**GRANT FUNDING OPPORTUNITY**

**Direct Air Capture Research, Demonstration, and Community Engagement**



**GFO-24-303**

<https://www.energy.ca.gov/funding-opportunities/solicitation>

**State of California**

**California Energy Commission**

**October 2024**

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| **Attachments**   | Attachment Number | Title of Section | | --- | --- | | 1 | Executive Summary Form | | 2 | Project Narrative Form | | 3 | Project Team Form | | 4 | Scope of Work Template | | 5 | Project Schedule | | 6 | Budget | | 7 | CEQA Compliance Form | | 8 | Past Projects Information Form | | 9 | Commitment and Support Letters Form ***(requires signature)*** | | 10 | Project Performance Metrics | | 11 | Applicant Declarations ***(requires signature)*** | | 12 | Appendix G from CEQA Handbook | |

# I. Introduction

## Purpose of Solicitation

In 2022, the California Climate Crisis Act[[1]](#footnote-2) was established to lower anthropogenic greenhouse gas (GHG) emissions by 85% below 1990 levels and attain carbon neutrality by 2045. To support this legislation, the California Air Resources Board (CARB) prepared the 2022 Scoping Plan, outlining the importance of implementing new strategies, such as carbon dioxide removal (CDR), to address residual carbon emissions to achieve carbon neutrality[[2]](#footnote-3). The Scoping Plan concluded that mechanical CDR will be needed to achieve carbon neutrality. Tackling this significant challenge will require research and development efforts to identify economically viable and scalable CDR solutions.

In 2023, the US Department of Energy (DOE) invested $1.2 billion towards the development of regional direct air capture (DAC) Hubs.[[3]](#footnote-4) More recently, the DOE announced a notice of intent to allocate up to $1.8 billion for the design, construction, and operation of mid- and large-scale commercial DAC facilities and infrastructure scaling platforms.[[4]](#footnote-5) In California, Assembly Bill (AB) 209[[5]](#footnote-6) launched the Carbon Removal Innovation Program, referred to as the Carbon Removal Innovation Support Program (CRISP) by the California Energy Commission. The goal of CRISP is to provide financial support to initiatives that promote DAC, which directly removes carbon dioxide from the atmosphere through physical processes, chemical processes, or both. CRISP is part of California Climate Investments, a statewide initiative that puts billions of Cap-and-Trade dollars to work reducing greenhouse gas emissions, strengthening the economy, and improving public health and the environment — particularly in disadvantaged communities.

Many existing DAC technologies are at lower technology readiness levels (TRL) and face challenges such as high cost and energy usage, deployment and infrastructure obstacles, the need for water and other resources, and the potential to be confused for a fossil fuel-linked carbon capture strategy. However, there is a need to remove legacy emissions, and scalable DAC technologies offer a viable solution to reaching carbon neutrality since the capture performance can be easily measured and verified.

The purpose of this solicitation is to advance the technical, economic, and environmental viability of innovative DAC technologies to meet the state’s carbon neutrality goals. This can include testing, piloting, and demonstrating advanced technologies, coupled with active community engagement, benefits planning, and community education.

Projects must fall within the following project groups:

* **Group 1**: Direct Air Capture Research and Development; and
* **Group 2**: Direct Air Capture Field Demonstration and Community Engagement.

To the extent that an awarded project aligns with future cost-sharing opportunities with other entities (public or private), such as DOE’s Regional DAC Hub funding announcement, it may leverage the CEC award to expand its scope or enhance its impact. If there are any necessary adjustments to the project scope, budget, or both that are warranted after selection by CEC to align with DOE funding opportunity announcement requirements, such changes may be requested. CEC may approve such changes after review.

See Section II of this solicitation for eligibility requirements. Applications will be evaluated as described in Section IV of this solicitation. Applicants may submit multiple applications, though each application must address only one of the project groups identified above. If an applicant submits multiple applications that address the same project group, each application must be for a distinct project (i.e., no overlap with respect to the technical tasks described in the Scope of Work).

Prospective applicants looking for partnering opportunities for this funding opportunity should register on the California Energy Commission’s Empower Innovation website at [www.empowerinnovation.net](http://www.empowerinnovation.net)

## Key Words/Terms

| **Word/Term** | **Definition** |
| --- | --- |
| Applicant | An entity that submits an application to this solicitation. |
| Application | An applicant’s written response to this solicitation. |
| Authorized Representative | The person submitting the application who has authority to enter into an agreement with the CEC. |
| California Native American Tribe | A Native American Tribe located in California that is on the contact list maintained by the Native American Heritage Commission for the purposes of Chapter 905 of the Statutes of 2004 (Pub. Resources Code, § 21073). |
| California Tribal Organization | A corporation, association, or group controlled, sanctioned, or chartered by a California Native American tribe that is subject to its laws, the laws of the State of California, or the laws of the United States. |
| CAM | *Commission Agreement Manager,* the person designated by the CEC to oversee the performance of an agreement resulting from this solicitation and to serve as the main point of contact for the grant recipient. |
| CAO | *Commission Agreement Officer*, the person designated by the CEC to oversee the internal administrative processes and to serves as the main point of contact for solicitation applicants. |
| CARB | *California Air Resources Board* |
| Carbon Intensity | *Carbon intensity is the measure of CO2 produced per dollar of GDP. In other words, it's a measure of how much CO2 we emit when we generate one dollar in our economy. [[6]](#footnote-7)* |
| CBO | *Community Based Organization*, a public or private nonprofit organization of demonstrated effectiveness that:   1. Has deployed projects and/or outreach efforts within the region (e.g., air basin or county) of the proposed disadvantaged or low-income community or similar community. 2. Has an official mission and vision statements that expressly identifies serving disadvantaged and/or low-income communities. 3. Currently employs staff member(s) who specialized in and are dedicated to – diversity, or equity, or inclusion, or is a 501(c)(3) non-profit. |
| CBP | *Community Benefits Plan* should be developed in collaboration with stakeholders and be tailored to meet the specific needs and priorities of the community in which the project is located. In addition, the CBP should outline how the proposed project will provide benefits to local communities, including job creation, economic development, environmental improvements, and social impact initiatives. CBP requirements are listed in Section II.B. of this solicitation manual. |
| CBPDP | *Community Benefits Plan Development Proposal* must contain all the requirements in Section II.B. of this solicitation manual. |
| CCUS | Carbon Capture, Utilization, and Storage |
| CDR | *Carbon Dioxide Removal* refers to approaches that remove carbon dioxide (CO2) from the atmosphere. CDR encompasses a wide array of approaches, including direct air capture (DAC) coupled to durable storage, soil carbon sequestration, biomass carbon removal and storage, enhanced mineralization, ocean-based CDR, and afforestation/reforestation. CDR does not refer to point-source carbon capture for the fossil fuel or industrial sector*[[7]](#footnote-8).* |
| CEC | State Energy Resources Conservation and Development Commission or, the California Energy Commission. |
| CEC funds | *CEC funds* are CRISP grant funds awarded under this solicitation. Also referred to as grant funds. |
| CEQA | California Environmental Quality Act, California Public Resources Code Section 21000 et seq. |
| CM | *Carbon Management*. The U.S. Department of Energy (DOE) uses “carbon management” as an umbrella term, as it encompasses a variety of technologies and pathways that reduce carbon dioxide emissions in support of achieving net-zero greenhouse gas emissions by 2050[[8]](#footnote-9)*.* These pathways could include but are not limited to the removal, capture, transport, storage, and conversion of carbon dioxide*.* |
| CO2 | *Carbon dioxide* |
| CRISP | *Carbon Removal Innovation Support Program* |
| DAC | *Direct Air Capture* is a technology that directly separates planet-warming CO2 from the atmosphere for permanent, safe geologic storage or the manufacture of clean, low-carbon fuels and chemicals.*[[9]](#footnote-10)* |
| Days | *Days* refers to calendar days*.* |
| Disadvantaged Community | Communities designated pursuant to Health and Safety Code section 39711 as representing the top 25% scoring census tracts from CalEnviroScreen along with other areas with high amounts of pollution and low populations as identified by the California Environmental Protection Agency. (https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40) |
| DOE | Refers to the U.S. *Department of Energy* |
| Energy Equity | The fair distribution of benefits and burdens from energy production and consumption. |
| GHG | *Greenhouse gas* |
| LCA | *Life cycle analysis* is a comprehensive form of analysis that uses the principles of Life Cycle Assessment, Life Cycle Cost Analysis, and various other methods to evaluate the environmental, economic, and social attributes of energy systems ranging from the extraction of raw materials from the ground to the use of the energy carrier to perform work (commonly referred to as the “life cycle” of a product).[[10]](#footnote-11) |
| Low Income Community | Communities within census tracts with median household incomes at or below 80 percent of the statewide median income or the applicable low-income threshold listed in the state income limits updated by the Department of Housing and Community Development. (https://www.hcd.ca.gov/grants-and-funding/income-limits) |
| Major Subrecipient | A Subrecipient that is budgeted to receive $100,000 or more of CEC funds, not including any equipment or match funds that may be provide by the Subrecipient. |
| MT | *Metric ton* |
| NOPA | *Notice of Proposed Award,* a public notice by CEC staff that identifies proposed grant recipients. |
| Pilot Test | Small scale testing in a laboratory or testing on a small portion of the production line of the affected industry. Pilot tests help verify the design and validity of an approach, and adjustments can be made at this stage before full-scale demonstrations |
| Principal Investigator | The technical lead for the applicant’s project, who is responsible for overseeing the project; in some instances, the Principal Investigator and Project Manager may be the same person. |
| Project Manager | The person designated by the applicant to oversee the project and to serve as the main point of contact for the CEC. |
| Project Partner | A person or entity that contributes financially or otherwise to the project (e.g., match funding, provision of a test, demonstration or deployment site), and does not receive CEC funds. |
| Recipient | A person or entity receiving a grant award under this solicitation. “Recipient” may be used interchangeably with “grant recipient”. |
| Solicitation | This entire document, including all attachments, exhibits, addenda, written notices, and questions and answers (“solicitation” may be used interchangeably with “Grant Funding Opportunity” or “GFO”). |
| Subrecipient | A person or entity that receives grant funds directly from a grant Recipient and is entrusted to make decisions about how to conduct some of the grant’s activities. A Subrecipient’s role involves discretion over grant activities and is not merely just selling goods or services. |
| Sub-Subrecipient | Has the same meaning as a Subrecipient except that it receives grant funds from a Subrecipient or any lower tier level of a Sub-Subrecipient. |
| State | State of California |
| TEA | *Techno-Economic Analysis* refers to a method for evaluating the economic performance of a technology. A TEA assesses the overall value of a technology, allowing analysts to objectively weigh benefits against costs.[[11]](#footnote-12) |
| TRL | Technology readiness levels are a method for estimating the maturity of technologies during the acquisition phase of a program.  Source: U.S. Department of Energy, “Technology Readiness Assessment Guide.” https://www2.lbl.gov/dir/assets/docs/TRL%20guide.pdf |
| Vendor | A person or entity that sells goods or services to the grant Recipient, Subrecipient, or any lower-tiered level of Sub-Subrecipient, in exchange for some of the grant funds, and does not make decisions about how to perform the grant’s activities. The Vendor’s role is ministerial and does not involve discretion over grant activities. |

## Project Focus

Projects funded by this solicitation will promote the adoption of CM technologies with the focus on developing, testing, and demonstrating DAC technologies from bench scale through field demonstrations, with emphasis on improvements in areas such as the following:

* cost reduction
* energy reduction
* technology advancements to improve capture efficiency, reduction of other resource inputs (e.g., potable water, thermal)
* reduction/reuse/elimination of the use of toxic materials (e.g., solvents, sorbents)
* technology scalability and potential applicability for California, including potential for construction, development, permitting, and operation
* criteria air pollutant emissions reductions
* opportunities for community education and equitable distribution of benefits among involved stockholders

Project focus and research goals are described below, and Section II.B lists further descriptions of project requirements and eligible technologies.

**Group 1: Direct Air Capture Research and Development**

Group 1 will target research and development of DAC technologies that effectively lower the cost, energy consumption, and GHG emissions of the system through improvements to various materials and components such as sorbent, solvent, separation materials, contactors, and separators. Projects must demonstrate rigorous measurement, reporting, and verification of carbon capture effectiveness, use of resources, and carbon intensity.

Examples of projects within Group 1 include:

* Improvements to increase the lifespan of the abovementioned materials and components.
* Optimization of various process design elements and operation of the system as a whole to simultaneously maximize efficiency and minimize toxicity, carbon footprint, energy consumption, and sustainable sorbent/solvent regeneration cycles.

