**Questions and Answers Document**

# **Disclaimer**

The following answers are based on California Energy Commission (CEC) staff’s interpretation of the questions received. The applicant is responsible for reviewing the Solicitation Manual and determining whether its proposed project is eligible for funding by reviewing the Eligibility Requirements within the solicitation. The CEC cannot give definitive advice as to whether a particular project is eligible for funding because not all application details are known.

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# **General/Administrative**

1. **Will these slides be available after the webinar?**

Yes, the presentation, zoom recording, and the list of attendees are posted on the Events webpage for this GFO at the following link: <https://www.energy.ca.gov/event/workshop/2022-10/pre-application-workshop-gfo-22-301-commercialization-industrial>

1. **Where (email) do you send questions?**

Please email questions to: [Crystal.Willis@energy.ca.gov](mailto:Crystal.Willis@energy.ca.gov)

1. **Where will we see the questions and answers in writing?**

The Q&A, along with any addendums for this solicitation, will be posted on the GFO-22-301 webpage on the CEC website:

<https://www.energy.ca.gov/solicitations/2022-10/gfo-22-301-commercialization-industrial-decarbonization-2022-cid-program?utm_medium=email&utm_source=govdelivery>

1. **Where can we get a copy or access to this recording?**

Please see response to Q.1.

1. **You have mentioned some of the projects may qualify for the gas program. Could you provide the name the specific program you are referring to?**

The Gas Research Program invests in technologies and solutions that help the gas sector support California’s energy and environmental goal. This program has annual budget plans and periodic solicitations that may be applicable to your project.

Please see the following links for information on this program:

* <https://www.energy.ca.gov/programs-and-topics/programs/natural-gas-program>
* <https://www.energy.ca.gov/data-reports/reports/energy-research-and-development-investment-plans-and-annual-reports>

1. **Will the 10/26 Grant Pre-Application Workshop be recorded to stream at a later date?**

The workshop recording is available on our website: <https://www.energy.ca.gov/event/workshop/2022-10/pre-application-workshop-gfo-22-301-commercialization-industrial>. Please also see the response to Q.1.

1. **If awarded, would July be the earliest agreement term start date (45 days after the business meeting in May 2023)? Confirming that this means that any work planned for before this start date cannot be reimbursable. If not, could you clarify if construction costs related to equipment placement could be reimbursable?**

Applications recommended for funding will be developed into a proposed grant agreement to be considered at a CEC Business Meeting tentatively planned for May 2023. Recipients may begin the project only after approval at a CEC business meeting and full execution of the grant agreement by all parties (Recipient and the CEC). Until the agreement is executed (signed) by all parties, no work that is to be paid for by the grant or match funds can begin. This includes construction, equipment, and installation costs.

Applicants should plan on a July 2023 agreement start date.

1. **a) What are examples of benefits to electric ratepayers? b) In the case of direct air capture, how would this apply?**

a) Examples of electric ratepayer benefits can be found in Section IV.F., scoring criteria 3, of the Solicitation Manual. These benefits include: annual electricity savings and fossil fuel consumption reduction, energy cost reductions, peak load reduction and/or shifting, infrastructure resiliency, and infrastructure reliability. Non-energy benefits include greenhouse gas (GHG) emission reductions, criteria pollutant reductions (e.g., NOx), water savings, cost reduction, and increased safety.

b) For direct air capture technologies, please indicate how the proposed technology could result in the benefits in listed in a) when compared to other direct air capture technologies. For instance, if your technology uses less electricity than most common commercially available direct air capture technologies, or uses non-potable water or no water, then these are benefits that can be quantified as savings to electric ratepayers. Please also see response to Q.12.

1. **Are there selection criteria points awarded for having additional partners contributing to the grant application scope?**

Having additional, relevant partners could result in higher score under criterion 4 “Team Qualifications, Capabilities, and Resources” found in Section IV.F. of the Solicitation Manual. Relevant partners are those that can demonstrate how their participation contributes toward completion of the project.

Project partners who contribute match funds (See Section I.K) may make the proposal eligible for preference points under criterion 8 “Match Funds”.

1. **Is the following link broken?**

**https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40**

We can confirm that the above link is correct. If issues still persist, please try using a different web browser such as Mozilla Firefox or Google Chrome or pasting the link directly on your browser.

