Greenhouse Gas Reduction Fund: Expenditure Record

California Energy Commission
Clean Hydrogen Program
Fiscal Years 2023-2026

Authorizing legislation:

Assembly Bill (AB) No. 209 (Chapter 251, Statutes of 2022) authorizes the California Energy Commission (CEC) to establish and administer the Hydrogen Program to provide incentives to eligible in-state hydrogen projects for the demonstration or scale-up of the production, processing, delivery, storage, or end use of hydrogen consistent with California Public Resources Code sections 25664 and 25664.1. The CEC has named the program the Clean Hydrogen Program, and this is the name used in this expenditure record.

Element 1: A description of each expenditure proposed to be made by the administering agency pursuant to the appropriation.

Agency that will administer funding:

- California Energy Commission

Amount of proposed expenditure and appropriation reference:

The total expenditure is $39 million per Items 3360-002-3228 of the Budget Act of 2023 (SB 109), 3360-102-3228 of the Budget Act of 2023 (SB 109), and the anticipated Budget Act of 2025 which provides the following funding:

- $4.4M total for administrative costs.
- $34.6M total for incentives for hydrogen production, processing, delivery, storage, or end use.

$1M in Item 3360-002-3228 of the FY23-24 budget is available for encumbrance or expenditure for actual administrative costs by the CEC until June 30, 2031, and shall be available for liquidation until June 30, 2033. These funds are included in the $4.4M total for administrative costs.

$4M in Item 3360-102-3228 of the FY23-24 budget is available for encumbrance or expenditure by the CEC until June 30, 2027, and shall be available for liquidation until June 30, 2031. This fund is available for encumbrance or expenditure for actual projects.

$34M is expected in the FY25-26 budget, anticipated to be available for encumbrance or expenditure by the CEC until June 30, 2029, and it shall be available for liquidation until June 30, 2033. These funds are not available until July 1, 2025, and are subject to budget changes. $3.4M of these funds would be included in the $4.4M total for administrative costs. $30.6M would be available for encumbrance or expenditure for actual projects out of publicly announced program funding areas.

Estimated amount of expenditures for administering agency administrative costs

- Administering agency administrative costs are estimated to be approximately $4.4M.

If applicable, identify laws or regulations that govern how funds will be used

- AB 1532 (Pérez, Chapter 807, Statutes of 2012), Senate Bill (SB) 535 (de León, Chapter 830, Statutes of 2012), SB 1018 (Budget and Fiscal Review Committee, Chapter 39, Statutes of 2012), SB 862 (Budget and Fiscal Review Committee, Chapter 36, Statutes of 2014), and AB 1550 (Gomez, Chapter 369, Statutes of 2016) provided the general framework for how the Cap-and-Trade Program auction proceeds will be administered to further the purposes of AB 32.
- AB 398 (E. Garcia, Chapter 135, Statutes of 2017) prioritized renewable energy for expenditures from the Greenhouse Gas Reduction Fund.
- The Budget Act of 2020 provided direction on the types of projects that should be funded for Greenhouse Gas Reduction Fund appropriations.
- AB 1261 (Burke, Chapter 714, Statutes of 2021) identified overlap among incentive programs.
- SB 1075 (N. Skinner, Chapter 363, Statutes of 2022) requires the California Air Resources Board (CARB) to ensure that statewide greenhouse gas emissions are reduced to at least 40 percent below 1990 levels by 2030. In consultation with the CEC and California Public Utilities Commission, CARB is required to prepare an evaluation that includes specified information relative to the deployment, development, and use of hydrogen. This bill requires the CEC, as part of the 2023 and 2025 editions of the integrated energy policy report, to study and model potential growth for hydrogen and its role in decarbonizing, as defined, the electrical and transportation sectors of the economy and its role in helping to achieve specified goals.
- AB 209 established the Clean Hydrogen Program and provides direction on how the funds will be allocated to recipients, including requirements for project eligibility and program implementation. All funds will be allocated and managed in accordance with this law.
    - The CEC may, in its discretion, advance up to 25 percent of the total Clean Energy Program money allocated under AB 209, which includes the Hydrogen Program. (See PRC 25661(b).)
- California Public Resources Code sections 25664 and 25664.1 lay out requirements for the Clean Hydrogen Program.
    - The CEC shall provide **financial incentives** for hydrogen projects that produce, process, deliver, store, or use hydrogen derived from water using **eligible renewable energy resources** or produced from those resources. (PRC 25664)
        - Eligible renewable energy resources means an electrical generating facility that meets the definition of a “renewable electrical generation facility” in PRC 25741, and also subject to the requirements of Public Utilities Code 399.12(e)(1)(A)-(D) and 399.12(e)(2).
        - Financial incentives is not defined but could likely be grants, loans, or other funding mechanisms.