Proposals must be at a technology readiness level (TRL) of 4-5 with the expectation of advancing one or more levels by the end of the project.

**Group 2: Direct Air Capture Field Demonstration and Community Engagement**

Group 2 will target field demonstrations of DAC technologies with the goal of testing and optimizing net CO2 removal of at least 1,000 MT of CO2/year by the end of the agreement and the potential to achieve $100/metric ton of CO2 equivalents by 2032. Projects must demonstrate rigorous measurement, reporting, and verification of capture efficiency, energy and resource consumption, and overall GHG and other emissions.

Examples of projects within Group 2 include:

* Strategies to minimize resource consumption, particularly energy, water, and land use.
* Development and demonstration of emerging/innovative technologies to scale up, move to a higher TRL and gather operation data via demonstration in California.
* Use of additive manufacturing techniques to facilitate scaleup and reduce the processing cost and requirements.
* Modular designs that minimize the cost of repair, replacement, and adjustments to infrastructure.
* Development of scalable manufacturing and low carbon intensity processes for producing novel DAC materials/components and integration of advanced materials/components into practical DAC systems.

Proposals must be at a TRL 6 or greater with the expectation of advancing one or more levels by the end of the project.

Projects in Group 2 must allocate at least 7 percent of CEC funds for community engagement, education, and risks/benefits analysis. Please refer to Section II.B for more information.

**NOTE:**  All demonstration sites should be located in California.

Section II.B lists further descriptions of project requirements and eligible technologies.

**NOTE:** Eligible projects do not include projects to benefit a petroleum or gas production, processing, or refining facility.

## Funding

1. **Amount Available and Minimum/ Maximum Funding Amounts**

There is **up to $14,700,000** available for grants awarded under this solicitation. The total, minimum, and maximum funding amounts for each project group are listed below.

| Project Group | Available CEC funding | Minimum CEC award | Maximum CEC award | Minimum match funding  (% of CEC funds requested) |
| --- | --- | --- | --- | --- |
| Group 1: Direct Air Capture Research and Development  TRL 4-5  (2-4 projects) | $2,000,000 | $500,000 | $1,000,000 | none |
| Group 2: Direct Air Capture Field Demonstration and Community Engagement  TRL>5  (3-8 projects) | $12,700,000 | $1,500,000 | $4,000,000 | 20% |

1. **Match Funding Requirement**

Match funding is required in the amount of at least 20% of the requested CEC funds for Group 2.

For the definition of match funding, see Section I K.

1. **Change in Funding Amount**

Along with any other rights and remedies available to it, the CEC reserves the right to:

* Increase or decrease the available funding and the minimum/maximum grant award amounts described in this section.
* Allocate any additional or unawarded funds to passing applications, in rank order.
* Reallocate funding between any of the groups
* Aggregate funds from multiple groups to fully fund the highest ranked passing applications, regardless of group.
* Reduce funding to an appropriate amount if the budgeted funds do not provide full funding for agreements. In this event, the proposed grant recipient and Commission Agreement Manager (CAM) will attempt to reach agreement on a reduced Scope of Work commensurate with available funding.

## Key Activities Schedule

Key activities, dates, and times for this solicitation and for agreements resulting from this solicitation are presented below. An addendum will be released if the dates change for activities that appear in **bold.**

| **ACTIVITY** | **DATE** | **TIME[[12]](#footnote-13)** |
| --- | --- | --- |
| Solicitation Release | October 04, 2024 |  |
| **Pre-Application Workshop** | **October 17, 2024** | **10:30 a.m.** |
| **Deadline for Written Questions[[13]](#footnote-14)** | **October 31, 2024** | **5:00 p.m.** |
| Anticipated Distribution of Questions and Answers | **November 19, 2024** |  |
| **Support for Application Submission in ECAMS** | **TBD** | **5:00 p.m.[[14]](#footnote-15)** |
| **1st Round Deadline to Submit Applications** | **December 13, 2024** | **11:59 p.m.** |
| **2nd Round Deadline to Submit Applications, if funds remain\*** | **TBD** | **11:59 p.m.** |
| Anticipated Notice of Proposed Award Posting (NOPA) Date Round 1 | Week of Jan 6, 2025 |  |
| Anticipated Notice of Proposed Award Posting (NOPA) Date Round 2 | TBD |  |
| Anticipated Energy Commission Business Meeting Date | March 2025 |  |
| Anticipated Agreement Start Date | 45 days after the Business Meeting |  |
| Anticipated Agreement End Date | March 30, 2030 |  |

\*Additional application rounds may be added at the discretion of the CEC. An addendum to this solicitation will be publicly released for notification if additional application rounds are added.

## Notice of Pre-Application Workshop

CEC staff will hold one Pre-Application Workshop to discuss this solicitation with potential applicants. Participation is optional but encouraged. The Pre-Application Workshop will be held remotely. Applicants may attend the workshop via the internet (Zoom, see instructions below), or via conference call on the date and at the time and location listed below. Please refer to the CEC's website at www.energy.ca.gov/contracts/index.html to confirm the date and time. Please be aware that the meeting will be recorded.

**Date and time:** October 17, 2024, 10:30 a.m.

**Zoom Instructions:**

To join the Zoom meeting, go to https://zoom.us/joinand enter the Meeting ID below and select “join from your browser.” Participants will then enter the meeting password listed below and their name. Participants will select the “Join” button.:

**Meeting ID:** 822 9867 5980

**Meeting Password:** mtg@1030

**Topic:** Pre-Application Workshop - GFO-24-303 - Direct Air Capture Research, Demonstration, and Community Engagement (CRISP Program)

**Telephone Access Only:**

Call **1-888 475 4499** (Toll Free) or **1-877 853 5257** (Toll Free). When prompted, enter the meeting number above. International callers may select a number from the Zoom International Dial-in Number List at: https://energy.zoom.us/u/adjzKUXvoy. To comment, dial \*9 to “raise your hand” and \*6 to mute/unmute your phone line.

**Access by Mobile Device:**

Download the application from the Zoom Download Center, https://energy.zoom.us/download.

**Technical Support** **for Pre-Application Workshop:**

* For assistance with problems or questions about joining or attending the meeting,

please call Zoom Technical Support at **1-888-799-9666 ext. 2.** You may also contact the CEC’s Public Advisor’s Office at publicadvisor@energy.ca.gov, or (916) 957-7910.

* System Requirements: To determine whether your computer is compatible, visit:

https://support.zoom.us/hc/en-us/articles/201362023-System-requirements-for-Windows-macOS-and-Linux.

* If you need a reasonable accommodation to participate, please Erica Rodriguez by e-mail at Erica.Rodriguez@energy.ca.gov or (916) 764-5705 at least five days in advance.

## Questions

During the solicitation process, for questions only related to submission of application in the new ECAMS system, please contact [ECAMS.SalesforceSupport@energy.ca.gov](mailto:ECAMS.SalesforceSupport@energy.ca.gov). Through that email address applicants will be able to access a team of technical assistants who can answer questions about application submission. Please also see Section III.B for additional information about the ECAMS system.

For all other questions, including all technical and administrative questions that are not related to submission of applications in the ECAMS system, please contact the Commission Agreement Officer listed below:

Crystal Willis, Commission Agreement Officer

California Energy Commission

715 P, MS-18

Sacramento, California, 95814

Telephone: (916) -529-1108

E-mail: Crystal.Willis@Energy.ca.gov

Applicants may ask questions at the Pre-Application Workshop and may submit written questions via email. However, all **technical** questions must be received by the deadline listed in the “Key Activities Schedule” above. Questions received after the deadline may be answered at the CEC's discretion. **Non-technical** questions (e.g., administrative questions concerning application format requirements or attachment instructions) may be submitted to the CAO at any time prior to 5:00 p.m. of the application deadline date. Similarly, questions related to submission of applications in the ECAMS system may be submitted to ECAMS.SalesforceSupport@energy.ca.gov at any time prior to 5:00 p.m. of the application deadline date.

The questions and answers will also be posted on the CEC’s website at: https://www.energy.ca.gov/funding-opportunities/solicitations

If an applicant discovers a **conflict, discrepancy, omission, or other error** in the solicitation at any time prior 5:00 p.m. of the application deadline date, the applicant may notify the CAO in writing and request modification or clarification of the solicitation. The CEC, at its discretion will provide modifications or clarifications by either an addendum to the solicitation or by written notice to all entities that requested the solicitation. At its discretion, the CEC may, in addition to any other actions it may choose, re-open the question/answer period to provide all applicants the opportunity to seek any further clarification required.

**Any verbal communication with a CEC employee or anyone else concerning this solicitation is not binding on the State and will in no way alter a specification, term, or condition of the solicitation. Therefore, all communication should be directed in writing to the assigned CAO.**

## Applicants’ Admonishment

This solicitation contains application requirements and instructions. Applicants are responsible for **carefully reading** the entire solicitation, asking appropriate questions in a timely manner, ensuring that all solicitation requirements are met, submitting all required responses in a complete manner by the required date and time, and **carefully rereading** the solicitation before submitting an application. In particular, please carefully read the **Screening and Scoring Criteria and** **Grounds to Reject an Application or Cancel an Award** in Part IV, and the relevant CRISP Grant terms and conditions located at: https://www.energy.ca.gov/funding-opportunities/funding-resources, or which will be posted there, and as may be updated for this new program.

Applicants are solely responsible for the cost of developing applications. This cost cannot be charged to the State. **All submitted documents will become publicly available records** and property of the State after the CEC posts the Notice of Proposed Award or the solicitation is cancelled. Only submit information you want made public. **Marking any portion of your application as confidential may result in disqualification**. **No portion of your application will be considered confidential.**

## Additional Requirements regarding environmental review

* Environmental Review. Prior to approval and encumbrance, the CEC must comply with the California Environmental Quality Act (CEQA) and other requirements. To comply with CEQA, the CEC must have CEQA-related information from applicants and sometimes other entities, such as local governments, in a timely manner. Unfortunately, even with this information, the CEC may not be able to complete its CEQA review prior to the encumbrance deadline for every project. For example, if a project requires an Environmental Impact Report, the process to complete it can take many months. For these reasons, it is critical that applicants organize applications in a manner that minimizes the time required for the CEC to comply with CEQA and provide all CEQA-related information to the CEC in a timely manner such that the CEC is able to complete its review in time for it to meet its encumbrance deadline.
* Reservation of right to cancel proposed award. In addition to any other right reserved to it under this solicitation or that it otherwise has, if the CEC determines, in its sole and absolute discretion, that the CEQA review associated with a proposed project would not likely be completed prior to the encumbrance deadline referenced above, and that the CEC’s ability to meet its encumbrance deadline may thereby be jeopardized, the CEC may cancel a proposed award and award funds to the next highest scoring applicant, regardless of the originally proposed applicant’s diligence in submitting information and materials for CEQA review. Examples of situations that may arise related to CEQA review include but are not limited to:
* Example 1: If another state agency or local jurisdiction, such as a city or county, has taken the role of lead agency under CEQA, the CEC’s review may be delayed while waiting for a determination from the lead agency.
* Example 2: If the proposed work is part of a larger project for which a detailed environmental analysis has been or will be prepared by another state agency or local jurisdiction, the CEC’s review may be delayed as a result of waiting for a supplemental or initial analysis, respectively, from the other agency.
* Example 3: If the nature of the proposed work is such that a project is not categorically or otherwise exempt from the requirements of CEQA, and an Initial Study or other detailed environmental analysis appears to be necessary, the CEC’s review, or the lead agency’s review, may take longer than the time available to encumber the funds. If an Initial Study, Negative Declaration, Mitigated Negative Declaration, Environmental Impact Report, or similar document[[15]](#footnote-16) has already been completed by another state agency or a local jurisdiction, serving as the lead agency, the applicant must ensure that such an analysis covers the work in the proposed project, or must obtain a revised analysis and determination from the lead agency reviewing the proposed project.
* Example 4: If the proposed project clearly falls under a statutory or categorical exemption, or is project for which another state agency or local jurisdiction has already completed its environmental review and adopted CEQA findings that the project will cause no significant effect on the environment, the project will likely have greater success in attaining rapid completion of CEQA requirements.

The above examples are not exhaustive of instances in which the CEC may or may not be able to comply with CEQA within the encumbrance deadline and are only provided as further clarification for potential applicants. Applicants are encouraged to contact potential lead and responsible agencies under CEQA as early as possible. Please plan applications accordingly.

## Background

1. **Carbon Removal Innovation Program, also known as the Carbon Removal Innovation Support Program (CRISP)**

AB 209 established the Carbon Removal Innovation Program, also known as the Carbon Removal Innovation Support Program (CRISP), directing the CEC to provide funding for projects that support DAC. DAC is an engineered carbon removal approach that involves the use of physical and chemical processes to extract CO2 directly from the atmosphere from any location. By encouraging the development and deployment of DAC technology, AB 209 aims to reduce GHG emissions and help achieve the state’s carbon neutrality goals by 2045. Despite the growing anticipation of DAC as a key carbon removal strategy, the technology is nascent and limited by high costs and energy consumption.