# **Technical**

1. **Are renewable fuels (e.g., green hydrogen, biogas, other renewable gaseous/liquid fuels) eligible under Group 1?**

Yes, if they are integrated with electrotechnologies. Please see the requirements for integration of electrotechnologies with renewable energy sources under project focus for Group 1, Section I.C.1. of the Solicitation Manual. One of the potential projects listed include the following:

* Develop and demonstrate integration of electrotechnologies with renewable energy sources, conventional heating, and/or thermal energy storage with a goal of demonstrating flexible operations, reduction of capital and operating costs, and potential for using low-cost electricity and load flexibility. Commercially available technologies can be part of the integration project, but CEC funds must only be spent on purchasing, developing, and demonstrating emerging and underutilized electrotechnologies. **CEC funds cannot be spent on the renewable energy portions of the project associated with the electrotechnology demonstration. These portions can be paid with match funds**.

1. **Group 2 projects may not directly benefit electric ratepayers - i.e., innovative materials that reduce GHG emissions. Is this a requirement to be considered for the grant?**

Yes. Projects resulting from this solicitation must benefit California electric ratepayers. See the examples provided in Section I.C.2. of the Solicitation Manual on potential projects and linkages with electricity-driven processes, such as electrochemical clinker production or use of alternative materials that enable electrification of production and reduce the need for high temperature heating. Please see criterion 3 “Impacts and Benefits for California IOU Ratepayers” in section IV.F of the Solicitation Manual. The first bullet asks that you identify and justify the annual electricity savings and fossil fuel consumption reduction, energy cost reductions, peak load reduction and/or shifting, infrastructure resiliency, and infrastructure reliability for your technology versus the current incumbent technology. The second bullet focuses on the non-energy benefits, such as GHG emissions reductions, water savings, criteria pollutant reductions, cost reductions, and increased safety. Applications that provide greater benefits to California ratepayers, with clear justification and reasonable assumptions, will receive higher scores under criterion 3.

1. **Can you please explain the “pre-commercial” qualifier?**

As indicated in Section I.B. of the Solicitation Manual, Pre-commercial Technology means:

“A technology that has not reached commercial maturity or been deployed at scales sufficiently large and in conditions sufficiently reflective of anticipated actual operating environments to enable the appraisal of operational and performance characteristics, or of financial risks.”

1. **a) Can a group get funding for two different projects in different categories? b) What about for two different projects in the same category?**

We assume that category has the same meaning as project groups referenced in Section I.C. of the Solicitation Manual.

1. Yes, applicants may be awarded funds for two different projects submitted to two different groups (such as Group 1 and Group 2).
2. Applicants may be awarded multiple awards within the same project group (e.g., Group 1) if the respective projects are distinct and different from each other (e.g., scope of work and budget are different for each project). Please also refer to Section IV.E., criterion 5, in the Solicitation Manual, and Attachment 1, Application Form, regarding project submission requirements.
3. **Are electric steam or hot water boilers applicable under group 1?**

Yes. Please refer to Section I.C.1. of the Solicitation Manual for Group 1, which has a focus on low carbon, **high temperature** industrial heating, defined as greater than 800 degrees Celsius or 1472 degrees Fahrenheit. The technologies must be advanced, emerging electrotechnologies, be pre-commercial or commercialized but underutilized due to economics and/or lack of verified field performance data, and currently at technology readiness level (TRL) 6-8.

1. **Are electric steam or hot water boilers applicable under Groups 2 and 3?**

No.

1. **Are small modular or micro- nuclear reactors allowable as zero-carbon source of heat for industry?**

No, nuclear power is not eligible for funding under this solicitation.

1. **Does the equipment have to be installed at a host site, or can it be demonstrated in the manufacturing facility it was built in?**

The project must be demonstrated at an industrial facility under real world conditions. However, projects may do initial testing at the manufacturing facility (or other appropriate facility) prior to installation and demonstration at an industrial facility that is relevant to document performance and energy performance, such as those listed in Section I.C., Tables 1, 2 and 3 of the Solicitation Manual. Please note that the proposed technology will be subject to implementation of a measurement and verification (M&V) plan during the term of the project as described in Section II.B.4. of the Solicitation Manual.

Furthermore, as indicated in Section IV.E. “Stage One: Application Screening,” Applicants are required to provide the following as part of the pass/fail screening criteria 7:

* The Application identifies one or more demonstration/ deployment site locations.
* All demonstration/ deployment sites are located in a California electric IOU service territory (PG&E, SDG&E, or SCE).
* The proposal includes a site commitment letter (Section III.C.10) for each demonstration/ deployment site.

