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DO NOT DESIGN OR SUBMIT APPLICATIONS ACCORDING TO THIS DRAFT
Comments are due on September 1, 2023, at 5:00 p.m.

DRAFT SOLICITATION CONCEPT

Electric Program Investment Charge

Subject Area: Clean, Dispatchable Generation

No applications are being accepted at this time. This is a draft compilation of solicitation concepts. Do not design or submit applications according to this DRAFT. The actual solicitation is subject to change.

The purpose of this draft solicitation concept is to solicit public feedback on eligibility requirements, goals and vision, and solicitation format (See Section 8 for specific questions). Staff will accept comments submitted to the California Energy Commission (CEC) Dockets Unit or by email until September 1, 2023, at 5:00 p.m. (See Section 9 for additional details on how to comment.)

http://www.energy.ca.gov/contracts/index.html
State of California
California Energy Commission
August 2023

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I. INTRODUCTION

This "draft solicitation concept" document details the concept under consideration for a competitive grant solicitation on clean, dispatchable energy technologies to be issued through the CEC's Electric Program Investment Charge (EPIC) 2021-2025 Investment Plan.[1] The purpose of this solicitation is to advance the performance and demonstrate cost improvements of clean dispatchable generation technologies. These projects aim to reduce dependence on fossil-based peaker power plants, complement intermittent renewable systems, and support Senate Bill (SB) 100 (De León, Chapter 312, Statutes of 2018) implementation using zero-carbon renewable fuels.[2]

For this solicitation, renewable fuels are gaseous and liquid fuels derived from renewable resources, including but not limited to hydrogen produced from renewable electricity through electrolysis of water, or biomethane produced from advanced pyrolysis or gasification of biomass wastes.[3] Eligible renewable electricity sources include those outlined in Section 25741(a)(1) of the California Public Resources Code, excluding landfill gas.[4] These projects will support reliability and resiliency of the state's electric grid and reduce greenhouse gas emissions.

II. FUNDING

Available Funding
There is $8,000,000 available for the grants resulting from this competitive solicitation.

Project Group	Available Funding	Minimum Award Amount	Maximum Award Amount
Group 1: Dispatchable Net-Zero Carbon Generation	$5,000,000	$2,500,000	$5,000,000

[1] Lew, Virginia, Anthony Ng, Mike Petouhoff, Jonah Steinbuck, Erik Stokes, and Misa Werner. 2023. *The Electric Program Investment Charge 2021–2025 Investment Plan: EPIC 4 Investment Plan.* California Energy Commission. Publication Number: CEC-500-2021-048-CMF-REV.
[2] California Energy Commission staff. 2021. *SB 100 Joint Agency Report: Creating a Path to a 100% Clean Energy Future.* California Energy Commission. Publication Number: CEC-200-2021-001. https://efiling.energy.ca.gov/EFiling/GetFile.aspx?tn=237167&DocumentContentId=70349.
[3] Bailey, Stephanie, Jane Berner, David Erne, Noemí Gallardo, Quentin Gee, Akruti Gupta, Heidi Javanbakht, Hilary Poore, John Reid, and Kristen Widdifield. 2023. *Final 2022 Integrated Energy Policy Report.* California Energy Commission. Publication Number: CEC-100-2022-001-CMD.
[4] California Public Resources Code, Section 25741(a)(1) https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=25741.&lawCode=PRC

Group 2: Cost-Effective Dispatchable Biomass Systems	$3,000,000	$1,500,000	$3,000,000

The CEC reserves the right to modify funding amounts.

Match funding is required in the amount of at least 25% of the requested project funds.

III. ELIGIBILITY REQUIREMENTS

A. APPLICANT REQUIREMENTS

1. Eligible Applicants

This is an open solicitation for public and private entities.

Each grant agreement resulting from this solicitation will include terms and conditions that set forth the recipient's rights and responsibilities. By submitting an application, each applicant agrees to enter into an agreement with the CEC to conduct the proposed project according to the terms and conditions that correspond to its organization, without negotiation: (1) University of California and California State University terms and conditions; (2) U.S. Department of Energy terms and conditions; or (3) standard terms and conditions.

CEC's terms and conditions will be located on the EPIC Program page at https://www.energy.ca.gov/programs-and-topics/programs/electric-program-investment-charge-epic-program. Please refer to the applicable Grant terms and conditions. Failure to agree to the terms and conditions by indicating that acceptance is based on modification of the terms will result in rejection of the application. Applicants must read the terms and conditions carefully. The CEC reserves the right to modify the terms and conditions prior to executing grant agreements.