**Applicable Laws, Policies, and Background Documents**

This program and solicitation are governed by the following laws, policies, and background documents.

Laws/Regulations

* **AB 1279 - The California Climate Crisis Act**

AB 1279 mandates the reduction of anthropogenic GHG emissions by 85% below 1990 levels and the attainment of carbon neutrality by 2045. This legislation aims to mitigate the impacts of climate change by setting ambitious targets for emissions reductions and transitioning towards a low-carbon economy. The Act requires stringent monitoring, reporting, and enforcement measures to ensure compliance with the emission reduction goals outlined, to protect the environment and public health for current and future generations.

Additional Information:

<https://legiscan.com/CA/text/AB1279/id/2604954>

* **AB 209 - Energy and Climate Change Act (2021-2022)**

AB 209 required the CEC to establish and administer the Carbon Removal Innovation Program to provide financial incentives to eligible projects that advance technologies for direct air capture of atmospheric carbon. Eligible projects shall not include a project to benefit a petroleum or gas production, processing, or refining facility, through enhanced oil and gas recovery.

Additional Information:

<https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB209>

[Carbon Removal Innovation Support Program - CRISP | California Energy Commission](https://www.energy.ca.gov/programs-and-topics/programs/carbon-removal-innovation-support-program-crisp)

<http://www.energy.ca.gov/research/>

<https://www.energy.ca.gov/showcase/energize-innovation>

* **AB 32[[16]](#footnote-17) - Global Warming Solutions Act of 2006**

AB 32created a comprehensive program to reduce GHG emissions in California. GHG reduction strategies include a reduction mandate of 1990 levels by 2020 and a cap-and-trade program. AB 32 also designates CARB as the state agency charged with monitoring and regulating sources of GHG emissions and requires CARB to develop a Scoping Plan that describes the approach California will take to reduce GHGs. CARB must update the plan at least once every five years.

Additional information: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\_id=200520060AB32http://www.leginfo.ca.gov/pub/15-16/bill/sen/sb\_0001-0050/sb\_32\_bill\_20160908\_chaptered.htm;

https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan

Applicable Law: California Health and Safety Code §§ 38500 et. seq.

* **Senate Bill (SB)** **905- Carbon Sequestration: Carbon Capture, Removal, Utilization, and Storage Program (2021-2022)**

SB 905 establishes a framework for using carbon capture, removal, utilization and storage technologies to reduce greenhouse gas emissions and combat climate change. The program outlined in the bill would focus on promoting the development and deployment of these technologies, as well as establishing goals and benchmarks for carbon sequestration in the state.

SB 905 also addresses the importance of supporting and incentivizing research and development in the field of carbon sequestration, as well as incorporating environmental justice considerations into the program's implementation.

Additional information: <https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB905>

* **SB 1314-Oil and gas: Class II injection wells: enhanced oil recovery (2021-2022)**

SB 1314 prevents an operator from injecting a concentrated carbon dioxide fluid from a CO2 capture process into a Class II injection well to enhance oil recovery, including facilitating in the recovery of oil from another well.

Additional information:

<https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB1314>

* **AB 1757- California Global Warming Solutions Act of 2006: climate goal: natural and working lands**

AB 1757 sets forth goals for reducing greenhouse gas emissions and increasing carbon sequestration through the preservation and restoration of forests, wetlands, and agricultural lands. By promoting sustainable land management practices, AB 1757 seeks to mitigate the effects of climate change and contribute to a more environmentally resilient California. AB 1757 underscores California's steadfast dedication to addressing global warming and safeguarding its environmental heritage for the benefit of future generations.

Additional information:

<https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB1757>

* **SB 32 - California Global Warming Solutions Act of 2006: emissions limit**

SB 32 expands on AB 32 by requiring that CARB ensure statewide GHG emissions are reduced to 40% below the 1990 level by no later than December 31, 2030. SB 32 further requires that these emission reductions are achieved in a manner that benefits the state’s most disadvantaged communities and is transparent and accountable to the public and the Legislature.

Additional information: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill\_id=201520160SB32

Applicable Law: California Health and Safety Code § 38566.

* **SB 100 - The 100 Percent Clean Energy Act of 2018**

SB 100 requires that 100 percent of retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies come from eligible renewable energy resources and zero-carbon resources by December 31, 2045. The bill requires the CPUC and the CEC, in consultation with CARB, to ensure that California’s transition to a zero-carbon electric system does not cause or contribute to GHG emissions increases elsewhere in the western grid.

Additional information: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill\_id=201720180SB100

Policies/Plans

* **CARB Scoping Plan (2022)**

The CARB Scoping Plan for 2022 outlines California's comprehensive strategy for reducing greenhouse gas emissions to meet state targets. The plan emphasizes the importance of carbon removal methods, such as reforestation, soil carbon sequestration, and DAC, in mitigating climate change and achieving carbon neutrality by 2045. It includes specific actions and initiatives to promote these practices, such as investing in research and development, implementing incentives for carbon removal projects, and collaborating with stakeholders to address potential challenges. Additionally, the plan highlights the need for continued monitoring and evaluation to ensure the effectiveness of these carbon removal efforts and track progress toward reaching emission reduction goals. By prioritizing carbon removal methods, the CARB Scoping Plan for 2022 demonstrates California's commitment to driving meaningful action on climate change and building a more sustainable future for generations to come.

Additional information: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents

* **Bioenergy Action Plan (2012)**

Various California state agencies developed the 2012 Bioenergy Action Plan to accelerate clean energy development, job creation, and protection of public health and safety. The plan recommends actions to increase the sustainable use of organic waste, expand research and development of bioenergy facilities, reduce permitting and regulatory challenges, and address economic barriers to bioenergy development.

Additional information: http://resources.ca.gov/docs/Final\_Bioenergy\_Action\_Plan\_\_ARB\_\_-\_press\_release\_8-22-12.pdf

* **Integrated Energy Policy Report (Biennial)**

California Public Resources Code Section 25302 requires the CEC to release a biennial report that provides an overview of major energy trends and issues facing the state. The IEPR assesses and forecasts all aspects of energy industry supply, production, transportation, delivery, distribution, demand, and pricing. The CEC uses these assessments and forecasts to develop energy policies and provide recommendations for future research and analysis areas.

Additional information: http://www.energy.ca.gov/energypolicy

Applicable Law: California Public Resources Code § 25300 et seq.

## Match Funding

* **“Match funds”** includes cash or in-kind (non-cash) contributions provided by the applicant, subrecipients, or other parties including pilot testing, demonstration, and/or deployment sites (e.g., test site staff services) that will be used in performance of the proposed project.

“Match funds” do not include: other CEC awards, future/contingent awards from other entities (public or private), the cost or value of the project work site, or the cost or value of structures or other improvements affixed to the project work site permanently or for an indefinite period of time (e.g., photovoltaic systems).

Definitions of “match funding” categories are listed below:

* + - **“Cash”** **match** means funds that are in the grant recipient’s possession or proposed by a match partner and clearly identified in a support letter, and are reserved for the proposed project, meaning that they have not been committed for use or pledged as match for any other project. Cash match can include funding awards earned or received from other agencies for the proposed technologies or study (but not for the identical work). Proof that the funds exist as cash is required. Cash match will be considered more favorably than in-kind contributions during the scoring phase.
    - **“In-Kind”** **match** can be in the form of goods or services that are not reimbursed with CEC funds such as labor (if reasonable and justified), donated space, existing equipment, existing supplies, services provided by a third-party or subrecipient, and other expendable property in support of the project. The value of in-kind match is based on the fair market value of the goods and services provided at the time it is claimed as match. The value of existing equipment must be prorated for its use in the project and depreciated or amortized over the term of the project using generally accepted accounting principles (GAAP). Labor rates for hours donated by non-employees who are not paid for their time must be consistent with those paid for similar work. Cost allocations must be reasonable and allocable to the proposed project. In-kind match share must be included in the agreement budget.

The grant recipient is expected to maintain appropriate documentation to support the fair market value of all in-kind match including match donated by third parties or major subrecipients.

* Match funds must be spent only during the agreement term, either before or concurrently with CEC funds or in accordance with an approved Match Fund Spending Plan. Match funds also must be reported in invoices submitted to the CEC.
* All applications that include match funds must submit commitment letters, **including applicant, subrecipients**, sub-subrecipients, and vendors that: (1) identify the source(s) of the funds; (2) justify the dollar value claimed; (3) provide an unqualified (i.e., without reservation or limitation) commitment that guarantees the availability of the funds for the project; and (4) provide a strategy for replacing the funds if they are significantly reduced or lost. Please see Commitment and Support Letters Form Attachment. Commitment and support letters must be submitted with the application to be considered.
* Any match pledged in an application must be consistent. For example, in the ECAMS system and in the Budget Attachment applicants will be asked to enter the project’s total match funding. The amounts listed in those places should be consistent with the amount or dollar value described in the commitment letter(s) (e.g., if $5,000 “cash in hand” funds are pledged in a commitment letter, the match amounts entered in the ECAMS system and in the Budget must match this amount). If the amounts listed in an application are inconsistent, the total amount pledged in the commitment letter(s) will be considered for match funding points.

Examples of preferred match share:

* + - **“Travel”** refers to all travel required to complete the tasks identified in the Scope of Work. Travel includes in-state and out-of-state, and travel to conferences. Use of match funds for out-of-state travel is encouraged, as the CEC discourages and may not approve the use of its funds for such travel. If an applicant plans to travel to conferences, including registration fees, they must use match funds.
    - **“Equipment” is** an item with a unit cost of at least $5,000 and a useful life of at least one year. **Purchasing equipment with match funding is encouraged,** as there are no disposition requirements at the end of the agreement for such equipment. Typically, grant recipients may continue to use equipment purchased with CEC funds if the use is consistent with the intent of the original agreement.
    - **“Materials”** under Materials and Miscellaneous are items under the agreement that do not meet the definition of Equipment (unit cost of at least $5,000 and a useful life of at least one year). **Using match funds for purchasing items such as laptops, notebooks, and/or personal tablets is encouraged, as the use of CEC funds for these purchases is not allowed.**

## Funds Spent in California

* Only CEC funds may count towards funds spent in California total.
* "Spent in California" means that:
  + (1) Funds in the "Direct Labor category and all categories calculated based on direct labor (e.g., fringe benefits, indirect costs and profit) are paid to individuals that pay California state income taxes on wages received for work performed under the agreement. Payments made to out-of-state workers do not count as “funds spent in California.” However, funds spent by out-of-state workers in California (e.g., hotel and food) can count as “funds spent in California.”; AND
  + (2) Business transactions (e.g., material and equipment purchases, leases, and rentals) are entered into with a business located in California.
  + (3) Total should include any applicable, subrecipients, sub-subrecipients, and vendors.
* Airline ticket purchases for out-of-state travel and payments made to out-of-state workers are not considered funds “spent in California.” However, funds spent by out-of-state workers in California (e.g. lodging) and airline travel originating and ending in California are considered funds “spent in California.” A business located in California means: 1) businesses registered with Secretary of State AND 2) transaction is with a location in California that is directly related to the grant project (e.g., direct purchase of material and equipment to be used in the grant) and results in the support of California business and jobs.
  + Example 1: CEC funds will be spent on temperature sensors.  The temperature sensors are manufactured in Washington. The grant recipient orders the temperature sensors directly from a CA based supply house.  The invoice shows that the transaction occurred with the CA based supply house. This transaction is eligible and can be counted as funds spent in CA.
  + Example 2: CEC funds will be spent on temperature sensors. The temperature sensors are manufactured in Washington. The grant recipient orders the temperature sensors directly from Washington.  The manufacturer has training centers in CA that instructs purchasers on how to use the sensors. The invoice shows that the transaction occurred in Washington. This transaction is not eligible and cannot be counted as funds spent in CA.

1. **CEC’s Rights and Remedies**

Any process explained in this solicitation is in addition to, and does not restrict, any other rights and remedies available to the CEC.