1. **Specifically on the renewable fuels question, would electrolytic production of hydrogen for use as high temperature heat or to decarbonize cement be eligible? Does that count as electrification?**

Possibly, if: 1) clean hydrogen (meaning, hydrogen produced by renewable resources) is used, 2) the project is developing and demonstrating integration of electrotechnologies with the clean hydrogen and meeting the requirements listed in Section I.C.1., and 3) the clean hydrogen and electrotechnologies will be used at the demonstration host-site (industrial facility). The Applicant would need to address in its proposal the electrotechnology to be used, the source of the clean hydrogen, and how and where the hydrogen will be produced, delivered to the host-site, and used by the host-site.

1. **a) Should all projects be demonstrated in an industrial environment? b) Can the technology be further developed (say TRL 4 to TRL 6) in a laboratory, located in California?**
2. Yes; please see response to Q.18.
3. No. Projects may do initial testing at a laboratory prior to installation and demonstration at an industrial facility. However, the majority of the emphasis must be on the demonstration at an industrial facility.
4. **We have a TRL 6 carbon dioxide (CO2) capture technology developed under prior DOE funding. This non-amine solvent-based absorption/regeneration technology will capture CO2 at > 99% capture efficiency from natural gas. As per preFEED, this technology offers a significant advantage over conventional amine-based CO2 capture technologies in terms of operating cost and capital cost. Can we apply for funding under this solicitation under Group 3: Energy Efficient Separation Processes to build the demonstration plant?**

Possibly. For Group 3, the research area focuses on developing, testing, and demonstrating advanced electric-driven separation technologies for the industrial sector that could reduce energy intensity. If the technology meets the requirements of Section I.C.3, provides benefits to electricity ratepayers, and will be demonstrated at an industrial facility, then it could be eligible.

1. **We demonstrated separating Lithium from brines at TRL 6. Can we apply under group 3 for a demo plant?**

No. The purpose of the solicitation is to demonstrate technologies that will help existing industries meet the state’s GHG emissions reduction targets through reduced reliance on fossil fuels and process emissions. As a result, the focus is on research to help existing industries. Lithium recovery is not an existing industry in California. However, the CEC has funded research on lithium recovery, and a report entitled “Selective Recovery of Lithium from Geothermal Brines” and can be downloaded at [Selective Recovery of Lithium from Geothermal Brines (ca.gov)](https://www.energy.ca.gov/sites/default/files/2021-05/CEC-500-2020-020.pdf). In addition, a new program entitled the Climate Innovation Program might provide funding for lithium processing, manufacturing, and recovery. For more information, go to [Climate Innovation Program (ca.gov)](https://www.energy.ca.gov/event/workshop/2022-11/climate-innovation-program).

1. **Does carbon capture and separation at a gas power plant (utility industry) qualify for Group 3?**

No, projects at utility powerplants are not eligible under this solicitation.

1. **Our technology produces industrial quantities of steam using hydrogen as a fuel. In our case studies, we have paired this technology with an electrolyzer.**

**The TRL-increasing qualifier exists within the steam production technology, and the electrification qualifier exists in established electrolyzer technologies. Would the use of these two technologies in tandem qualify a project in group 1?**

Yes, if it meets the requirements of Group 1 and is integrated with an electrotechnology, such as a high temperature heat pump at an industrial facility. Group 1 zero-carbon heat source projects of interest should focus on the development, testing, and demonstration of high temperature heat pump technologies that advance electrification and improve energy efficiency by recovering waste heat. See also response to Q19.

1. **We are developing a direct air capture technology that we are moving from bench/prototype to an integrated pilot scale. We would be moving from TRL 5/6 to TRL 7/8. Would that qualify for area 3?**

Yes, if it meets the requirements of Group 3, including the research metrics. Please also see responses to Q.12 and Q.21.

1. **Can the carbon capture technology be used on waste heat from an industrial process that obviates the need for electrical driven capture? Does this qualify?**

No, this type of project is not within the scope of the EPIC program and this solicitation. Projects of this type could potentially be within the scope of the Gas Research Program. Please also see response to Q.5.

1. **Does Group 1 include decarbonization of industrial processes that do not include electrification? For example, high temperature solar-thermal with storage where thermal energy is used directly to displace GHG-producing heat sources?**

No, this type of project is not withing the scope of the EPIC program and this solicitation. Projects of this type could potentially be within the scope of the Gas Research Program. Please see response to Q.5.