        - Federal cost share: financial incentives may be used as matching funds by entities that have received a grant under US Code Title 42, sect. 16161 (solar and wind technologies). (PRC 25664.1(b))
    - Projects must be **in-state**, for the demonstration or scale-up of the production, processing, delivery, storage, or end use of hydrogen. (PRC 25664.1(a))
    - The CEC shall only provide financial incentives to eligible projects that help reduce sector-wide emissions, as determined by the CEC. (PRC 25664.1(e))
    - The CEC shall prioritize eligible projects that benefit geographically diverse areas of the state. (PRC 25664.1(f))
    - The CEC shall prioritize eligible projects that maximize air quality, equity, health, and workforce benefits. (PRC 25664.1(g))
    - The CEC shall include in guidelines (if adopted – see PRC 25664.1(c), below) or project requirements (if no guidelines are adopted) that the financial incentives received under the Hydrogen Program do not supplant or result in duplicative offset credits, renewable energy credits (RECs), or other forms of compliance credits. (PRC 25664.1(d))

Continuation of existing Expenditure Record

- This is a new program that does not have an existing Expenditure Record.

Project Types

- Demonstration or scale up of clean hydrogen[1] production, processing, delivery, storage, or use.
- Cost share for California-based entities to leverage clean hydrogen federal funding opportunities.

Describe the projects and/or measures that will be eligible for funding

- Producing clean hydrogen at a centralized scale (5 or more metric tons per day) through eligible hydrogen production pathways for various hard-to-electrify sectors (e.g., industrial facilities, heavy-duty/offroad transportation, back-up electricity generation). Project activities may include processing, delivering, or storing hydrogen in addition to production, but must avoid any benefit to oil refineries or facilities associated with fossil fuels.
- Producing clean hydrogen at distributed scale (1 to 5 metric tons per day) through eligible hydrogen production pathways for various hard-to-electrify sectors (e.g., industrial facilities, heavy-duty/offroad transportation, back-up electricity generation). Project activities may include processing, delivering, storing, or using hydrogen in addition to production, but must avoid any benefit to oil refineries or facilities associated with fossil fuels.

[1] For the purposes of the Clean Hydrogen Program, clean hydrogen is defined as hydrogen produced from water using eligible renewable energy resources, as defined in Section 399.12 of the Public Utilities Code, or produced from these renewable energy resources.

- Researching innovative strategies, methodologies, or technologies to advance clean hydrogen production.

Intended recipients

- Local transit agencies
- Non-profit organizations
- Businesses
- Local and Tribal Governments
- Universities and Research Institutions
- National Laboratories
- Public and private low-carbon fuel producers
- Hard-to-electrify end use sectors such as industrial facilities, heavy-duty transportation, or back-up electricity generation
- Local ports and maritime industry

Program structure and process for selecting projects for funding

- Competitive solicitation, evaluation, and selection of projects, including cost-share applications, according to criteria specified in solicitation manuals.

Element 2: A description of how a proposed expenditure will further the regulatory purposes of Division 25.5 (commencing with Section 38500) of the Health and Safety Code, including, but not limited to, the limit established under Part 3 (commencing with Section 38550) and other applicable requirements of law.