# II. Eligibility Requirements

## Applicant Requirements

1. **Eligibility**
2. This solicitation is open to all public and private entities. **Terms and Conditions**

Each grant agreement resulting from this solicitation will include terms and conditions that set forth the grant recipient’s rights and responsibilities. By submitting an application in the ECAMS system, each applicant agrees to enter into an agreement with the CEC to conduct the proposed project according to the CRISP terms and conditions. All terms and conditions are located at [https://www.energy.ca.gov/funding-opportunities/funding-resources](https://www.energy.ca.gov/funding-opportunities/funding-resources ) or will be posted there, and as may be updated for this new program. Please refer to the applicable CRISP Grant terms and conditions. Failure to agree to the terms and conditions by taking actions such as failing to provide the required authorizations and certifications or indicating that acceptance is based on modification of the terms may result in **rejection** of the application. Applicants **must** **read** the terms and conditions carefully.The CEC reserves the right to modify the terms and conditionsprior to executing grant agreements.

If a California Native American Tribe (Tribe) or California Tribal Organization with sovereign immunity is listed as a proposed awardee in the Notice of Proposed Award, CEC staff must receive the following before bringing the proposed award to a CEC Business Meeting:

1. A resolution or other authorizing document by the governing body of the Tribe or California Tribal Organization authorizing the Tribe or California Tribal Organization to enter into the proposed agreement, including accepting the Special Terms and Conditions for California Native American Tribes and Tribal Organizations with Sovereign Immunity.

2. A limited waiver of sovereign immunity in the form and manner required by tribal law; and

3. A resolution or other authorizing document delegating authority to execute the agreement to an appropriate individual.

The above requirements may be provided in one or more documents. The document(s) will be included as an exhibit to the resulting grant agreement.

Delay in award. Any delay in the Tribe or Tribal Organization’s ability to provide such documentation may result in delayed award of the grant agreement.

Reservation of right to cancel proposed award. Funds available under this solicitation have encumbrance deadlines which the CEC must meet in order to avoid expiration of the funds. In addition to any other rights reserved to it under this solicitation or that it otherwise has, the CEC reserves the right to cancel a proposed award if it determines, in its sole and absolute discretion, that the documentation described above would likely not be provided prior to an encumbrance deadline, and that the CEC’s ability to meet its encumbrance deadline may thereby be jeopardized. In this instance, the CEC may cancel the proposed award and award funds to the next highest scoring applicant.

1. **California Secretary of State Registration**

All corporations, limited liability companies (LLCs), limited partnerships (LPs) and limited liability partnerships (LLPs) that conduct intrastate business in California are required to be registered and in good standing with the California Secretary of State prior to its project being recommended for approval at an CEC Business Meeting.  If not currently registered with the California Secretary of State, applicants and project team members (e.g. subrecipients and even match fund partners) are encouraged to contact the Secretary of State’s Office as soon as possible to avoid potential delays in beginning the proposed project(s) (should the application be proposed for funding).  Applicants should provide the exact legal names of entities included in their applications, along with any fictitious business names. Fictitious business names must be currently valid, i.e., not expired with the Secretary of State. As part of the CEC’s due diligence, particularly during the agreement development phase, CEC staff may request the supporting documentation regarding the above registration requirements.

For more information, contact the Secretary of State’s Office via its website at www.sos.ca.gov.  Sole proprietors do not have to be registered with the California Secretary of State. However, the local government may require a business license and if using a fictitious business name, registration of the name may be required. Sole proprietors must be able to provide evidence of required licenses and/or registration with the appropriate local government, or evidence that such licenses and/or registration is not required, to the CEC prior to the project being recommended for approval at a CEC Business Meeting.

1. **Russia Sanctions**

The budget must NOT identify that CEC funds will be spent outside of the United States or for out-of-country travel. However, match funds may cover these costs if there are no legal restrictions. Recent legal restrictions may include Russian Sanctions as described below:

On March 4, 2022, Governor Gavin Newsom issued Executive Order N-6-22 (the EO) regarding Economic Sanctions against Russia and Russian entities and individuals. “Economic Sanctions” refers to sanctions imposed by the U.S. government in response to Russia’s actions in Ukraine, as well as any sanctions imposed under state law. The EO directs state agencies to terminate contracts with, and to refrain from entering any new contracts with, individuals or entities that are determined to be a target of Economic Sanctions.

Accordingly, should the State determine Recipient is a target of Economic Sanctions or is conducting prohibited transactions with sanctioned individuals or entities, that shall be grounds for termination of this agreement. The State shall provide Recipient advance written notice of such termination, allowing Recipient at least 30 calendar days to provide a written response. Termination shall be at the sole discretion of the State.

## Project Requirements

This solicitation seeks projects that develop and demonstrate innovative DAC technologies that will advance their technical, economic, and environmental viability to meet the state’s carbon neutrality goals. This can include testing, piloting, and demonstrating advanced technologies, coupled with active community engagement and benefits planning. Project emphasis and research goals are briefly described in Section I.C., while detailed requirements for each group are listed in this section.

All the funded projects are required to report employment outcomes to CEC annually using the Excel reporting template developed by California Climate Investments. Reports should use the latest version of the Excel template that is available at the time of reporting, supplied by the contract agreement manager.

**Group 1: Direct Air Capture Research and Development**

Proposals must be at a TRL of 4-5 with the expectation of advancing one or more levels.

**NOTE:** all demonstration sites must be located in California.

Proposed projects under Group 1 should focus on one of the following research topics:

1. Development of novel materials for DAC

Projects under this topic will conduct research and development initiatives focused on the fabrication and testing of novel and low carbon intensity DAC materials such as sorbents, solvents, membranes, and electrodes that are specifically fabricated for DAC conditions and illustrate superior whole-system performance compared to the existing materials designed for point source air capture.

Applicants must demonstrate a comprehensive understanding of the proposed materials, their performance improvements over existing products, their capability for CO2 capture at the dilute concentration typical for the atmosphere, and their applicability to a variety of DAC technologies. In addition, projects must address the main technical barriers such as CO2 selectivity and uptake, reaction kinetics and equilibrium constraints, energy and water demand, and operational temperature and pressure.

Feasibility studies through bench-scale testing of any DAC material composition must be completed before applying to this solicitation. Applicants must provide supporting data and scientific evidence and results supporting the effective functionality of the proposed materials in the Technical Merit Section of the Project Narrative.

Applications solely focusing on DAC materials screening, modeling, or both will not be considered for this GFO.

Example projects include but are not limited to:

* Fabrication of advanced sorbents, membranes, and electrodes from low-cost and low-carbon intensity materials (including recycled materials), and materials with minimal processing requirements.
* Fabrication of scalable, efficient, low-cost, and low-carbon-footprint advanced membranes, electrodes, or both for DAC via additive manufacturing methods.
* Production of innovative solvents such as those with minimal processing and regeneration requirements and derived from nontoxic renewable/green resources with low-cost and a low-carbon footprint.
* Development of materials and coatings that increase the longevity of DAC components, reducing the need for frequent maintenance or replacement.

1. DAC component design

Projects under this topic will conduct research and development initiatives focused on designing, testing, and validating advanced DAC technology components such as air contactors, desorbers, dehumidifiers, and electrochemical cells that are tailored for specific DAC processes. These components shall have improved lifespan and/or be capable of more efficient heat transfer, mass transfer, or both while simultaneously minimizing toxicity, pressure drop, energy consumption, and overall carbon footprint.

Applicants must demonstrate a comprehensive understanding of the proposed components and their applicability to DAC technologies. In addition, in the Technical Merit section of the Project Narrative, applicants must provide supporting data that the proposed component design has scale-up capability and identify the main technical barriers that, if solved, could reduce carbon footprint, costs, and energy consumption of the system through improvements to one or more of the following: heat transfer, mass transfer, lifespan, and pressure drop.

Applications solely focusing on DAC components screening, modeling, or both will not be considered for this GFO.

Example projects include but are not limited to:

* Fabrication of scalable, efficient, low-cost, and low-carbon-footprint advanced DAC components via additive manufacturing methods.
* Design of low-cost and scalable contactor and desorber with improved volumetric CO2 productivity and minimal energy consumption and pressure drop.
* Design of low-cost and scalable electrochemical cells with enhanced mass transfer and CO2 capture (at a concentration typically available in air and near ambient conditions) with significantly reduced land, power, and water requirements and a lower environmental footprint.

1. DAC pilot test and integration

Projects under this topic will conduct research and development initiatives that integrate DAC process advancements to lower the cost, energy, and carbon intensity. This research area involves testing existing/prefabricated DAC materials and components in pilot units that capture atmospheric CO2. This area of interest targets DAC technologies and applies to carbon capture materials and components that have already undergone development and testing in laboratory-scale systems. Pilot testing in an integrated system will allow for further refinement of the process and the identification of potential optimization opportunities. Additionally, there is a need both to fully evaluate the techno-economic aspects of these DAC configurations and their overall CO2 impact through life cycle analysis (LCA) and to conduct a preliminary community education and outreach plan on the proposed pilot test. The pilot test must take place in California and must show applicability for potential in-state deployments.

Applicants must describe in the Project Narrative under technical approach how they plan to construct and operate an integrated pilot DAC system, including but not limited to the integration of DAC processes with other technologies (such as those in the examples listed below), a discussion of technology cost competitiveness assessment compared to other approaches, maturity and technology readiness, risk analysis, and challenges and barriers.

Example projects include but are not limited to:

* Integration of innovative sorbent/solvent regeneration (CO2 desorption) approaches that reduce energy usage, such as humidity, electro-swing adsorption, and advanced membrane technology.
* Integrated approaches, such as reactive capture and energy storage.
* Integrated DAC process with renewable energy sources for increased sustainability and cost-effectiveness. CRISP funds cannot be used for renewable energy production.
* Integration of advanced strategies and models to reduce cost and enhance the efficiency and precision of measurement reporting and verification (MRV) for DAC technologies.
* Design and construction of a DAC technology prototype using advanced materials/components that can increase techno-economic competitiveness compared to competing approaches, with potential for commercialization within five years.
* Development of monitoring and control strategies for improved operation of DAC systems in terms of cost and energy reduction and capture capacity.

The Project Narrative (Attachment 2) must discuss the following in the sections identified and include references and assumptions to justify responses.

**Technical Merit:**

1. Describe and justify that the proposed technologies are currently at a TRL 4-5 and how the proposed project will progress to at least one TRL by the end of the agreement. Applicants must include the following in their discussion:
   * A literature review, including references, that provides an evaluation of existing DAC materials and/or components and process integration pathways TRL, capacity limits, challenges and restrictions and how the proposed technology will be an improvement and why.
   * Baseline of the current state of the proposed DAC materials/components or process developments and discussion of how the innovation will result in reduced energy consumption and costs when commercialized.
   * Identification of specific technical and economic barriers and discussion of how CEC funding can overcome these barriers and improve the economics and commercialization of the proposed project.
2. Describe the involved carbon capture and separation mechanisms such as sorption equilibrium, reaction kinetics and thermodynamics and/or description of the DAC component design concept.
3. Discuss how the proposed project will meet all research goals listed in Table 1 and the disposition of the project after the grant term. The applicant is required to define the current status of each metric and justify the approach to fulfill each research goal.
4. In addition to the research goals listed in Table 1, discuss how the project will result in increased scale of atmospheric carbon removal using the proposed technology, reduced requirements for various resources (e.g., potable and non-potable water), improved purity of the CO2 produced, and any other specific success metrics that are measurable, achievable, and relevant to the proposed project within the term of the proposal.
5. Describe how the captured atmospheric carbon will be disposed of within the project term and plans for beyond the agreement term. Projects within Group 1 may release captured CO2 back into the atmosphere within the agreement term but must account for this in the assessment of project impacts and benefits. Applicants must identify pathways for proper firm sequestration of captured CO2 when technology is fully scaled up and include it in the LCA.