1. **Question from ABEI Energy, an IPP that fully manages renewable electricity generation projects. Taking advantage of the renewable energy production capacity that ABEI Energy has, we are currently working on developing renewable hydrogen projects integrally (production, transport, and distribution). We wondered if a project related to switching from use of a fossil fuel such as natural gas to renewable hydrogen at an industrial thermal process would be eligible within any of the 3 project groups of this GFO. Since there is no reference to hydrogen in the Application Manual, we are not sure.**

The question is unclear as to what is an IPP. The focus of this solicitation is not on production of renewable hydrogen. All technologies must show electric ratepayer benefits, so just using renewable hydrogen for a thermal process would not be eligible under this solicitation. Projects of this type could potentially be within the Gas Research Program. Please also see response to Q.5 and Q.19. In addition, you may want to review the new CEC Clean Hydrogen Program to see whether your technology would be applicable: [Staff Workshop on the Implementation of the Clean Hydrogen Program (ca.gov)](https://www.energy.ca.gov/event/workshop/2022-12/staff-workshop-implementation-clean-hydrogen-program).

1. **When thinking about industrial decarbonization more broadly, we envision hydrogen playing a role – including in the cement industry. However, when I looked at the details of this particular initiative, it seemed that electric technologies were the focus. Am I understanding this correctly, or is there an opportunity for hydrogen in this particular solicitation?**

The solicitation is under the Electric Program Investment Charge (EPIC) program and is focused on electricity benefits and technologies; use of hydrogen for thermal processes is not eligible. Please see responses to Q.5, Q.19, and Q.28.

1. **Centriair develops air emissions control technology for the food, waste, and industrial sectors. For the painting/coating industry, where volatile organic compound (VOC) emissions are typically mitigated using direct incineration or by using regenerative/recuperative oxidation technologies, Centriair has developed an equally effective air emissions control technology based on medium pressure UV light that is sometimes supported by an activated carbon polishing step. Successful demonstration of this UV technology will, over time, lead to the reduction/elimination of thermal oxidation technologies for many types of industries having to mitigate VOC emissions (e.g., an example of successful technology substitution for industrial decarbonization).**

**However, I do suspect that an "environmental" project described above falls outside the scope of this solicitation. Even so I would like to get your opinion on the project's applicability.**

Possibly, if the technology can document the energy and GHG reductions and meets the research goals for Group 1 and Table 1 “Direct electrification of heating”.

1. **We demonstrated separating Lithium from brines at TRL 6. Can we apply under group 3 for a demo plant?**

No. Please see response to Q.22.

1. **We have a TRL 6 CO2 capture technology developed under prior DOE funding. This technology was demonstrated at an integrated pilot plant scale. This non-amine solvent based absorption/regeneration technology will capture CO2 at > 99% capture efficiency from natural gas. As per preFEED, this technology offers a significant advantage over conventional amine based CO2 capture technologies in terms of operating cost and capital cost.**

**Our host site (client) wants to remove > 300,000 MT/year CO2 from natural gas before recovering NGLs in the gas processing plant using this technology. To reduce risk, we would like to build and operate a small demonstration plant on a slip stream of natural gas.**

**Can we apply for funding under this solicitation under Group 3: Energy Efficient Separation Processes to build the demonstration plant?**

Possibly. Please see response to Q.21.

1. **Does a direct air capture device need to be demonstrated in a specific site or can it be demonstrated, say as a home appliance planted in someone’s (in a disadvantage community) back yard?**

For the purposes of this solicitation, project test/demonstration site(s) must be at an industrial facility. Projects hosted at a residential and/or commercial location are not eligible under this solicitation. Please see response to Q.18.

1. **In Group 1, the GFO lists developing, testing, and demonstrating solutions for high-temperature industries and also specifies technologies at TRL 6-8. Are technologies that start at lower TRL levels, say 4 to 5, responsive to this GFO?**

No.

1. **In all three Groups, are projects required to conduct a demonstration at a working industrial site?**

Yes, please see response to Q.18.

1. **In Group 1, are HTHP technologies that utilize either waste heat or heat from renewable sources to generate electricity for industrial plant needs, other than direct heating, thereby reducing overall plant carbon footprint, responsive to this GFO?**

No. The focus of Group 1 is not to produce electricity, but to use the waste heat or other indirect heating sources in a HTHP to convert low temperature waste heat into useful, higher-temperature heat for use in industrial processes. If your project were to demonstrate the integration of industrial heat pumps with waste heat and heat from renewable energy sources, and this higher temperature heat were used to offset the high temperature process heat, then this type of project would be eligible. Please refer to Section I.C.1, “Zero-carbon heat sources”, fourth bullet for more information.