How the expenditure is consistent with the Investment Plan and the Scoping Plan

- AB 1532 (Chapter 807, Statutes of 2012) requires that monies from the Greenhouse Gas Reduction Fund be appropriated in a manner that is consistent with the three-year Investment Plan. The “Cap-and-Trade Auction Proceeds Fourth Investment Plan, covering Fiscal Years 2022-23 through 2024-25” recommends support for low-carbon fuels (e.g., renewable gas, hydrogen from low-carbon sources). The Investment Plan also recommends prioritizing funding for sectors that will be difficult to electrify, specifically for innovative industrial emissions reduction projects. Therefore, the expenditures covered by this record are consistent with the Investment Plan and align with the priorities expressed in the Plan.
- California’s 2022 Climate Change Scoping Plan identified key strategies and recommendations to continue reducing greenhouse gas emissions and achieve the goals and purposes of AB 32 and related statutes. The Scoping Plan estimates that by 2045, demand for low-carbon hydrogen will increase nearly two-fold the current levels of fossil hydrogen – equivalent to a 1,700-fold increase in existing low-carbon hydrogen supply – and would support emerging end uses such as heavy-duty vehicles, power generation, industrial process heat, and synthetic fuels for aviation. Hydrogen produced from water using renewable energy resources or produced directly from renewable energy resources can provide low-carbon energy and act as an alternative to fossil

fuels, helping meet California's greenhouse gas reduction goals of 40 percent below 1990 levels by 2030 and carbon neutrality by 2045. The projects funded by the Clean Hydrogen Program will reduce carbon and criteria air pollutant emissions in hard-to-electrify sectors, and, therefore, the expenditures covered by this record are consistent with the Climate Change Scoping Plan and align with the priorities expressed in the Plan.

Element 3: A description of how a proposed expenditure will contribute to achieving and maintaining greenhouse gas emission reductions pursuant to Division 25.5 (commencing with Section 38500) of the Health and Safety Code.

Describe how expenditures will facilitate the achievement of greenhouse gas emission reductions in the State

- Expenditures will reduce greenhouse gas emissions by providing grants to advance the development and deployment of low-carbon, cost-competitive hydrogen production from renewable energy sources and reduced greenhouse gas emissions in hard-to-electrify sectors.
- Expenditures will help reduce usage of fossil fuels and sector-wide emissions (e.g., from a project’s designated hard-to-electrify end-use sector such as industrial facilities, heavy duty transportation, or back-up electricity generation).
- Expenditures will advance near-commercial stage carbon-neutral technologies that produce clean fuel for transportation, provide clean and sustainable energy for electrification to support the resilience and stability of the electricity grid, and supply dispatchable backup power for underserved and disadvantaged communities.
- The cost-share part of the program will leverage federal funding opportunities to implement the above-mentioned technologies.

Explain when greenhouse gas emission reductions and/or co benefits are expected to occur and how they will be maintained

- Clean hydrogen production facilities will begin to yield greenhouse gas and criteria air pollutant emissions reductions over traditional hydrogen production as soon as the facilities become operational. Facility operations are expected to begin by 2030.
- Use of clean hydrogen (as a replacement for traditional hydrogen and fossil fuels) will yield emissions reductions and criteria air pollutant emission reductions immediately upon use. Offtake and use of clean hydrogen from these facilities are also expected to occur by 2030.
  Projects are required to maintain compliance and report on benefits, including reductions in greenhouse gas emissions, throughout the duration of the project.

Element 4: A description of how the administering agency considered the applicability and feasibility of other non-greenhouse gas reduction objectives of Division 25.5 (commencing with Section 38500) of the Health and Safety Code.