If an applicant, by law, cannot agree to the (1), (2), or (3) terms and conditions listed above without negotiation, the applicant can apply and request to negotiate terms. The CEC retains the sole right to refuse to agree to any terms changes. Note: the Energy Commission Agreement Management System (ECAMS) system will require applicants to agree to certain certifications before submitting an application, including certifying the applicant will conduct the proposed project according to the terms and conditions without negotiation. Applicants that, by law, cannot agree to the terms and conditions will not be penalized for agreeing to the ECAMS system certifications.

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 Energy Commission Business Meeting. If not currently registered with the California Secretary of State, bidders 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 successful). For more information, contact the Secretary of State's Office at http://www.sos.ca.gov/. Sole proprietors using a fictitious business name must be registered with the appropriate county and provide evidence of registration to the Energy Commission prior to their project being recommended for approval at an Energy Commission Business Meeting.

2. Number of Applications

Applicants may only submit one application for each group, which may include multiple project locations throughout the state.

IV. PROJECT FOCUS

The overall goal of this solicitation is to support adoption of clean, dispatchable generation in California and reduce the reliance in fossil-based technologies while providing reliable power for critical infrastructures. According to scenarios in the SB 100 Joint Agency Report[5], zero-carbon dispatchable resources will play an important role in achieving 100 percent zero-carbon electricity by 2045. Dispatchable generation technologies can help meet energy demand through their ability to rapidly ramp up and down, complement intermittent renewables such as solar and wind, and replace fossil-based peaker plants that are currently relied upon for grid balancing. Clean, dispatchable generation technologies, which are non-intermittent, can rapidly ramp up or down to match the energy demand and include a range of options: renewable fueled systems such as gas turbines and reciprocating engines that use high percentage blends of clean hydrogen, fuel cells using clean hydrogen, and bioenergy generation technologies that produce clean hydrogen for electric applications, among others.

However, most clean dispatchable generation technologies are not yet widely deployed due to their high costs relative to the existing fleet of fossil gas plants and other alternatives (e.g., electricity imports), limited resource supply (e.g., biomethane and clean hydrogen) compared to intermittent renewable resources, suboptimal system efficiency and reliability, and in some cases, lack of performance data and demonstrations of deployment and grid integration. The projects resulting from this competitive solicitation will address these challenges and support the state's decarbonization efforts and the reliability and resiliency of the electric grid.
By deploying clean, dispatchable generation, this endeavor can benefit communities, workforce, air quality, and natural environments should clean, dispatchable generation

[5] https://www.energy.ca.gov/publications/2021/2021-sb-100-joint-agency-report-achieving-100-percent-clean-electricity

be used to replace diesel, fossil gas, or other fossil fuel-based power generation. Any clean, dispatchable generation technologies that meet the minimum requirements and project elements identified in this solicitation are eligible to apply. To ensure these projects realize significant GHG emission reductions, projects must use 100 percent renewable fuel for power generation.

Projects funded under this solicitation will develop and demonstrate renewable fueled technologies that could provide:

1) Back-up power during grid-outages and act as grid support.
2) Grid resiliency and flexibility by supplying power during high electric demand and reducing the strain from the grid.

A. Project Elements

CEC staff plans to release this solicitation with two groups. Group 1 focuses on prime movers that can use one hundred percent renewable fuel, while Group 2 will complement Group 1 by focusing on fuel availability, such as technologies that can convert woody biomass waste into hydrogen and electricity.

Group 1: Dispatchable Net-Zero Carbon Generation

This group will provide grid support by deploying dispatchable generation technologies, such as, but not limited to, reciprocating engines or linear generators, that will use one hundred percent renewable fuel blends using clean hydrogen, biogas, ammonia, or other renewable fuel, or any combination of these fuels. Projects should include enhancing features such as combined heat and power (CHP) capabilities, higher system efficiency compared to fossil-based legacy systems, or carbon capture technologies to improve economic feasibility.

Example projects operating on 100 percent renewable fuels include, but are not limited to:

- Demonstrating a 25 kilowatt (kW) to 1 megawatt (MW) system CHP at 50% electrical efficiency, 90% CHP efficiency, and a projected lifetime of 80,000 hours at a cost of $2,000/kW or lower.
- Developing state-of-the-art fuel-flexible processors, such as reforming reactors, that can convert different types of hydrocarbon fuels, such as biomethane, into mixtures of hydrogen and carbon monoxide. The mixture can be used for reciprocating engines or linear generators and demonstrate the ability to achieve high efficiency and durability metrics.
- Introducing new power cycles or heat transfer fluid for power generation to increase efficiency, while developing state of the art control systems to react to grid outages.