1. **a) In Group 2, would a technology that produces electricity from waste heat, with that electricity assumed to offset a portion of the electricity needed for CCUS, be considered responsive to this GFO? b) Does this GFO seek only technologies that directly reduce the kWh required per ton of CO2 captured?**

a) No. The focus of this group is on increasing the energy efficiency of the carbon capture process.

b) Yes.

1. **All proposals are required to conduct M&V on performance and compare to the baseline. It appears that all projects should be ‘field demonstration’. If yes, do the demonstration sites have to be in an IOU service territory, as stated in Stage 1 Application Screening Criteria?**

Yes, all demonstration sites for all groups must be in one of the following electric IOU service territories: Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), or San Diego Gas and Electric Company (SDG&E). Also, see response to Q.18.

1. **Under Group 1, is a proposal on electric boiler acceptable?**

Please see response to Q.15.

1. **Can we list a complementary project under DOE FOA 2804 as cost-share project, even though the DOE will notify selection in April 2023 (1+ months after the CEC proposal due date)?**

No. Cash match only includes funding awards already earned or received. See Section I.K. in the Solicitation Manual.

1. **If the project purchases the equipment from a California sales agent (for equipment manufactured outside California), is that considered as California spend?**

Yes, if the business transaction is entered into with a business located in California.

Please refer to Section I. L “Funds Spent in California”.

1. **Can we allocate funds from this grant to the integration work, from software development to manufacturing line set up? (The TRL9 equipment would be purchased from our budget, but we are asking about the integration work.)**

No. Project funds are to be used for technology development, testing, and demonstration. The intent of this solicitation is not to assist with production/manufacturing facility setup.

Please consider applying to an upcoming “Realizing Accelerated Manufacturing and Production for Clean Energy Technologies (RAMP)” solicitation when available. You can sign up for our listserve to be notified about future RAMP solicitations.

* For details on the previous RAMP solicitation, please see:

<https://www.energy.ca.gov/solicitations/2022-04/gfo-21-304-realizing-accelerated-manufacturing-and-production-clean-energy>

* For a list of CEC list serves, please see:

<https://public.govdelivery.com/accounts/CNRA/signup/31719>

1. **Can we allocate CEC funds for production line setup, including facilities improvement?**

No.

1. **We'll need to offer sales/promotion training for both resellers and customers; is this covered under the grant?**

No.

1. **We'll also need to create marketing materials (used in promotion at events, in media). Are the marketing material expenses covered under the grant?**

Yes, but for project-related activities only.

1. **Would it be helpful to have an institutional partnership (i.e., university)? If so, what is the preferred kind of research institution?**

It is up to the Applicant to decide on the best partnerships for its proposed project. Please see response to Q.9.

1. **Would university process verification resources (used to ensure before and after improvements) be billable under this program?**

Yes, if the university is a subcontractor that is providing the independent third-party M&V for the project as discussed in Sections I.C. and II.B.4.

1. **In the case of matching funds, say $1M.**
   1. **Does this need to be in the bank at the time of application?**
   2. **If yes, does it need to be on the account balance for a period of time?**
   3. **How do we prove this?**

a, b, and c: Please see Section I.K and Attachment 10 (Commitment and Support Letters) for instructions for documenting the required match. This section indicates that Applicants must submit a match funding commitment letter (if applicable) signed by a representative of each entity or individual that is committing to providing match funding. The 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 in the letter 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.

1. **The application document says we are "encouraged" to use match funds to purchase "Equipment" (>$5K+) and "Materials" (<$5K). What is meant by "encouraged"? How do we know which pieces of equipment should be match funds and which should go toward the budget?**

The CEC encourages that equipment be purchased with match funds to avoid disposition requirements at the of the agreement, such as removal of the prototype or test equipment from the demonstration site. Additionally, materials like laptops, notebooks, personal tablets, and computers cannot be reimbursed with CEC funds but could be included as match funds. Please refer to Section I.K. for more details.

Projects that use match funds for equipment and/or materials may receive higher scores under Section IV.F. Scoring Criteria 5 “Budget and Cost-Effectiveness” and preference points under Section IV.F. Scoring Criteria 8 “Match Funds”.

1. **Are building and equipment leases ok to put in the budget? Should we prorate them?**

Building leases are generally considered as indirect costs and should be included in your indirect rate. If the building lease is classified as a direct cost, a justification should be provided. As for equipment leases, please provide justification for the nature of the equipment and how it is to be used in the project.