Expected co-benefits, particularly environmental, economic, public health and safety, and climate resiliency

- Adoption of clean hydrogen will yield environmental co-benefits by reducing the use of fossil fuels in hard-to-electrify applications, particularly in the transportation, industrial, and electricity generation sectors. Projects that lead to reduced consumption of fossil fuels could also result in decreased life-cycle environmental impacts of hydrogen as an alternative energy carrier for use in hard-to-electrify sectors. This includes reducing greenhouse gas emissions and criteria air pollutant emissions and improving air quality.
- Providing support for small-scale and large-scale hydrogen production facilities will improve hydrogen affordability and yield economic co-benefits. Small-scale facilities with onsite storage and end-use projects can match hydrogen supply with demand in proximity, avoiding high transportation costs. Onsite storage allows for hydrogen to be stored until needed, reducing the need for expensive transportation infrastructure, and making small-scale hydrogen production more affordable and accessible. Meanwhile, large-scale production demonstration projects can lead to economies of scale, reducing overall production costs and making hydrogen more affordable for end-users. Additionally, funded demonstrations can help identify barriers, inefficiencies, and areas of improvement in hydrogen production, ultimately benefiting the public through lower procurement costs.
- Providing support for the construction of new clean hydrogen facilities or upgrading existing clean hydrogen facilities will yield economic co-benefits related to workforce development. Projects will create and retain jobs through development, construction, operations, and maintenance, leading to economic growth and workforce development within the hydrogen industry. These projects can stimulate local economies and attract larger investments. Additionally, projects funded by this program could help ensure the competitiveness of California's hydrogen sector, its stable operations, and the security of jobs associated with its operations, transport, and use in California.
- This program will yield climate resiliency benefits by increasing reliability of clean hydrogen fuel supply and improving energy reliability. Funded projects would increase reliability of clean hydrogen fuel supply and improve energy reliability. These projects could use or dispense hydrogen that is produced on-site and reduce risk of supply disruptions. The hydrogen can be stored on site, along with renewable generation, to provide long-term storage for clean energy. Hydrogen can also be used for power generation during peak demand, or for the creation of a renewable hydrogen microgrid that could be used to generate power for communities during times of peak demand.

How the project will support other objectives of AB 32 and related statutes

- Implementation of the Clean Hydrogen Program will support other objectives of AB 32 and related amendments by:

- Improving air quality, including reducing criteria air pollutant emissions when clean hydrogen is used to replace fossil fuels such as diesel;
- Maximizing environmental co-benefits for California, as hydrogen production consumes less water than fossil fuel processing (e.g., oil refining);
- Improving and modernizing California's energy infrastructure, as clean hydrogen offers a reliable source of clean energy that acts as an alternative energy carrier in hard-to-electrify end use sectors.

Percentage of total funding that will be expended for projects that are located in and benefit priority populations[2] per CARB guidance

- The administering agency did not include a minimum target to locate projects within and provide benefits to priority populations, but some projects may meet the criteria for providing benefits to priority populations. Program staff plan to implement reporting for community benefits.

Describe the benefits to priority populations per CARB guidance

- These expenditures will result in the installation of clean and renewable hydrogen fuel production technologies and other decarbonization technologies, some of which may be installed in clean hydrogen facilities located in priority population areas. This may result in localized decreases in criteria air pollutants and improved air quality by reducing and avoiding the use of fossil fuels.
- The state is seeing increasing retail prices for hydrogen fuel. These projects may provide direct cost savings for hydrogen fuel and increased access to clean and renewable hydrogen fuel for residents and local businesses in disadvantaged or low-income communities, and for low-income households. The program may fund projects demonstrating hydrogen production facilities that are partnered with hydrogen refueling stations. Larger-scale projects have the potential to benefit multiple communities with a single project.

Explain strategies the administering agency will use to maximize benefits to disadvantaged communities

- The CEC will provide preference points during the scoring phase for applications benefiting priority populations. The applicant must provide a meaningful explanation of how the project meets CARB's criteria for providing benefits to priority populations in their proposal. Applicants who receive these preference points must ensure their projects do not place substantial burdens on priority populations.
- If funded, recipients must provide updates on the benefits to the affected communities and CEC staff before starting key activities such as construction, equipment installation, and operations. CEC staff and the Technical Advisory Committee, which will include community representatives, may review these reports to determine if the project meets

[2] Priority populations include residents of: (1) census tracts identified as disadvantaged by California Environmental Protection Agency per SB 535; (2) census tracts identified as low-income per AB 1550; or (3) a low-income household per AB 1550. See Section VII.B Funding Guidelines for more information on the definitions of priority populations.

