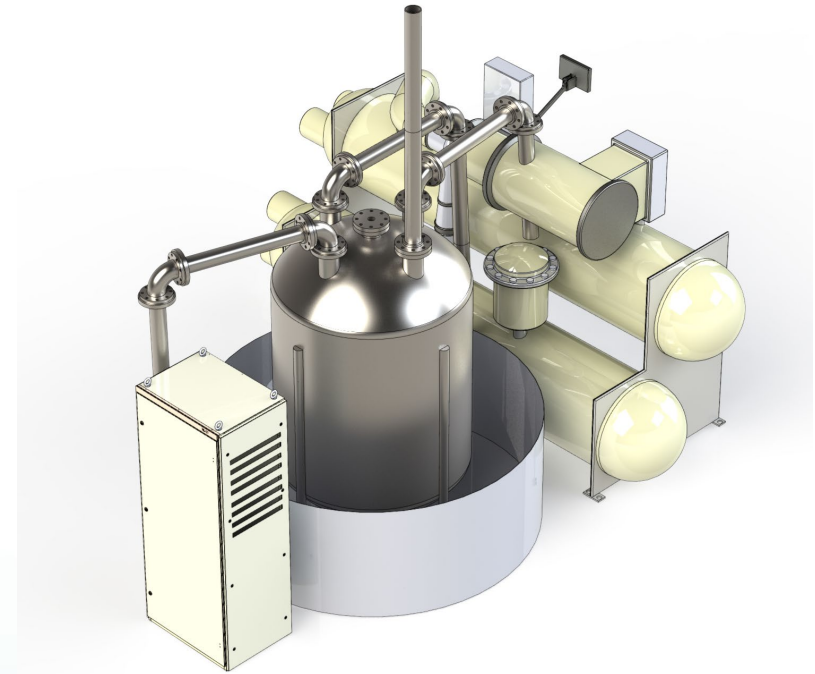


The Guidebook for Decarbonizing Healthcare,  
Available Online  
Source: <https://decarbhealthcare.com/>



# Industrial and Agricultural Innovation: Decarbonizing California's Chemical Industry

- **925 million metric tons:** Amount of CO<sub>2</sub> emitted by the chemistry industry worldwide in 2021.
- **Third:** Chemical industry's rank in California among largest GHG-emitting industrial subsectors.
- **15%:** Anticipated reduction in gas usage at Element 16's demonstration site.



Element 16's Thermal Energy Storage System  
Source: Element 16





# Transportation:

## Hydrogen Fuel Cells and Cleaning Up California's Railyards

- **800+:** Number of switcher locomotives in use in California.
- **10,000 Gallons:** Est. annual diesel consumption displaced.
- **3 Tons:** Amount of NOx displaced annually.



Sierra Northern's Zero-Emission Hydrogen Switching Locomotive

Source: Sierra Northern Railway





# Resiliency, Health, and Safety

## Electromagnetic & Optical Sensor Technologies for Gas Storage Safety Monitoring

- **~400:** Number of underground gas storage wells in California.
- **2 years:** The current frequency of wellbore inspection.
- **1 minute:** The frequency of the data with EM-TDR and optical fiber technology.



Fiber Optics Installation at PG&E's McDonald Island Gas Storage Field  
Source: LBNL



# Staff Recommendation

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- Approve *Gas Research and Development Program 2023 Annual Report*