Applicants should prorate building and equipment leases in a reasonable manner that accounts for expected usage to support the project over the agreement term.

1. **How will the incoming TRLs impact the scoring of the application? Is more favor given to projects that enter at a higher TRL?**

Each project will be reviewed and scored based on its responsiveness to the scoring criteria as described in Section IV “Evaluation and Awards” and Attachment 3, Project Narrative. Please review the questions in Section I.C. for each of the groups. Proposals are expected to describe and justify current TRLs and how the proposed project will lead to progress up one or more levels by the end of the agreement term.

1. **Are there tools for calculating annual electricity (EPIC) and thermal savings (PIER NG) (kilowatt-hour and therms), energy cost reductions, peak load reduction and/or shifting, infrastructure resiliency, infrastructure reliability?**

No. Please use Attachment 13 in your calculations of annual energy and cost savings and peak load reductions and/or shifting. Please provide your assumptions, calculations, and estimates.

1. **Can we include the value of equipment we have already purchased towards the value of the in-kind contribution? If so, do you have suggestions for assessing the value? Should we prorate the value?**

Yes, it may be counted as “In-Kind” match funding. Section I.K., Match Funding states:

In-Kind match is typically in the form of the value of personnel, goods and services, including direct and indirect costs. This can include equipment, facilities, and other property as long as the value of the contribution is based on documented market values or book values, prorated for its use in the project, and depreciated or amortized over the term of the project using generally accepted accounting principles (GAAP).

Applicants must ensure the personnel, goods, services, and equipment(s) are relevant for the proposed project. .

1. **Must the project be located in California? If so, must it be at a cement plant in California?**

Yes. Projects must be in California at an appropriate industrial demonstration host site for the proposed technologies. The demonstration site must be in the service area of PG&E, SCE, or SDGE.

Group 2 projects must be demonstrated at a California cement/concrete manufacturing facility within an electric IOU service area. See response to Q.18.

1. **Do all the partners need to have locations/ops in CA?**

No. Applicant and project partners are not required to be in California; however, projects that maximize the spending of CEC funds in California will receive points per scoring criterion 6 “CEC Funds Spent in California”. Please note that all recipients and subcontractors much be registered with the California Secretary of State; see Section II.A.3 “California Secretary of State Registration”.

1. **Does the project need to be at one site? Or can it be multiple/in phases?**

It is preferred to have the project located at one host site. However, if the project needs to be at multiple sites or done in phases, then the Applicant must thoroughly discuss the reasons for multiple sites/phases, potential risks, and mitigation strategies for replacing lost sites and/or delays in phases and budgeting for each of the sites/phases.

1. **Will a project that seeks to decarbonize concrete by replacing traditional materials (sand, gravel, water, admixtures, cement) with carbon sequestering materials qualify?**

Yes, such a project may be eligible under Group 2 if it includes electrification or is related to the electricity system and is located at a cement and/or concrete manufacturing facility in California, within an electric IOU service area, and benefits their ratepayers. See response to Q18.

1. **What is the anticipated date of funding?**

The anticipated agreement start date is July 2023 for Round 1 submissions. Please also see response to Q.7.

1. **What is the maximum duration for a project and when does it need to be completed?**

Please see Section I.E “Key Activities Schedule”. In general, agreement terms are for approximately four years from the agreement start date, and they must end at least three months before the liquidation deadline for the CEC funds. Assuming an agreement start date of June 30, 2023, the end date will be March 30, 2027.

1. **For Group 2 projects that are using a baseline concrete formulation to compare to, is the baseline concrete also required to have independent M&V? Who creates the baseline?**

Yes, both would need independent M&V of properties (and other metrics as necessary) to ensure proper evaluation. This can be done by the selected M&V subcontractor on the recipient’s team.

Please also see Section II.B.4 “Measurement and Verification Plan”.

1. **While there is an excerpt describing ways to decarbonize concrete for Group 2 projects (page 10 Application Manual), the Research Metrics for Group 2 (Table 2 in Application Manual) are centered around electrification of cement production process ( i.e, there are no research metrics for different ways to decarbonize concrete other than enabling electrification processes). How should this be addressed for Group 2 projects that, for example, replace conventional materials in a concrete formulation with carbon reducing materials?**

As the funds for this solicitation are coming from electric ratepayers, all projects funded must show benefits to these ratepayers, and this is the reason for the focus on electrification in the Table 2 Research Metrics for Group 2. As indicated on Page 11, one of the potential projects is to develop and demonstrate the use of alternative raw materials and processes to produce cement and/or concrete that can enable electrification of production by reducing the need for high temperature heating. The key here is how the alternative raw materials can reduce process heating temperatures to allow for electrification, compared to current operating temperatures.