Table 1: Research Goals for Group 1

|  |  |  |
| --- | --- | --- |
| Metric | Baseline | Research Goal |
| Reduce cost/ton of captured CO2 | Applicant defined | 30% or greater reduction in cost with a plan to achieve $100/MT of CO2 equivalents by 2032 |
| Reduce energy consumption/intensity of the capture process of the DAC approach | ≤ 2500 kWh/MT CO2 | 30% or greater reduction in overall energy use (total of electricity and thermal) |

**Technical Approach:**

1. Project plan outlining activities and milestones to advance the technology from its current TRL to at least one higher TRL and reach the research goals listed in Table 1 by the end of the project term.
2. Project plan outlining activities and steps to validate performance through laboratory/pilot tests followed by models and simulations, including methodology and specifics on final project objectives.
3. Discussion of the operational procedures for conducting testing and data collection within laboratory-scale systems, pilot-scale systems, or both to validate performance through laboratory/pilot tests followed by models and simulations, including methodology and specifics on final project objectives. This should include a detailed description of the anticipated testing conditions such as feed composition, operational pressure, temperature, and flow rate. Applicant shall include a discussion of power, water, and heat requirements and waste management during the testing.
4. Description of the technology transfer plan and a discussion of how verified results and data collected will be disseminated and made publicly available.
5. Discussion of where and how sufficient quantities of the innovative DAC materials/components will be obtained. The applicant must indicate whether the materials/components will be fabricated on-site as a part of research and development efforts or are already available at a reasonable price and have low carbon footprints for the laboratory-scale and prototype testing.
6. Analysis of the cost-effectiveness of the proposed project, including fixed and other necessary costs for long-term operation (beyond the term of the proposal), potential energy savings, and use of available renewable energy. Applicants are required to outline the strategies that the project team will implement to maximize the cost-effectiveness of the requested CEC funds and minimize indirect and overhead costs.
7. The Project Narrative (Attachment 2) must include a Measurement and Verification Plan (MVP) that outlines the methods for measuring and quantifying actual project benefits, including the assessment of reduced carbon intensity in comparison to existing products and processes and improved energy efficiency (in terms of therms and kWh per kg of captured CO2) associated with the proposed DAC technology. The MVP activities must also be detailed in the “Technical Tasks” section of the Scope of Work Template (Attachment 4). The MVP must specify the approach for accurately measuring and verifying energy savings resulting from energy efficiency measures, including the methodology, tools, and protocols that will be utilized to monitor and report progress toward energy efficiency objectives. Projects that include MVP measurement conducted by a third independent party will receive preference. The plan should demonstrate the third party's expertise and experience in conducting thorough and accurate measurement and verification processes, including any certifications or qualifications that support their capabilities in this area.

**Impacts and Benefits**

1. Group 1 projects are not required to submit a community benefits plan (CBP); however, if funded, recipients are required to create a Community Benefits Plan Development Proposal (CBPDP) as a part of their final deliverables upon the completion of the project. This CBPDP must include:
   * project’s plan for outreach and engagement, including community partners
   * project’s impact on criteria pollutants, water, and other resources
   * project’s potential benefits to local communities
   * approaches for negotiating future Community Benefits Agreements and integrating stakeholder and community feedback to develop and improve ongoing engagement

**Team Qualifications, Capabilities, and Resource**

1. Demonstrated expertise in the design, development, and optimization of DAC systems, particularly in the use of sorbents, solvents, contactors, and separators.
2. Prior experience in research and development projects, specifically those related to CDR technologies, with a focus on lowering cost and energy consumption.
3. Expertise in materials science, particularly in examining and improving the performance and lifespan of materials used in DAC processes.
4. Proficiency in advanced modeling and simulation tools to assess DAC systems' technical, economic, and environmental impacts and optimize various process design elements.
5. Experience in developing rigorous MRV protocols for quantifying carbon capture effectiveness, resource use, and carbon intensity.
6. Previous experience in managing complex research projects, including coordinating with multiple stakeholders, funders, and community representatives to ensure project success.
7. A diverse team comprising experts in engineering, environmental science, economics, policy, and social sciences to address the multifaceted challenges of DAC technologies.
8. Demonstrated experience and track of success in managing multi-stakeholder collaborative research and development projects involving diverse stakeholders, with a focus on CDR technologies and projects based in California environments.
9. Familiarity with environmental regulations and policies relevant to carbon management and DAC technologies, including the ability to analyze their impact on project viability.

**NOTE:** CEC accepts no confidential materials, and all application documents submitted will be available to the public.

**Group 2: Direct Air Capture Field Demonstration and Community Engagement**

Proposals must be at a TRL of 6 or higher with the expectation of advancing one or more levels.

**NOTE:** all demonstration sites must be located in California.

Proposed projects under Group 2 should focus on conducting field demonstrations to test and improve DAC technologies to achieve net removal of at least 1,000 MT of CO2/year by the end of the agreement, with the potential to reach a cost of $100/MT CO2 equivalents by 2032. This will involve implementing strategies to reduce resource consumption, especially in terms of land use and energy, water, and other feedstocks, as well as showcasing accurate MRV of capture efficiency, energy and resource usage, and overall greenhouse gas and other emissions.

Example projects include but are not limited to:

* All the examples from Group 1, but for Group 2, CO2 removal capacity must be able to scale up to 1,000 MT/year by the end of the agreement.
* Develop and demonstrate emerging/innovative technologies to scale up, move to a higher TRL, and gather operation data via demonstration in California DAC conditions.
* Use of non-potable water and waste heat/steam in proposed DAC process to reduce energy intensity, resource intensity, or both.
* Use of additive manufacturing techniques to facilitate scaleup and reduce processing cost and requirements.
* Use of renewable energy sources, electricity, or zero-carbon fuel for process needs. CEC funds cannot be used for onsite renewable energy production, but such costs can be paid for using match funds.
* Optimization of modular designs that minimize the cost of repair, replacement, and adjustments to infrastructure.
* Integration of innovative cost- and energy-saving DAC components, designs, and strategies.
* Minimized use of clean water resources, including net production of clean water and use of wastewater in solvents, electrolytes, etc.
* Minimized use of toxic solvents or sorbents for CO2 capture and development of approaches to minimize associated risks.
* Development of scalable manufacturing and low-carbon-intensity processes for producing novel DAC materials/components and integration of advanced materials/components into practical DAC systems.

The Project Narrative (Attachment 2) must discuss the following in the sections identified and include references and assumptions to justify responses:

**Technical Merit:**

1. Describe and justify that the proposed technologies are currently at a TRL>5 and how the proposed project will progress to at least one TRL by the end of the agreement. Applicants must include the following in their discussion:

* Include a literature review, including references, that provides an evaluation of existing DAC materials/components and process integration pathways TRL, capacity limits, challenges, and restrictions and explains how and why the proposed technology will be an improvement.
* Provide a baseline of the current state of the proposed DAC materials/components or process developments and discuss how the innovation will result in reduced energy consumption and costs when commercialized.
* Identify specific technical and economic barriers and discuss how CEC funding can overcome these barriers and improve the economics and commercialization of the proposed project.

1. Describe the proposed DAC system including carbon capture and separation mechanisms, resource requirements (i.e., electric power, heat, water, other feedstocks), and land utilization, and include a process flow diagram.
2. Discuss potential side benefits and risks associated with the proposed DAC system, including but not limited to handling hazardous materials and products and their disposal at the end of the life cycle.
3. Describe the results from the preliminary LCA and techno-economic analysis (TEA) of the proposed DAC technology.
4. Discuss how the proposed project will meet all the research goals listed in Table 2 and discuss the disposition of the project after the grant term. The applicant is required to define the current status of each metric and justify the approach to fulfill each research goal.
5. In addition to the research goals listed in Table 2, discuss how the project will result in an increased scale of atmospheric carbon removal using the proposed technology, reduced requirements for various resources (e.g., potable and non-potable water), improved purity of the CO2 produced, and any other specific success metrics that are measurable, achievable, and relevant to the proposed project within the term of the proposal.
6. Describe how the captured atmospheric carbon will be disposed of within the project term and disposal plans for beyond the agreement term. Applicants must identify pathways for proper firm sequestration of captured CO2. If the CO2 is to be transported and stored, applicants must describe potential arrangements, how and where the CO2 will be transported and stored, the status of environmental permitting, and existing and planned local community engagement.
7. Discuss the selection of the field and pre-commercialization demonstration site, environmental permitting, and any existing community engagement.

Table 2: Research Goals for Group 2

|  |  |  |
| --- | --- | --- |
| Metric | Baseline | Research Goal |
| Reduce cost/ton of captured CO2 | ≤$600/MT of CO2 equivalents | 30% or greater reduction in cost with a plan to achieve the ultimate goal of $100/MT of CO2 equivalents by 2032 |
| Reduce energy consumption/intensity of the capture process of the DAC approach | ≤ 2000 kWh/MT CO2 | 30% or greater reduction in overall energy use (total of electricity and thermal) |

**Technical Approach:**

1. Detailed testing and engineering design plan outlining activities and steps to reach the research goals listed in Table 2 and validate performance through field demonstrations followed by models and simulations, including methodology and specifics on final project objectives. Applicant must include a description of the technology transfer plan and a discussion of how the project will both advance the technology from its current TRL to at least one higher TRL and meet a target of 1000 MT CO2/year by the end of the project term.
2. Discussion of the operational procedures for conducting testing and data collection within pilot-scale systems and field demonstrations. Applicant must include a description of how the verified results and collected data will be disseminated and made publicly available.
3. In addition to the research goals listed in Table 2, discussion of how the project will result in increased scale of atmospheric carbon removal of the proposed technology, reduced requirements for various resources (e.g., potable and non-potable water), improved purity of the CO2 produced, and any other specific success metrics that are measurable, achievable, and relevant to the proposed project within the term of the proposal.
4. Description of how pilot testing will be conducted in the field, at an identified site in California. This should include the approach that will be used and the level of community engagement and education activities.
5. Detailed description of the anticipated testing conditions such as feed composition, operational pressure, temperature, and flow rate. Applicant shall include a discussion of power, water, and heat requirements and waste management during the field testing.
6. Discussion of where and how sufficient quantities of the innovative DAC materials/components will be obtained. The applicant must indicate whether the materials/components will be fabricated on-site as a part of research and development efforts or are already available at a reasonable price and have low carbon footprints for large-scale applications.
7. Detailed description of and justification for the selected location.
8. Description of the procedure for conducting the TEA and LCA and creating a business plan, and a summary of the preliminary LCA and TEA.

Measurement Reporting and Verification Plan (under Technical Approach)

1. The Project Narrative (Attachment 2) must include an MRV Plan that describes how the actual project benefits will be measured and quantified. For example, including the assessment of reduced carbon intensity in comparison to existing products and processes and improved energy efficiency (in terms of therms and kWh per kg of captured CO2) associated with the proposed DAC technology. The activities proposed in the MRV Plan must be included in the “Technical Tasks” section of the Scope of Work Template (Attachment 4), be aligned with the research goals in Table 2, and include:
   * Monitoring: The MRV Plan must outline the monitoring methods and technologies to be used to track CO2 capture, transportation, and storage throughout the DAC process. This may include monitoring equipment, sensors, and data collection procedures to measure CO2 concentrations, flow rates, and other relevant parameters.
   * Reporting: The MRV Plan should specify the reporting requirements for documenting and reporting CO2 capture and storage data to regulatory authorities, the hosting community, and the public. This may include regular reporting intervals, data formats, and reporting protocols to ensure transparency and accountability.
   * Verification: The MRV Plan should describe the verification procedures and independent third-party audits that will be conducted to validate the accuracy and reliability of the CO2 capture and storage data. Verification processes help ensure the integrity of the project's CO2 and criteria pollutant emissions reductions and compliance with regulatory standards.
   * Data Management: The MRV Plan should describe the data management procedures for collecting, storing, and analyzing CO2 capture and storage data. This may include data quality control measures, data security protocols, and data sharing mechanisms to facilitate transparency and accountability.
   * Compliance Assurance: The MRV Plan should outline the procedures for ensuring compliance with regulatory requirements, including permit conditions, reporting deadlines, and emissions reduction targets. This may involve internal controls, documentation requirements, and compliance monitoring mechanisms to demonstrate adherence to regulatory standards.

**Impacts and Benefits**

1. Projects must allocate at least 7 % of CEC funds for community engagement, education, and risks/benefits analysis. The CBP must include, but not limited to:
   * Allocating funding for community engagement, tribal engagement, or both and inclusion of relevant tasks outlined in the Scope of Work.
   * Approaches to identifying stakeholders and engagement strategies.
   * Approaches for negotiating Community Benefits Agreements.
   * Plans for meeting and hosting workshops regularly with community-based organizations (CBO) and/or California Tribal Organizations where the demonstration project is occurring.
   * Protocols for sustained engagement.
   * Strategies for integrating stakeholder and community feedback to develop and improve ongoing engagement.
   * Plans for developing and providing informational materials for distribution on the CEC-funded DAC technology, including carbon, energy, and resource intensity; impacts to local communities, including air and water emissions; potential risks and mitigation strategies; and potential economic development and other benefits.
2. The demonstration site shall be located within the same community or service area as the community and/or California Tribal Organization that it is proposing to assist. A letter of support from the hosting community must be submitted with the application package as indicated in Attachment 9.