CARB's criteria for providing benefits to priority populations and should continue to be funded.

Explain how the administering agency will avoid potential substantial burdens to disadvantaged communities and low-income communities or, if unknown, explain the process for identifying and avoiding potential substantial burdens

Examples:

- The administering agency has received feedback from Environmental Justice organizations expressing concerns of hydrogen creating new harms or perpetuating impacts of the fossil fuel system on low-income communities. The program requires that applicants identify, in their applications, actions and methodologies that will be pursued to demonstrate community engagement and support (e.g., public workshops, discussions with community leaders or organizations, community surveys, language services, educational pamphlets with language translations available, letters of support from community partners). Applicants must also provide methodologies used to determine environmental impacts on communities before and after project installation. The agency will evaluate and consider these measures in project selection.
- The administering agency has received feedback from communities expressing concerns with the eligible end uses and the nitrogen oxides emissions that result from blending hydrogen in fossil gas systems. Future funding eligibility will be limited to those project types that avoid any benefit to facilities associated with fossil fuels and do not include hydrogen injected into gas pipelines as an end use.
- The administering agency will consult directly with communities, community representatives, and Environmental Justice organizations through various means including workshops and public comments on program guidelines to identify potential burdens. The agency will make programmatic adjustments to eligibility criteria, and ultimately funding decisions, as necessary to avoid potential substantial burdens to priority populations.

Element 5: A description of how the administering agency will document the result achieved from the expenditure to comply with Division 25.5 (commencing with Section 38500) of the Health and Safety Code.

How the administering agency will track / report progress to make sure projects are implemented per requirements in statute and CARB guidance

- The CEC has over 30 years of experience implementing similar programs and projects. Funding recipients will be required to maintain records and submit quarterly progress reports. Monthly meetings will be held between recipients and the Commission Agreement Manager (CAM), in addition to periodic Critical Project Review (CPR) meetings to ensure tasks and deliverables are completed in line with the agreement's Scope of Work. Finally, to ensure timely project completion, the Recipient must complete Key Project Activities, including Pre-Construction, Construction, and Post-Construction technical tasks. CPR meetings will be held to ensure completion of Key Project Activities, and the CAM will then issue a Progress Determination to the Recipient, where a negative Progress Determination or "no-go" decision may lead to

project termination. If a funding recipient does not perform in accordance with program requirements, the recipient will be subject to the remedies for non-performance, as identified in the Clean Hydrogen Program's terms and conditions and the grant agreement.

Describe the approach that will be used to document greenhouse gas emission reductions and/or other benefits before and after project completion

- The CEC will estimate the greenhouse gas emission reductions and co-benefits expected and achieved from projects using quantification methodologies that CARB will develop in coordination and collaboration with the CEC.

Type of information that will be collected to document results, consistent with CARB guidance

- To determine the employment outcomes, the agency will compile data from funding recipients on jobs provided, training, and retention, consistent with CARB guidance.
- The administering agency will collect data on project location, baseline and estimated emissions, clean hydrogen production costs, type of technology that was installed, monitored hydrogen leakage, and other data, as applicable and as specified in CARB guidance.
- The funding recipients must provide High Quality Digital Photographs of pre- and post-technology installation at the project sites.

How the administering agency will report on program status

- The administering agency will report to CARB consistent with CARB guidance. The administering agency will provide regular updates on the program, including expenditure amounts, greenhouse gas emission reductions, and other benefits, as applicable (e.g., jobs supported, community benefits, environmental impacts).
- The funding recipients are required to develop and submit a Project Case Study Plan as part of their Knowledge Transfer Activities. The Plan will outline the objectives, goals, and activities of the case study, and how the recipients will document the planning, construction, commissioning, and operation of the technologies being demonstrated.
- The funding recipients must develop presentation materials and participate in CEC-sponsored conference/workshop(s) and annual Clean Hydrogen Program Projects Meetings for information sharing activities.