1. **Does the project have to include co-funding from a partner company?**

All proposals are required to provide at least 20% of requested CEC funds as match funds. These match funds may come from the Applicant, subcontractors, other project partners, or some combination of these. Please see Section I.D.2 “Match Funding Requirement, Section I.K “Match Funding,” and Attachment 10 for the requirements for commitment and support letters for match funders, demonstration sites, and project partners.

1. **Can CEC provide more clarification on eligible and non-eligible technologies for wastewater treatment of biosolids/sludge (under Group 3: Energy Efficient Separation Processes)? Is a biosolids/sludge treatment technology that involves the use of another treatment method eligible as long as it meets the other technology (e.g., electricity driven) and research goal (e.g., GHG emissions reductions) requirements?**

Yes, if the other treatment method referred to is an advanced separation technology.

1. **Can CEC provide clarification on system level and facility level definitions / calculations for wastewater treatment of biosolids/sludge (under Group 3: Energy Efficient Separation Processes)? Currently, treated biosolids from treatment facilities are typically hauled to landfills/land farms. Would the baseline calculations include energy/resource use for hauling off treated sludge from treatment facilities to landfills?**

No, baseline calculations should be for electricity, fossil fuel use, and GHG emissions reductions within the facility boundaries.

1. **Please confirm the TRL requirement for technologies under Group 2 and Group 3. TRL requirement for Group 1 is given as 6-8 and TRL requirement for Group 2 and Group 3 is 5 – 8.**

The TRLs as listed in the GFO are correct, and projects are expected to be within these TRL ranges and progress at least one level by end of the project.

1. **Section I.C.1. says: “The purpose of this research area is to develop, test, and demonstrate low-carbon, high-temperature industrial heating solutions within areas such as direct electrification of heating (electrotechnologies) and high temperature heat pumps (HTHP),” and “Describe and discuss pre-commercial and commercialized technologies that are part of the proposed project and how their implementation at the demonstration sites will lead to energy and GHG emissions reductions.”**
2. **What exactly constitutes a “demonstration site?”**
3. **Is there a preference for projects located at field sites (e.g., at an operational industrial facility) versus at the award recipient’s property (e.g., within the headquarters of the technology developer / award recipient)?**
4. The project must be demonstrated at an industrial facility under real world operating conditions. The facility must be in a California electric IOU service area (PG&E, SCE, or SDG&E).
5. The demonstration site must be at an operational industrial facility.

Please also see response to Q.18.

1. **In Table 1, for the “Direct Electrification of Heating” technology category, is “25 percent or greater reduction in fossil fuel use” the only Research Goal? Or, on the other hand, are all of the items in the “Research Goal” column intended to be Research Goals for the “Direct Electrification of Heating” technology category? In the latter case, all of the following would be considered Research Goals for the “Direct Electrification of Heating” technology category:**

* **25 percent or greater reduction in fossil fuel use**
* **25 percent or greater reduction of facility-level GHG emissions**
* **10 percent of greater reduction in operational and maintenance costs**
* **10 percent of greater reduction in capital expense**
* **15 percent load reduction during peak hours compared to baseline load**
* **profile**
* **Simple payback of under three years**

**To phrase the question another way, should there have been an additional horizontal line separating “Direct Electrification of Heating” and “Zero-carbon heat sources” into two clear and distinct rows (as is the case in Table 2)?**

All Research Goals listed in Table 1 apply to both “Direct Electrification of Heating” and “Zero-carbon heat sources.”

1. **When during the project performance period do the independent third-party M&V processes need to occur? The Solicitation Manual is clear that the M&V processes should occur “at least 6 months prior to the project deployment, and 6 months post-deployment,” but it’s not clear when relative to the CEC project start and end date, and relative to the submission of the final report, the M&V processes should occur.**

This is project dependent. Applicants must plan the overall project schedule to meet the 6-month pre- and post-deployment at the selected demonstration host site. Applicants will delineate the specific M&V tasks in Attachment 5 and provide the schedule for these M&V tasks in Attachment 6. **All M&V must occur within the agreement term, and this should be indicated in Attachment 6.**

1. **Can you explain the comments during the pre-application workshop about needing to be associated with a particular industry for Group 3's direct air capture scope? What are the requirements for CO2 sources (i.e., not point source) and end uses?**

For the purposes of this solicitation, direct air capture project test/demonstration site(s) must be located at an industrial facility. The CO2 source will be from the atmosphere and not point source. In developing your response, please identify the end use for the captured CO2 (e.g., use in the cement process or capture and release). See also response to Q33.