**Team Qualifications, Capabilities, and Resource**

1. Demonstrated knowledge and experience in engineering, environmental science, economics, policy, and social sciences relevant to DAC technologies.
2. Established record of developing and operating DAC technologies, including a running DAC system and evidence of successful outcomes.
3. Relevant experience in research, development, deployment, or operational aspects of DAC or CCUS projects, showcasing expertise and practical knowledge.
4. Strong capability in implementing rigorous MRV frameworks that quantify capture efficiency, emissions, and resource consumption, ensuring compliance with project objectives.
5. Experience working collaboratively with diverse stakeholders and availability of necessary tools, facilities, and financial resources to support the successful execution of the DAC demonstration and community engagement project.
6. Previous experience in outreach, education, and engagement with under-represented communities, with proven ability to allocate funds effectively to design and implement community engagement and education initiatives, including the ability for community engagement and assessment.
7. Experience in analyzing environmental, economic, and regulatory policies related to CM and their implications for DAC technologies.
8. Previous experience conducting market assessments, identifying business opportunities, and strategizing for the commercialization of DAC technology.
9. Familiarity with environmental regulations and policies related to carbon capture, climate change, and GHG gas emissions, enabling strategic navigation of regulatory landscapes and compliance.

**NOTE:** CEC accepts no confidential materials, and all application documents submitted will be available to the public.

# III. Application Submission Instructions

## Application Format, Page Limits

All items listed below are required as part of the application package. Failure to provide any items may result in disqualification of the application. Attachment requirements are expanded and explained below in this section and in the attachments themselves.

|  |  |  |
| --- | --- | --- |
| **Item** | **Attachment Number** | **Page Limitation** |
| Executive Summary | Attachment 1 | Two pages |
| Project Narrative | Attachment 2 | Twenty pages |
| Project Team | Attachment 3 | Two pages for each resume |
| Scope of Work | Attachment 4 | Thirty pages |
| Project Schedule | Attachment 5 | Four pages |
| Budget | Attachment 6 | None |
| CEQA Compliance Form | Attachment 7 | None |
| Past Project Information | Attachment 8 | Two pages for each project description |
| Commitment and Support Letters | Attachment 9 | Two pages, excluding the cover page |
| Project Performance Metrics | Attachment 10 | None |
| Applicant Declaration | Attachment 11 |  |

## Method For Delivery

The only method of submitting applications to this solicitation is Energy Commission Agreement Management System (ECAMS), available at: https://ecams.energy.ca.gov.

The CEC is providing a team of technical assistants to support applicants with this new process. Please email ECAMS.SalesforceSupport@energy.ca.gov for support.

ECAMS allows applicants to complete and submit their application to the CEC prior to the date and time specified in this solicitation. Files uploaded to the system must be in Microsoft Word XP (.doc format) or newer and Excel Office Suite formats unless originally provided in the solicitation in another format.  Attachments requiring signatures, such as match funding commitment letters, may be scanned and submitted in PDF format.  Completed Budget Forms, Attachment, must be in Excel format.

The deadline to submit applications through ECAMS system is 11:59 p.m. on the Deadline to Submit Applications date shown in the Key Activities Schedule. ECAMS automatically closes at 11:59 pm. If the full submittal process has not been completed before 11:59 p.m., your application will not be considered.

The CEC strongly encourages Applicants to upload and submit all applications by 5:00 p.m. because CEC staff will not be available after 5:00 p.m. or on weekends to assist with the upload process. And please note that while we endeavor to assist all would-be applicants, we can’t guarantee staff will be available for in-person consultation on the due date, so please plan accordingly.

Please give yourself ample time to complete all steps of the submission process: do not wait until right before the deadline to begin the process. Due to factors outside the CEC’s control and unrelated to ECAMS, upload times may be much longer than expected. For example, unexpected issues could occur, causing long delays that prevent timely submission. Please plan accordingly. For instructions on how to apply using the ECAMS system, please see the How to Apply document available on the CEC website at: https://www.energy.ca.gov/funding-opportunities/funding-resources, under General Funding Information, Energy Commission Agreement Management System (ECAMS).

First time users must register as a new user to access the system. There will be two types of user accounts to establish: 1) An organizational account, for the entity applying to the solicitation; and 2) user accounts for individuals who will be submitting the application on behalf of the organization.

Applicants will be required to upload all attachments marked “required” in the system in order for the application to be submitted.

## Application Content

Below is a general description of each required section of the application. Please reference each individual attachment for a detailed description of the information requested by that attachment. Completeness in submitting all the information requested in each attachment will be factored into application scoring.

1. Executive Summary Form (Attachment 1)

The Executive Summary includes: a project description; the project goals and objectives to be achieved; an explanation of how the goals and objectives will be achieved, quantified, and measured; and a description of the project tasks and overall management of the agreement.

1. Project Narrative Form (Attachment 2)

This form includes the majority of the applicant’s responses to the Scoring Criteria in Section IV. The following must also be addressed for both Applied Research & Technology Demonstration projects:

* 1. **Group Specific Questions**
     + Include required group specific information (see Section I.C. and II.B) in the specified sections.

1. Project Team Form (Attachment 3)

Identify by name all key personnel[[17]](#footnote-18) assigned to the project, including the project manager and principal investigator (if applicable), and individuals employed by any major subrecipient (a major subrecipient is a subrecipient receiving $100,000 or more of Commission funds). Clearly describe their individual areas of responsibility. Include the information required for each individual, including a resume (maximum two pages).

1. Scope of Work Template (Attachments 4)

Applicants must include a completed Scope of Work for each project, as instructed in the template. The Scope of Work identifies the tasks required to complete the project.

Electronicfiles for the Scope of Work must be in **MS Word** file format**.**

1. Project Schedule (Attachment 5)

The Project Schedule includes a list of all products, meetings, and due dates. All work must be scheduled for completion by the “Key Dates” section of this solicitation manual.

Electronic files for the Project schedule must be in MS Excel file format.

1. Budget Forms (Attachment 6)

Because this solicitation is utilizing the new ECAMS system for submitting applications, applicants have two options for uploading a budget:

1. **Option 1: Prime Applicant’s budget is both keyed directly into ECAMS and uploaded as an MS Excel attachment; the Prime Major Subrecipient(s) budgets are uploaded as MS Excel attachments.** The new ECAMS system allows applicants to build the prime applicant’s budget directly into the system. At this time, there is no way to input major subrecipient budgets directly into the system. Instructions for inputting budget items into the ECAMS system are included at: https://www.energy.ca.gov/funding-opportunities/funding-resources.
2. **Option 2: Upload all budgets (Prime and Major Subrecipients) as MS Excel attachments** and leave the ECAMS budget sections blank.

Instructions for completing the budgets can be found in Budget Category Guidance at the ECAMS Resources page. **Read the instructions tab on the MS Excel attachments Attachment 6 before completing the worksheets**. Complete and submit information on **all** budget worksheets. The salaries, rates, and other costs entered on the worksheets will become a part of the final agreement.

1. All project expenditures (match share and reimbursable) must be made within the Anticipated Agreement Start and End dates listed in the “Key Activities Schedule” of this solicitation manual. Match share requirements are discussed in Part I.D and I.K of this solicitation. The entire term of the agreement and projected rate increases must be considered when preparing the budget.
2. The budget must reflect estimates for **actual** costs to be incurred during the agreement term. The CEC may only approve and reimburse for actual costs that are properly documented in accordance with the grant agreement terms and conditions. Rates and personnel shown must reflect the rates and personnel the applicant would include if selected as a Recipient.
3. The rates proposed, except for Direct Labor and Fringe Benefits, are considered capped and may not change during the agreement term. Except for Direct Labor and Fringe Benefits, the grant recipient will only be reimbursed for actual rates and not to exceed the capped rates. The rates proposed for Direct Labor and Fringe Benefits are treated as estimates; a grant recipient can invoice at higher rates as long as it is only invoicing for actual expenditures it has made. If an applicant, by law, cannot agree to Direct Labor and Fringe Benefits rates being treated as estimates, the applicant can request to modify this term. This modification may be negotiated if the applicant is proposed for award. The CEC retains the sole right to refuse to agree to any requested modifications. The budget must NOT include any grant recipient profit from the proposed project, either as a reimbursed item, match
4. share, or as part of overhead or general and administrative expenses (subrecipient profit is allowable, though the maximum percentage allowed is 10% of the total subrecipient rates for labor, and other direct and indirect costs as indicated in the Category Budget tab). Please review the terms and conditions and budget forms for additional restrictions and requirements.
5. The budget must allow for the expenses of all meetings and products described in the Scope of Work. Meetings may be conducted at the CEC or by conference call, as determined by the CAM.
6. Applicants must budget for permits and insurance. Permitting costs may be accounted for in match share. Permit costs and the expenses associated with obtaining permits are not reimbursable with CEC funds, with the exception of costs incurred by University of California grant recipients.
7. The budget must NOT identify that CEC funds will be spent outside of the United States or for out-of-country travel. However, match funds may cover these costs if there are no legal restrictions.
8. **Prevailing wage requirement:** Projects that receive an award of public funds from the CEC often involve construction, alteration, demolition, installation, repair or maintenance work over $1,000. For this reason, projects that receive an award of public funds from the CEC are likely to be considered public works under the California Labor Code. See Chapter 1 of Part 7 of Division 2 of the California Labor Code, commencing with Section 1720 and Title 8, California Code of Regulations, Chapter 8, Subchapter 3, commencing with Section 16000.

Projects deemed to be public works require among other things the payment of prevailing wages, which can be significantly higher than non-prevailing wages.

By accepting this grant, the grant recipient as a material term of this agreement shall be fully responsible for complying with all California public works requirements including but not limited to payment of prevailing wage. Therefore, as a material term of this grant, the grant recipient must either:

(a) Proceed on the assumption that the project is a public work and ensure that:

1. prevailing wages are paid; and
2. the project budget for labor reflects these prevailing wage requirements; and
3. the project complies with all other requirements of prevailing wage law including but not limited to keeping accurate payroll records, and complying with all working hour requirements and apprenticeship obligations;

or,

(b) Timely obtain a legally binding determination from the Department of Industrial Relations or a court of competent jurisdiction before work begins on the project that the proposed project is not a public work.

1. California Environmental Quality Act (CEQA) Compliance Form (Attachment 7)

The CEC requires the information on this form to facilitate its evaluation of proposed activities under CEQA (California Public Resources Code Section 21000 et. seq.), a law that requires state and local agencies in California to assess the potential environmental impacts of their proposed actions. The form will also help applicants to determine CEQA compliance obligations by identifying which proposed activities may be exempt from CEQA and which activities may require additional environmental review. If proposed activities are exempt from CEQA (such as paper studies), the worksheet will help to identify and document this. This form must be completed regardless of whether the proposed activities are considered a “project” under CEQA.

Failure to complete the CEQA process in a timely manner after the CEC’s Notice of Proposed Award may, in the CEC’s sole discretion and without limiting any of the CEC’s other rights and remedies, result in the cancellation of a proposed award and allocation of funding elsewhere, such as to the next highest-scoring project.

1. Past Projects Information (Attachment 8)

The Past Projects Information Form asks for information about the Applicant and its major subrecipients’ past agreements with the CEC and other entities.

1. Commitment and Support Letter Form (Attachment 9)

A commitment letter commits an entity or individual to providing the service or funding described in the letter. A support letter details an entity or individual’s support for the project. Commitment and Support Letters must be submitted with the application. Letters that are not submitted by the application deadline will not be reviewed and counted towards meeting the requirement specified in the solicitation.

* + 1. Commitment Letters

Applicants must submit a **match funding** commitment letter from each entity that is committing to providing match funding. Each commitment letter must be signed by an authorized representative of the entity or by the individual that is making the commitment. A commitment letter must include all of the following: (1) identification of the source(s) of the funds; (2) a justification of the dollar value claimed; (3) an unqualified (i.e. without reservation or limitation) commitment that guarantees the availability of the funds for the project; and (4) a strategy for replacing the funds if they are significantly reduced or lost.

* If the project involves pilot testing/demonstration/deployment activities, the applicant must include a site commitment letter signed by an authorized representative of the proposed pilot test/demonstration/deployment site. The letter should: (1) identify the location of the site (street address, parcel number, tract map, plot map, etc.) which must be consistent with ECAMS and Attachment 8; and (2) unconditionally commit to providing the site for the proposed activities if recipient is awarded a CEC grant.
* **Project partners** that are making contributions other than match funding or a pilot test/demonstration/deployment site, and are not receiving CEC funds, must submit a commitment letter signed by an authorized representative that: (1) identifies how the partner will contribute to the project; and (2) unconditionally commits to making the contribution if Recipient is awarded a CEC grant.
  + 1. Support Letters

All applicants must include at least one support letter from a project stakeholder (i.e., an entity or individual that will benefit from or be involved in the project) that: (1) describes the stakeholder’s interest or involvement in the project; (2) indicates the extent to which the project has the support of the relevant industry and/or organizations; and (3) describes any support it intends (but does not necessarily commit) to provide for the project, such as funding or the provision of a pilot test/demonstration/deployment site.