Additionally, projects must focus on demonstrating (behind-the-meter) flexibility with

the main grid using automated control systems that can support the facility during outages or peak hours. The system must be deployed and used in high-impact applications, such as hard to decarbonize industries and critical facilities that need long duration resilience and operational reliability.

Grant applicants will provide detailed information and plans, including but not limited to:

- Performance Metrics, including:
  - Current and targeted levelized costs of electricity ($/kWh).
  - Current and targeted system performance under normal operating conditions, such as transient response, ramp rate, standalone electric efficiency, and overall system efficiency.
  - Fuel procurement estimates (including quantity and source), if applicable.
  - Anticipated greenhouse gas or other air pollutant emissions assessments and methodology in generating electricity (recommended method for monitoring and reporting is the Argonne Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) model).[6]
- Proposed sites, preferably located in a disadvantaged[7] or low-income[8] community and/or Tribes[9].
- Feasibility assessment of the viability of the project, identifying potential sites and evaluating the project's economic, technical, and environmental feasibility.
- Technology readiness level (TRL)[10] of the proposed technology/production system design, including backup materials and explanation of accomplished TRL milestones prior to the application process.
- Approach to:
  - Solicit, consider, and integrate input from local communities through a community engagement plan that aims to inform, educate, and involve local community members in the project's development and deployment.
  - Identify specific community benefits and impacts that are expected and resulted from the project. This includes workforce development, jobs created or retained, community investments, and local health impacts.

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[6] Argonne National Laboratory, "GREET Model" 2022 https://greet.es.anl.gov/

[7] Disadvantaged communities are communities designated that represent the 25% highest scoring census tracts in CalEnviroScreen 4.0, census tracts previously identified in the top 25% in CalEnviroScreen 3.0, census tracts with high amounts of pollution and low populations, and federally recognized tribal areas as identified by the Census in the 2021 American Indian Areas Related National Geodatabase. (https://oehha.ca.gov/calenviroscreen/sb535)

[8] Low-income Communities are defined as 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-funding/income-limits/state-and-federal-income-limits.shtml)

[9] 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. https://nahc.ca.gov/

[10] U.S. Department of Energy. *Technology Readiness Assessment Guide.* https://www2.lbl.gov/dir/assets/docs/TRL%20guide.pdf

- Develop a business and market plan, including a techno-economic assessment and plans for deployment beyond the term of the proposed project.

Group 2: Cost-Effective Dispatchable Biomass Systems

This group promotes and expands pathways for clean hydrogen production for electric applications using biomass-based pathways that use cellulosic feedstock, such as wood and agricultural waste. The group will complement Group 1 by addressing fuel availability, while demonstrating dispatchability by generating electricity when needed.

An example project includes, but is not limited to:

- Gasification or pyrolysis technologies that integrate a reforming system to produce 25 kg of hydrogen per day for electric applications. The technology should be coupled with hydrogen storage and prime mover technology that is capable in generating at least 15-20 kW of electricity. The integrated system must demonstrate both hydrogen production and electric capabilities on site when needed to support the grid and to enhance reliability.

Grant applicants will provide detailed information and plans, including but not limited to:

- Performance Metrics, including:
  - Expected hydrogen production capacity per day (kg per day).
  - Water consumption estimates (including quantity and source) and methodology, if applicable.
  - Feedstock procurement estimates (including quantity and source), if applicable.
  - Anticipated gate-to-gate greenhouse gas or other air pollutant emissions assessments and methodology (recommended method for monitoring and reporting is the Argonne GREET model).
  - Current and targeted system performance under normal operating conditions, such as efficiency and electric capacity.
  - Current and targeted levelized costs of electricity ($/kWh).
- Proposed site location(s).
- Feasibility assessment of the viability of the project, identifying potential sites and end-use application(s), and evaluating the project's economic, technical, and environmental feasibility.
- TRL of the proposed technology/production system design, including backup materials and explanation of accomplished TRL milestones prior to the application process.
- Approach to:
  - Solicit, consider, and integrate input from local communities through a community engagement plan that aims to inform, educate, and involve local community members in the project's development and deployment.
  - Identify specific community benefits and impacts that are expected and

resulted from the project. This includes workforce development, jobs created or retained, community investments, and local health impacts.
- Develop a business and market plan, including a techno-economic assessment and plans for deployment beyond the term of the proposed project.

B. California Environmental Quality Act

Prior to CEC approval and encumbrance, the CEC must comply with the California Environmental Quality Act (CEQA). 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 project applications and provide all CEQA-related information in a manner that minimizes the time required for the CEC to comply with CEQA and enables the CEC to complete its review in time to meet its encumbrance deadline.

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.