1. **Would Group 3’s scope be inclusive of equipment/construction needed to capture ambient CO2 for separation technologies?**

Yes.

1. **If choosing Group 2: Do we need to specifically demonstrate our process for cement production (i.e., does the lime we produce need to be used specifically for cement production)?**

Yes, Group 2 project should focus on developing and demonstrating energy efficiency and decarbonization technologies for California’s cement and/or concrete manufacturing industry. For the provided example of lime production, yes, the lime produced must be associated with cement and/or concrete manufacturing. Please see response to Q.61.

1. **Is there additional weighting of the various items under "Technical Approach"?**

No specific additional weighting is applied to the items listed. You must respond to the items listed in Section I.C. for the Group for which you are applying in the Project Narrative (Attachment 3). Your responses to these items will be evaluated as part of the scoring criteria in Section IV. These additional requirements must be included in the Project Narrative and will be evaluated as part of the Section IV.F “Technical Merit” and “Technical Approach” scoring criteria.

1. **The “paint and coatings industry” is a $3 billion industry with a presence in all 50 states that employs over 285,000 people engaged in the manufacture, application, and distribution of its products. Coatings are indispensable products, engineered to perform well under varied conditions. Specifically, they provide durability and performance enhancement to products manufactured by the high-tech industries in California including auto, space, and defense industries – integral to providing products that also provides jobs for thousands of employees, and end-use customers.**

**One of the challenges paint and coating applicators face is air emissions control of VOCs. A conventional technology for emissions control is thermal oxidation – an energy intensive technology even when recuperative/regenerative technologies are deployed for air emissions control.**

**CentriarUSA (www.centriair.com) proposes to demonstrate an ultraviolet (UV) oxidation technology (UV Ox) as an alternative to thermal oxidation technologies for air emissions control from paint booths. The technology relies on the use of UV light to completely oxidize organic contaminants present in process streams. The organic compounds are oxidized either through direct photolysis (absorption of the UV light), or through excitation and decomposition via contact with ozone and hydroxyl radicals that are generated from UV interactions. UV Ox technology is commonly used (in Europe) in the industry to eliminate many, if not most, organic as well as some inorganic compounds in foul ventilation air.**

**A simplified life cycle cost (LCC) analysis reveals that the capital expenditure (CAPEX) for a regenerative/recuperative oxidation technologies (RTO) and UV Ox system is approximately the same. It follows that operating expense (OPEX) is primarily a function of energy cost. In this analysis we compare OPEX for a small RTO with a similarly sized UV Ox system. The upshot is that OPEX for a UV Ox system is approximately 20 percent of the RTO alternative. Some advantages include electrification by technology substitution that also minimizes GHG emissions at a considerably lower cost than thermal oxidation alternatives.**

**Given that Reasonably Available Control Technology (RACT) or Best Available Control Technology (BACT) is required for new or modified projects, it follows that incumbent technologies have a distinct advantage that is difficult and often very costly to overcome. Even though there is room in the regulations “to provide an alternative” having the same or better removal efficiency of the constituents of concern, that process is conducted on a case- by-case basis, usually by State or local permitting agencies. This introduces uncertainties with respect to the time that the review process might take, what verification/validation data that will be required, and the overall cost including cost due to unforeseen start-up delays. These are all difficult barriers for an operating company to overcome when/if the existing RTO needs to be replaced. It follows that the path towards acceptance of UV Ox technology, as an alternative to thermal oxidation as a VOC emissions control technology, will require a full-scale demonstration of the UV Ox technology to subsequently be included in the EPA established the RACT/BACT/LAER Clearinghouse database of air pollution technology information.**

Please see response to Q30.

1. **Our core technology is membrane-based for “point-source” capture and NOT for direct air capture. Do we qualify for either:**

* **Group 2: Technologies for increasing efficiency of electricity driven carbon capture and utilization, or**
* **Group 3: Energy efficiency improvements to existing non-thermal separation processes to improve economics and market viability.**

**The project may be eligible for Group 3, if the industrial power generation facility is already operational at an industrial facility and the project would capture the carbon dioxide emissions from the exhaust stack. The project must be demonstrated at an industrial facility as described in the GFO for Group 3 and be within one of the electric investor-owned utility service areas.**