



925.719.2704



anna@buildmomentum.io



## Notice of Funding Opportunity

**Title:** California Energy Commission – Advancing Cost and Efficiency Improvements for Low Carbon Hydrogen Production

**Website:** <https://www.energy.ca.gov/solicitations/2021-08/gfo-21-502-advancing-cost-and-efficiency-improvements-low-carbon-hydrogen>

**Funding:** Total: \$3,500,000. Maximum awards: \$500K-\$2M, depending on group.

**Dates:** Pre-Application Workshop: September 16, 2021 at 10AM  
Deadline for Written Questions: September 24, 2021  
Deadline to Submit Full Applications: October 29, 2021

**Summary:** The purpose of this solicitation is to fund applied research and development (ARD) and technology demonstration and deployment (TD&D) projects that will address the technical and economic challenges of producing hydrogen from carbon-neutral production pathways in accordance with the Emerging Renewable Hydrogen Production research initiative in the Fiscal Year 2020-2021 Natural Gas Budget Plan. The two focus areas of this solicitation will advance the science and technology of emerging hydrogen production pathways to produce low-carbon hydrogen that is cost-competitive with fossil-based SMR process. Significant improvements in efficiency, materials, and production approaches (e.g. reforming and associated technologies) are necessary to reduce costs and increase adoption of low-carbon hydrogen production.

### Project Topic Areas:

#### Group 1: Pilot Scale Demonstration of Low-Carbon Hydrogen Production

Projects funded under Group 1 must deploy a pilot scale demonstration of advanced low-carbon hydrogen production technologies that will improve the production capacity and lower the cost of renewable hydrogen, specifically demonstrating alternatives to the widely commercialized fossil natural gas-based processes of hydrogen production. These pilot scale projects must have readily available renewable feedstock and should focus on the methods and processes of hydrogen production. Examples of possible projects include but are not limited to: Demonstration of hydrogen production technology from biogas or biomethane in partnership with a dairy digester facility such as those funded by the California Department of Food and Agriculture (CDFA) and California Public Utilities Commission (CPUC); Demonstration of hydrogen production technology from biogas or biomethane in partnership with a wastewater treatment facility with fully operational digester and biogas system; Demonstration of a hydrogen production system that generates other value products such as heat and power.

#### Group 2: Advancing the Readiness of Emerging Hydrogen Production

While projects funded under Group 1 focus on relatively mature demonstrations of converting biogas or biomethane to renewable hydrogen, projects funded under Group 2 focus on bench-scale demonstration of expanding the range of feedstocks and associated production pathways, for example syngas and bioliquid feedstocks and photoelectrochemical and microbial-based production pathways. Successful projects from this group will advance emerging feedstocks or production pathways and address feedstock resource limitations associated with the emerging feedstocks that are examined, such as geographic constraints and feedstock variability. The production of low-carbon hydrogen from Group 2 pathways must have gone through a successful proof of concept and initial experimental work. Possible projects include but are not limited to: Development, investigation, and demonstration of emerging photolytic processes, e.g., photobiological or photoelectrochemical, or of biological and fermentation processes for hydrogen production; Advancement in technology readiness of thermochemical process (e.g. gasification or biomass-derived liquid reforming) for continuous hydrogen production; Demonstration of increased feasibility, cost-effectiveness, and readiness of other early stage systems involving gas or liquid reforming and use of micro-plasma for biogas to hydrogen conversion.

### Funding:

801 K Street, Suite 2700  
Sacramento CA 95814  
buildmomentum.io



**MOMENTUM**

925.719.2704



anna@buildmomentum.io



There is up to \$3,500,000 available for grants awarded under this solicitation. Match funding is required in the amount of at least 10% of the requested project funds.

Project Group	Available funding	Minimum award amount	Maximum award amount	Minimum match funding (% of Natural Gas Funds Requested)
<b>Group 1:</b> Pilot Scale Demonstration of Low-Carbon Hydrogen Production	\$2,000,000	\$1,000,000	\$2,000,000	10%
<b>Group 2:</b> Advancing the Readiness of Emerging Hydrogen Production	\$1,500,000	\$500,000	\$750,000	10%

**Project Requirements:**

To be eligible under Group 1, the proposed renewable hydrogen production demonstration must meet each of the following minimum technical requirements. Projects exceeding the minimum technical requirements will score higher in accordance with the evaluation criteria: 1) To demonstrate the levelized cost of hydrogen, applicants should submit Project Performance Metrics that includes, at a minimum, hydrogen production costs, hydrogen capacity production, GHG emissions reductions, energy efficiency, energy usage, installation and capital costs, as well as how the cost improvements achieved by the innovation will meet this target once applied to a commercial scale system. Applicants may use National Renewable Energy Laboratory’s (NREL) or other relevant calculators. Describe the parameters, assumptions, and calculator used in the estimate and explain how the innovative technology, tool, or process proposed would contribute to the levelized cost target in Project Performance Metrics; 2) Must have a continuous supply of 100% renewable feedstock for at least 500 hours. Eligible renewable feedstock for hydrogen conversion include biogas or biomethane such as biomass digester gas, wastewater gas, municipal solid waste gas from pre-landfilled material and other waste biomass feedstock; 3) Demonstrate the innovation that achieves an output of 25 kg of hydrogen or more per day by project conclusion; 4) Demonstrate the innovation that would help achieve or exceed the renewable hydrogen cost targets of \$2.5/kg hydrogen projected at commercial or industrial scale; 5) Achieve maximum hydrogen purity (above 99%) for end-use operations; 6) Demonstrate an increase in TRL, from TRL 4 or 5 at the beginning of the project to TRL 6 or greater by the end of the project; 7) Demonstrate the technology for no less than 6 months in a relevant field environment that is located in an industrial or commercial settings and in a natural gas IOU service territory.

To be eligible under Group 2, proposed renewable hydrogen production demonstration must meet each of the following minimum technical requirements. Projects exceeding the minimum technical requirements will score higher in accordance with the evaluation criteria: 1) Describe the parameters and assumptions used to calculate the targeted metrics and explain how the innovative technology or process will meet these targets once applied to a commercial scale system; 2) Demonstrate an increase in TRL from at least TRL 3 at the beginning of the project to TRL 4 or greater by the end of the project; 3) Demonstrate the innovation that achieves at a minimum output of 1 kg of hydrogen or more per day by project conclusion; 4) Demonstrate the innovation that would help achieve or exceed the renewable hydrogen cost targets of \$2.5/kg hydrogen projected at commercial or industrial scale; 5) Achieve maximum hydrogen purity for end-use operations; 6) Demonstration sites must be located at in a natural gas IOU service territory. The metrics included in Table 2 identify the target levelized cost of emerging hydrogen production technologies along with the required TRL by the end of the project. In its present status, these systems have not successfully penetrated the market largely because of high capital costs and lack of testing and demonstration in real applications. Thus, the project must focus on feasibility, efficiency and advancement of TRL levels to advance market readiness.

**Eligible Applicants:**

This solicitation is open to all public and private entities. Demonstration projects in this solicitation must be located in the service territory of a California natural gas Investor Owned Utility (NG IOU), which includes Pacific Gas and Electric Company, San Diego Gas & Electric Company, and Southern California Gas Company. All projects in this solicitation must benefit natural gas IOU ratepayers.