1. Project Performance Metrics (Attachment 10)

The purpose of this questionnaire is to identify and document performance targets for the project. The performance targets should be a combination of scientific, engineering and techno-economic metrics that provide the most significant indicator of the research or technology’s potential success. The metrics should provide constructive targets for the performance of the technology or project and how the metric will be measured and evaluated, during the project and after the project is complete.

1. Applicant Declaration (Attachment 11)

This form requests the applicant make certain declarations under penalty of perjury. This form must be signed by an authorized representative of the applicant’s organization

1. Appendix G from CEQA Handbook (Attachment 12)

Applicants may use this attachment as a reference guide for projects to complete the CEQA compliance form (Attachment 7). The Environmental Checklist Form is not required for application submission.

# IV. Evaluation and Award Process

## Application Evaluation

Applications will be evaluated and scored based on responses to the information requested in this solicitation and on any other information available, such as past performance of CEC agreements. To evaluate applications, the CEC will organize an Evaluation Committee that consists of primarily, or all CEC staff. The Evaluation Committee may use additional technical expert reviewers to provide an analysis of applications.

1. **Stage One: Application Screening**

The Evaluation Committee will screen applications for compliance with the Screening Criteria in **Section IV.E** of this Part. **Applications that fail any of the screening criteria will be rejected.**

1. **Stage Two: Application Scoring**

Applications that pass Stage One will be submitted to the Evaluation Committee for review and scoring based on the Scoring Criteria in **Section IV.E** of this Part.

* The scores for each application will be the average of the combined scores of all Evaluation Committee members.

## Ranking, Notice of Proposed Award, and Agreement Development

1. **Ranking and Notice of Proposed Award**

Applications that receive at least the minimum required score for all criteria will be ranked according to their score by group.

* CEC staff will post a **Notice of Proposed Award (NOPA)** that includes: (1) the total proposed funding amount; (2) the rank order of applicants; and (3) the amount of each proposed award. The CEC will post the NOPA on its website and will e-mail it to all entities that submitted an application. Proposed awards must be approved by the CEC at a business meeting.

**Debriefings:** Applicants that are not proposed for funding may request a debriefing after the release of the NOPA by e-mailing the CAO listed in Part I. A request for debriefing must be received **no later than 30 calendar days** after the NOPA is released.

* In addition to any of its other rights, the CEC reserves the right to:
  + Allocate any additional funds to passing applications, in rank order;
  + Aggregate funds from multiple groups to fully fund the highest ranked passing application(s), regardless of group. (if applicable); and
  + Negotiate with successful applicantstomodify the project scope, schedule, project team entity that will receive the award, project location and/or level of funding.

1. **Agreements**

Applications recommended for funding in a NOPA will be developed into a proposed grant agreement to be considered at a CEC Business Meeting. Grant recipients may begin the project only after full execution of the grant agreement (i.e., approval at a CEC business meeting and signature by the grant recipient and the CEC).

* **Agreement Development:** The Contracts, Grants, and Loans Office will send the grant recipient a grant agreement for approval and signature. The agreement will include the applicable terms and conditions and will incorporate this solicitation and the application by reference. The CEC reserves the right to modify the award documents (including the project scope, level of funding and terms and conditions) prior to executing any agreement.
* **Performance Evaluation:** An applicant receiving an award under this solicitation is subject to evaluation of performance under the resulting agreement. The CEC reserves the right to utilize the performance evaluation to screen and score future funding applications.
* **Failure to Execute an Agreement:** If the CEC is unable to successfully execute an agreement with an applicant in a timely manner, it reserves the right to cancel the pending award and use the funds elsewhere, such as to fund the next highest-ranked, eligible application.

## Grounds to Reject an Application or Cancel an Award

Applications that do not pass the screening stage will be rejected. In addition, the CEC reserves the right to reject an application and/or to cancel an award for any reason, including any of the following:

* The application contains false or intentionally misleading statements or references that do not support an attribute or condition contended by the applicant.
* The application is intended to erroneously and fallaciously mislead the State in any way.
* The application does not comply or contains caveats that conflict with the solicitation, and the variation or deviation is material.
* The applicant has previously received funding through an EPIC or Public Interest Energy Research (PIER) agreement, has received the royalty review letter (which the CEC annually sends out to remind past award recipients of their obligations to pay royalties), and has not responded to the letter or is otherwise not in compliance with repaying royalties.
* The applicant has received unsatisfactory agreement performance evaluations from the CEC or another California state agency.
* The applicant is a business entity required to be registered with the California Secretary of State and is not in good standing.
* The applicant has not demonstrated that it has the financial capability to complete the project.
* The applicant fails to meet CEQA compliance within sufficient time for the CEC to meet its encumbrance deadline or any other deadlines, as the CEC in its sole and absolute discretion may determine.
* The applicant has included a statement or otherwise indicated that it will not accept the terms and conditions, or that acceptance is based on modifications to the terms and conditions. If an applicant, by law, cannot agree to certain terms and conditions, the applicant can request a modification. This modification may be negotiated if the applicant is proposed for award. The CEC retains the sole right to refuse to agree to any requested modifications.

## Miscellaneous

1. **Solicitation Cancellation and Amendment**

It is the policy of the CEC not to solicit applications unless there is a bona fide intention to award an agreement. However, if it is in the State’s best interest, the CEC reserves the right, in addition to any other rights it has, to do any of the following:

* Cancel this solicitation;
* Revise the amount of funds available under this solicitation;
* Amend this solicitation as needed; and/or
* Reject any or all applications received in response to this solicitation.

If the solicitation is amended, the CEC will post an addendum on CEC’s website at: https://www.energy.ca.gov/funding-opportunities/solicitations. The CEC will not reimburse applicants for application development expenses under any circumstances, including cancellation of the solicitation.

1. **Modification or Withdrawal of Application**

Applicants may recall or modify a submitted application within ECAMS before the deadline to submit applications. Applications cannot be changed after that date and time. An application cannot be “timed” to expire on a specific date. For example, a statement such as the following is non-responsive to the solicitation: “This application and the cost estimate are valid for 60 days.”.”

1. **Confidentiality**

Though the entire evaluation process from receipt of applications up to the posting of the NOPA is confidential, **all submitted documents will become publicly available records** and property of the State after the CEC posts the NOPA or the solicitation is cancelled. **The CEC will not accept or retain applications that identify any portion as confidential unless the applicant clarifies in writing that marking the material as confidential was a mistake and the material can be made public.**

1. **Solicitation Errors**

If an Applicant discovers any ambiguity, conflict, discrepancy, omission, or other error in the solicitation at any time prior to 5:00 p.m. of the application deadline date, the Applicant should immediately notify the CEC of the error in writing and request modification or clarification of the solicitation. The CEC will provide modifications or clarifications by written notice to all entities that requested the solicitation. The CEC will not be responsible for failure to correct errors.

1. **Immaterial Defect**

The CEC may waive any immaterial defect or deviation contained in an application. The CEC’s waiver will not modify the application or excuse an applicant proposed for funding from full compliance with solicitation requirements.

1. **Tiebreakers**

If the score for two or more applications are tied, the application with a higher score in the XX criterion will be ranked higher. If still tied, an objective tie-breaker (such as a random drawing) will be used.

1. **Clarification Interviews**

The Evaluation Committee may conduct optional Clarification Interviews with applicants to clarify and/or verify information submitted in the application. However, these interviews may not be used to change or add to the content of the original application. Applicants will not be reimbursed for time spent answering clarifying questions.

1. **Opportunity to Cure Administrative Errors**

The CEC understands and appreciates the significant time and expense applicants spend preparing applications. An administrative error that prevents an applicant from submitting a complete application frustrates both the CEC and applicants. The purpose of this process is to reduce the number of applications screened out or receiving a significantly reduced score for administrative errors while maintaining a fair competition. This process also ensures better competition and thus better projects to benefit California.

After the application deadline, an applicant might identify, or the Evaluation Committee may find what reasonably appears to be, an administrative error. For purposes of this solicitation only, an administrative error is defined as an applicant’s inadvertent mistake that prevents materials in existence as of the application deadline from appearing in its submitted application. Examples include, but are not limited to, accidentally:

* Scanning and submitting every other page in a document instead of every page.
* Submitting the wrong document.
* Leaving out a document.

If the Evaluation Committee find what reasonably appears to be an administrative error, they can communicate with the applicant to confirm. If an applicant finds an administrative error in its application, it should immediately contact the Commission Agreement Officer listed in the “Contact Information/Questions” section of this solicitation.

If an administrative error has been identified and communicated to the Commission Agreement Officer, the CEC may, but is not required to, allow the applicant a period of time to provide the missing materials. Reasons why the CEC might NOT allow an applicant to fix an administrative error include, but are not limited to:

* The funds have a deadline that does not allow time to fix the error.
* The application has been screened out or does not receive a passing score for reasons unrelated to the administrative error, making irrelevant any efforts to fix the error.
* The applicant brings the error to the CEC’s attention too late in the solicitation process (e.g., after awards have been approved at a Business Meeting).

If the Evaluation Committee allows an applicant the opportunity to fix an administrative error, the Commission Agreement Officer will communicate in writing to the applicant’s project manager listed the deadline by which the applicant must provide the missing materials. Reasonable efforts will be made to confirm receipt of the notice, but actual notice cannot be guaranteed, and the obligation is on the applicant to ensure the proper contact(s) are listed and available to respond. The Evaluation Committee will not consider any materials submitted after the deadline.

This process only allows applicants to submit materials in existence as of the application deadline. This process does NOT allow applicants to submit material created or modified after the application deadline. The CEC has sole discretion to determine whether materials submitted are eligible for consideration by the Evaluation Committee under this opportunity to cure.

Applicants must include the following certification along with the materials it submits to fix an administrative error and must explain why the materials were not provided due to an inadvertent administrative error:

“I certify on behalf of the applicant that the materials provided herein existed at the time of the application deadline, have not been modified since, and were not originally provided due to an inadvertent administrative error as described herein.”

The Evaluation Committee is not responsible for finding, or communicating with the applicant about, any errors in an application. Applicants remain solely responsible for submitting applications, including any material submitted to fix an administrative error, that meet all solicitation requirements.

## Stage One: Application Screening

| **Screening Criteria**  *The Application must pass ALL criteria to progress to Stage Two.* | **Pass/Fail** |
| --- | --- |
| 1. The application is received by the CEC by the due date and time specified in the “Key Activities Schedule” in Part I of this solicitation and is received in the required manner (e.g., no emails or faxes). | Pass  Fail |
| 1. The application addresses only one of the eligible project groups, as indicated by the information the Applicant enters into the ECAMS system. | Pass  Fail |
| 1. If the applicant has submitted more than one application for the same project group, each application is for a distinct project (i.e., no overlap with respect to the technical tasks described in the Scope of Work, Attachment).   *The CEC may conduct a clarification interview with an applicant to clarify and/or verify information in its applications to help CEC determine whether each application is for a distinct project. The final determination shall be made solely by CEC.* | Pass  Fail |
| 1. The Application includes Commitment Letters that total the minimum of 20*%* in match share of the total requested CEC funds. (Group 2 only) | Pass  Fail |
| If the project involves technology pilot testing/demonstration/deployment activities, application identifies one or more pilot test/demonstration/deployment site locations. (Group 2 only) | Pass  Fail |

**Screening Criteria for Past Performance**

| **Screening Criteria** |  |
| --- | --- |
| **Applicant Past Performance with Energy Commission**  An applicant may be disqualified under this solicitation due to severe performance issues under one or more prior or active CEC agreements. This past performance screening criterion does not apply to applicants that do not have any active or prior agreements with the CEC.  The applicant—defined for the purpose of this past performance screening criterion as at least one of the following: the business, principal investigator, or lead individual acting on behalf of themselves—received funds from the Energy Commission (e.g., contract, grant, or loan) and entered into an agreement(s) with the Commission and demonstrated **severe performance issues** characterized by significant negative outcomes including:   * Significant deviation from agreement requirements that were caused by factors that are, or should have been, within applicant’s control; * Termination with cause; * Demonstrated poor communication, project management, and/or inability, due to circumstances within applicant’s control, or which should have been within applicant’s control, from materially completing the project; * Deliverables were not submitted to the CEC or were of significantly poor quality. For example, applicant delivered poorly written reports that required significant rework by staff prior to acceptance or publication; and * Severe audit findings not resolved to CEC’s satisfaction. Severe audit findings may include but are not limited to: incomplete or unsatisfactory deliverables; grant funds used inappropriately (i.e., other than as represented); or questioned costs. |  |
| **Must pass to continue with Scoring Criteria** | **Pass/Fail** |

## Stage Two: Application Scoring

Applications that pass ALL Stage One Screening Criteria and are not rejected as described in Section IV.C. will be evaluated based on the Scoring Criteria and the Scoring Scale below (except for criteria 6−7, which will be evaluated as described in each criterion). Each criterion has an assigned number of possible points and is divided into multiple sub-criteria. The sub-criteria are not equally weighted. The Project Narrative Attachment must respond to each sub-criterion unless otherwise indicated.