V. HOW AWARD IS DETERMINED

Applicants passing administrative and technical screening will compete based on evaluation criteria and will be scored and ranked based on those criteria. Unless the CEC exercises any of its other rights regarding this solicitation (e.g., to cancel the solicitation or reduce funding), applications obtaining at least the minimum passing score will be recommended for funding in ranked order until all funds available under this solicitation are exhausted.

If the funds available under this solicitation are insufficient to fully fund a grant application, the CEC reserves the right to recommend partially funding that application. In this event, the applicant/proposed awardee and Commission Agreement Manager shall meet and attempt to reach an agreement on a reduced scope of work commensurate with the level of available funding.

VI. ADMINISTRATIVE AND COMPLETENESS SCREENING

The Contracts, Grants, and Loans Branch will review applications for compliance with administrative requirements and completeness. Applications that fail Stage One shall be disqualified and eliminated from further evaluation.

VII. TECHNICAL AND COST EVALUATION OF APPLICATIONS

Applications passing Stage One will be submitted to the Evaluation Committee to review and score based on the Evaluation Criteria in this solicitation. As an example, potential Evaluation Criteria for the solicitation could include the following (note that these could change when the CEC solicitation is released):

- Technical Merit
- Technical Approach
- Impacts and Benefits to California
- Team Qualifications, Capabilities, and Resources
- Budget and Cost-Effectiveness
- Funds Spent in California
- Benefits to Disadvantaged, Low-Income Communities, and/or Tribes and Localized Health Impacts.

During the evaluation and selection process, the Evaluation Committee may send clarification questions via email for the purpose of clarification and verification of information provided in the application. However, these questions and answers may not be used to change or add to the contents of the original application.

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

After scoring is completed, applications not attaining a score of 70 percent of the total possible points will be eliminated from further competition.

All applicable Preferences will be applied to all applications attaining a minimum of 70 percent of the total possible points. The agreement shall be awarded to the responsible applicant meeting the requirements outlined above who achieves the highest score after application of Preferences.

VIII. QUESTIONS FOR STAKEHOLDERS

To shape the direction and scope of this solicitation, CEC staff are seeking responses and comments to the following:

1. Do the Project Groups in Section IV.A. of this document address the primary objectives of expanding and improving renewable fueled technologies that can a) provide back-up power during grid-outages and acts as grid support and b) support grid resiliency and flexibility? If not, why? Are there alternative pathways or priorities that should be considered?

2. Which renewable fuels and/or generation technologies have the greatest potential for providing grid benefits in the near-term (5 years) and medium-term (10 years) that should be prioritized for funding?
3. What are the near-term and medium-term technical targets (e.g., costs, efficiency, ramp rate, emissions, etc.) to advance technologies from Groups 1 and 2 to a higher TRL?
    a. What should be the starting and target TRLs for these two groups?
4. Are the proposed levels of project funding for Group 1 and Group 2 appropriate to achieve the desired outcomes? If not, why?
    a. What would be the typical range of costs (e.g., capital costs) for the anticipated projects, and could projects leverage CEC funding to encourage private investments?
    b. What would be an appropriate scale for Group 1 and Group 2 for this level of funding (i.e., in terms of kW or MW)?
5. Is four years a feasible project timeline? Are there any potential barriers or challenges in implementing the proposed projects?
    a. If grant awardees were CEQA-ready (see CEQA in Section 4) but need to obtain regulatory approvals and permitting during the project, is a 4-year timeframe feasible for completion? If not, what is the recommended term for a funded project?
6. Which end-use sectors, facilities, or communities are expected to be most positively impacted by these types of projects?
7. Please provide relevant comments regarding other considerations not explicitly listed above.

IX. WRITTEN COMMENTS

Comments on this "draft solicitation concept" document are due by **September 1, 2023, at 5:00 p.m.**

Please submit comments to the CEC using the e-commenting feature by accessing the comment page for this docket at: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=23-ERDD-01. A full name, e-mail address, comment title, and either a comment or an attached document (.doc, .docx, or .pdf format) is mandatory. Please include "23-ERDD-01 Advancing Clean, Dispatchable Generation Concept" in the comment title. After a challenge-response test is used by the system to ensure that responses are generated by a human user and not a computer, click on the "Agree & Submit Your Comment" button to submit the comment to the CEC's Docket Unit.

Please note that written comments, attachments, and associated contact information included within the documents and attachments (e.g., your address, phone, email, etc.) become part of the viewable public record. This information may become available via Google, Yahoo, and any other search engines.

Interested stakeholders are encouraged to use the electronic filing system described above to submit comments. If you are unable to submit electronically, you may email your comments to: DOCKET@energy.ca.gov and include "23-ERDD-01 Advancing Clean, Dispatchable Generation Concept" in the subject line.