**Scoring Scale**

|  |  |  |
| --- | --- | --- |
| **% of Possible Points** | **Interpretation** | **Description** |
| 0% | Not Responsive | Response does not include or fails to address the requirements being scored. The omission(s), flaw(s), or defect(s) are significant and unacceptable. |
| 10-30% | Minimally Responsive | Response minimally addresses the requirements being scored. The omission(s), flaw(s), or defect(s) are significant and unacceptable. |
| 40-60% | Inadequate | Response addresses the requirements being scored, but there are one or more omissions, flaws, or defects or the requirements are addressed in such a limited way that it results in a low degree of confidence in the proposed solution. |
| 70% | Adequate | Response adequately addresses the requirements being scored. Any omission(s), flaw(s), or defect(s) are inconsequential and acceptable. |
| 75% | Between Adequate and Good | Response better than adequately addresses the requirements being scored. Any omission(s), flaw(s), or defect(s) are inconsequential and acceptable. |
| 80% | Good | Response fully addresses the requirements being scored with a good degree of confidence in the applicant’s response or proposed solution. No identified omission(s), flaw(s), or defect(s). Any identified weaknesses are minimal, inconsequential, and acceptable. |
| 85% | Between Good and Excellent | Response fully addresses the requirements being scored with a better than good degree of confidence in the applicant’s response or proposed solution. No identified omission(s), flaw(s), or defect(s). Any identified weaknesses are minimal, inconsequential, and acceptable. |
| 90% | Excellent | Response fully addresses the requirements being scored with a high degree of confidence in the applicant’s response or proposed solution. Applicant offers one or more enhancing features, methods or approaches exceeding basic expectations. |
| 95% | Between Excellent and Exceptional | Response fully addresses the requirements being scored with a better than excellent degree of confidence in the applicant’s response or proposed solution. Applicant offers one or more enhancing features, methods or approaches exceeding basic expectations. |
| 100% | Exceptional | All requirements are addressed with the highest degree of confidence in the applicant’s response or proposed solution. The response exceeds the requirements in providing multiple enhancing features, a creative approach, or an exceptional solution. |

**Scoring CRITERIA**

**The Project Narrative Attachment** must respond to each criterion below. The responses must directly relate to the solicitation requirements and focus as stated in the solicitation. Any estimates of energy savings or GHG impacts should be calculated as specified in the References for Calculating Energy End-Use and GHG Emissions Attachment, to the extent that the references apply to the proposed project.

| **Scoring Criteria** | **Possible Points** |
| --- | --- |
| 1. **Technical Merit** 2. The proposed project provides a clear and concise description of the technological, scientific knowledge advancement, and/or innovation that will overcome barriers to achieving the State’s statutory energy goals. 3. Describes the competitive advantages of the proposed project over state-of-the-art (e.g., efficiency, emissions, durability, cost). 4. Provides information listed in Section II.B under “Technical Merit.” | **15** |
| 1. **Technical Approach** 2. Proposal describes the technique, approach, and methods to be used in performing the work described in the Scope of Work. 3. The Scope of Work identifies goals, objectives, and deliverables, details the work to be performed, and aligns with the information presented in Project Narrative. 4. Identifies and discusses factors critical for success, in addition to risks, barriers, and limitations (e.g. loss of demonstration site, key subcontractor). Provides a plan to address them. 5. Discusses the degree to which the proposed work is technically feasible and achievable within the proposed Project Schedule and the key activities schedule in Section I.E. 6. Describes the technology transfer plan to assess and advance the commercial viability of the technology. 7. Provides information documenting progress towards achieving compliance with the California Environmental Quality Act (CEQA) by addressing the areas in Section I.I and Section III.C.3., and Section III.C.7. 8. Provides information listed in Section II.B under “Technical Approach.” | **25** |
| 1. **Impacts and Benefits** 2. Provides clear, plausible, and justifiable (quantitative preferred) potential benefits of the proposed project, and provides information listed in Section II.B under “Impacts and Benefits.” | **20** |
| 1. **Team Qualifications, Capabilities, and Resources**   Evaluations of ongoing or previous projects, including project performance by applicant and team members, will be used in scoring for this criterion.   1. Identifies credentials of applicant and any subrecipient and sub-subrecipient key personnel, including the project manager, principal investigator and technology and knowledge transfer lead *(include this information in the Project Team Form Attachment).* 2. Explains the team structure and how various tasks will be managed and coordinated. 3. Describes the facilities, infrastructure, and resources available that directly support the project. 4. Provides information listed in Section II.B under “Team Qualifications, Capabilities, and Resources.” | **15** |
| **Total Possible Points for criteria 1− 4**  **(Minimum Passing Score for criteria 1− 4 is 70% or 52.50)** | **75** |
| 1. **Budget and Cost-Effectiveness** 2. Budget forms are complete for the applicant and all subrecipients, as described in the Budget instructions. 3. Justifies the reasonableness of the requested funds relative to the project goals, objectives, and tasks. 4. Justifies the reasonableness of direct costs (e.g., labor, fringe benefits, equipment, materials & misc. travel, and subrecipients). 5. Justifies the reasonableness of indirect costs (e.g., overhead, facility charges (e.g., rent, utilities), burdens, subrecipient profit, and other like costs). | **10** |
| 1. **CEC Funds Spent in California**   Projects that maximize the spending of CEC funds in California will receive points as indicated in the table below (see Funds Spent in California section for more details).   |  |  | | --- | --- | | **Percentage of CEC funds spent in CA vs Total CEC funds requested**  (derived from Budget Attachment) | **Percentage of Possible Points** | | >60% | 20% | | >65% | 30% | | >70% | 40% | | >75% | 50% | | >80% | 60% | | >85% | 70% | | >90% | 80% | | >95% | 90% | | >98% | 100% | | **20** |
| 1. **Ratio of Direct Labor to Indirect Costs**   The score for this criterion will be calculated by the following formula:  This ratio will then be multiplied by the maximum possible points for this criterion and rounded to two decimal places.  NOTE: For the purposes of this criterion, the CEC will include the facility charges (e.g., rent, utilities, etc.), burdens and other like costs that are budgeted as direct costs into the indirect costs in the formula. | **10** |
| **Total Possible Points for Criteria 1-7**  **(Minimum Passing Score for Criteria 1 – 7 is 70% or 80.50 points)** | **115** |
| **Preference Points** Applications must meet all minimum passing scores (Scoring Criteria 1-4 and 1-7 to be eligible for preference points. | |
| **Match Funds**   1. Cash match share is preferred; however, in-kind match cost share is permitted and will be considered for solicitation match requirements. Points for this criterion will be evaluated based on the proposed cash match relative to the total match (cash + in-kind) contributions using the Cash Match Scoring Table:   **Cash Match Scoring Table**   | Percentage of Proposed Cash Match Funds | Score | | --- | --- | | 80 to 100% | 5 | | 60 to <80% | 4 | | 40 to <60% | 3 | | 20 to <40% | 2 | | 10 to <20% | 1 | | **5** |
| 1. Additional points will be awarded to applications that exceed the minimum match requirements based on the percentage above the minimum match using the Exceeds Minimum Match Scoring table:   **Exceeds Minimum  Match Scoring Table**   | Percentage above Minimum Match (cash and in-kind) | Score | | --- | --- | | 80% | 5 | | 60 to <80% | 4 | | 40 to <60% | 3 | | 20 to <40% | 2 | | 10 to <20 % | 1 | | **5** |
| 1. **Disadvantaged & Low-Income Communities (Group 2 only)**   Applications applying under Group 2 and proposing projects located in and benefiting low-income and/or disadvantaged communities may qualify for additional preference points. To receive or qualify for additional points, the proposed project must demonstrate benefits to the disadvantaged and/or low-income communities by describing the following: |  |
| 1. The application identifies the specific and measurable impacts of the DAC pilot project, particularly related to the targeted community. It should also include a clear and actionable strategy for ensuring benefits delivery and preventing negative impacts. | **5** |
| 1. Applicant has letters of support from community-based organizations, environmental justice organizations, or other relevant parties that demonstrate their belief that the proposed project will lead to increased equity and is both feasible and commercially viable in the identified low-income and/or disadvantaged community(ies). | **5** |
| 1. Applicant demonstrated a history of community engagement related to the project. This includes evidence of past community meetings, workshops, or other events where the applicant has solicited and considered public input. Additionally, applicants must provide a detailed description of how they have addressed community concerns and feedback from these engagement activities. This may include specific actions taken to incorporate community input into the project design, implementation, or evaluation. | **5** |
| 1. **Measurement and Verification Plan (Group 1 only)** 2. Additional points will be awarded to applicants who applied under Group 1 and included MVP measurement conducted by a third independent party. It should be demonstrated in the plan that the expertise and experience of the third party in conducting thorough and accurate measurement and verification processes are included, along with any certifications or qualifications that support their capabilities in this area. | **5** |
| **Total Possible Points** | **145** |

1. AB 1279, Muratsuchi, Chapter 337, Statutes of 2022 [↑](#footnote-ref-2)
2. [California Air Resources Board (CARB) 2022 Scoping Plan](https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents#:~:text=The%202022%20Scoping%20Plan%20Update%20focuses%20on%20outcomes%20needed%20to,economic%2C%20environmental%2C%20energy%20security%2C) [↑](#footnote-ref-3)
3. [Biden-Harris Administration Announces Up To $1.2 Billion For Nation’s First Direct Air Capture Demonstrations in Texas and Louisiana](https://www.energy.gov/articles/biden-harris-administration-announces-12-billion-nations-first-direct-air-capture) [↑](#footnote-ref-4)
4. [OCED Issues Notice of Intent for up to $1.8 Billion to Fund Transformational Direct Air Capture Technologies and Remove Legacy Carbon Dioxide](https://www.energy.gov/oced/articles/oced-issues-notice-intent-18-billion-fund-transformational-direct-air-capture) [↑](#footnote-ref-5)
5. AB 209, Committee on Budget, Chapter 251, Statutes of 2022 [↑](#footnote-ref-6)
6. [US. Department of Energy Interactive: Energy Intensity and Carbon Intensity by Numbers](https://www.energy.gov/articles/interactive-energy-intensity-and-carbon-intensity-numbers) [↑](#footnote-ref-7)
7. [US. Department of Energy Carbon Dioxide Removal](https://www.energy.gov/fecm/carbon-dioxide-removal#:~:text=Carbon%20dioxide%20removal%20(CDR)%20refers,CO2)%20from%20the%20atmosphere.) [↑](#footnote-ref-8)
8. [US. Department of Energy Carbon Management Resource Portal](https://www.energy.gov/fecm/carbon-management-resource-portal#:~:text=The%20U.S.%20Department%20of%20Energy,greenhouse%20gas%20emissions%20by%202050.) [↑](#footnote-ref-9)
9. US. [Department of Energy Direct Air Capture Explained](https://www.energy.gov/sites/default/files/2024-08/Direct%20Air%20Capture%20Factsheet_August%202024.pdf) [↑](#footnote-ref-10)
10. [US. National Energy Technology Laboratory, Life Cycle Analysis (LCA) of Energy Technology and Pathways](https://netl.doe.gov/LCA) [↑](#footnote-ref-11)
11. [US. Department of Energy, Introduction to Techno-Economic Analysis](https://www.energy.gov/sites/default/files/2022-01/2022-01-19%20-%20Intro%20to%20TEA%20-%20Slides%20and%20Transcript_compliant_1_0.pdf) [↑](#footnote-ref-12)
12. Pacific Standard Time or Pacific Daylight Time, whichever is being observed. [↑](#footnote-ref-13)
13. This deadline does not apply to non-technical questions (e.g., administrative questions concerning application format requirements or attachment instructions), including questions regarding application submission in the ECAMS system or to questions that address an ambiguity, conflict, discrepancy, omission, or other error in the solicitation. Such questions may be submitted to the CAO listed in Section G at any time prior to 5:00 p.m. of the application deadline date. Please see Section G for additional information. [↑](#footnote-ref-14)
14. Please see Section I.G Questions and Section III.B Method for Delivery for more information. [↑](#footnote-ref-15)
15. This catch-all refers to other types of environmental reviews, such as those prepared under the National Environmental Policy Act (NEPA). [↑](#footnote-ref-16)
16. AB 32 (Statutes of 2006, chapter 488) [↑](#footnote-ref-17)
17. “Key personnel” are individuals that are critical to the project due to their experience, knowledge, and/or capabilities. [↑](#footnote-ref-18)