**GRANT FUNDING OPPORTUNITY**

**Commercializing Industrial Decarbonization**

**(2022 CID Program)**

**EPIC Program**



**GFO-22-301 Addendum 1**

http://www.energy.ca.gov/contracts/index.html

**State of California**

**California Energy Commission**

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##### Table of Contents

I. Introduction 2

A. Purpose of Solicitation 3

B. Key Words/Terms 4

C. Project Focus 6

D. Funding 17

E. Key Activities Schedule 18

F. Notice of Pre-Application Workshop 19

G. Questions 20

II. Eligibility Requirements 28

A. Applicant Requirements 28

B. Project Requirements 29

III. Application Organization and Submission Instructions 32

A. Application Format, Page Limits, and Number of Copies 32

B. Method For Delivery 33

C. Application Content 33

IV. Evaluation and Award Process 39

A. Application Evaluation 39

B. Ranking, Notice of Proposed Award, and Agreement Development 39

C. Grounds to Reject an Application or Cancel an Award 40

D. Miscellaneous 41

E. Stage One: Application Screening 42

F. Stage Two: Application Scoring 43

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| **Attachments**

| Attachment Number | Title of Section |
| --- | --- |
| 1 | Application Form ***(requires signature)*** |
| 2 | Executive Summary  |
| 3 | Project Narrative  |
| 4 | Project Team  |
| 5 | Scope of Work  |
| 6 | Project Schedule |
| 7 | Budget  |
| 8 | CEQA Compliance Form  |
| 9 | References and Work Product |
| 10 | Commitment and Support Letters ***(require signature)*** |
| 11 | Project Performance Metrics |
| 12 | Applicant Declaration ***(require signature)*** |
| 13 | References for Calculating Energy End-Use and GHG Emissions |

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# I. Introduction

California’s industrial sector is as diverse and unique as California’s population and geography. By itself, California’s $3.4 trillion gross domestic product (2021 GDP) places it fifth among the world’s largest economies. For 2021, the robust and growing industrial sector accounted for 12% of California’s GDP.[[1]](#footnote-2)

To produce the varied products and commodities that California is known for requires large quantities of energy and water. Available estimates indicate that on an annual[[2]](#footnote-3) basis, California’s industrial sector accounts for over 25% of the state’s electricity consumption, 35% of its gas use, and over 20% of the state’s greenhouse gas emissions[[3]](#footnote-4) (GHG).

Emission reductions in this sector can contribute significantly to meeting the 2030 targets as set forth in Senate Bill (SB) 350.[[4]](#footnote-5),[[5]](#footnote-6) New technology advancements are needed to enable electrification of high-temperature process heating (which accounts for 85 percent of gas use in industry) and use of waste heat with high-temperature electric heat pumps. Additional technology advancements are needed in manufacturing and process changes to reduce both reliance on fossil fuels and process emissions. Examples include:

1. Switching from energy-intensive thermal processes usually involving fossil fuel combustion for heating (for example, distillation or evaporation), to lower-intensity electrically driven non-thermal separations (for example, membranes).
2. Incorporating electricity-driven carbon capture and utilization282F[[6]](#footnote-7) to reduce process emissions.
3. Changing materials formulation to reduce process emissions such as in cement production.

To increase the value proposition and business case for industrial decarbonization, efforts are needed to increase the energy efficiency of these technologies and reduce their capital and operating costs. Technology demonstrations and technology transfer efforts are needed to promote adoption by increasing awareness of decarbonization opportunities, highlighting successful approaches, and overcoming risk aversion.

Given the scale of California’s industrial sector’s energy usage, diversity, and significant contributions to California’s economy, it is vital to find solutions to help this sector remain competitive in the global economy while helping to meet California’s ambitious energy efficiency, renewable energy and decarbonization goals.

## Purpose of Solicitation

The industrial sector has significant potential for improvements in energy and water efficiency but is a difficult sector in which to promote energy efficiency and to decarbonize. Each individual facility has unique operational needs, has a mix of old and new equipment, lacks easy access to actionable operation data for decision–making, and lacks verified performance data under real-world conditions for promising emerging technologies.

The purpose of this solicitation is to fund technology development and demonstration projects of promising pre-commercial technologies to accelerate industrial decarbonization and increase overall energy efficiency to reach statewide goals set forth by SB 32[[7]](#footnote-8), SB 100[[8]](#footnote-9), and SB 350[[9]](#footnote-10).

Projects must fall within one of the following project groups:

**Group 1**: **Low-Carbon, High-Temperature Industrial Heating**

**Group 2: Energy Efficiency and Decarbonization of Concrete Manufacturing**

**Group 3**: **Energy Efficient Separation Processes**

See Part II of this solicitation for project eligibility requirements. Applications will be evaluated as follows: Stage One proposal screening and Stage Two proposal scoring. 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 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

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## Key Words/Terms

| **Word/Term** | **Definition** |
| --- | --- |
| Applicant | The entity that submits an application to this solicitation. |
| Application | An applicant’s written response to this solicitation. |
| Authorized Representative | *Authorized Representative*, the person signing the application form who has authority to enter into an agreement with the CEC.  |
| 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 Recipient. |
| CAO | Commission Agreement Officer |
| CBO | Community Based Organization. A public or private nonprofit organization of demonstrated effectiveness that: 1. Has an office in the region (e.g., air basin or county) and meets the demographic profile of the communities they serve.
2. Has deployed projects and/or outreach efforts within the region (e.g., air basin or county) of the proposed disadvantaged or low-income community.
3. Has an official mission and vision statements that expressly identifies serving disadvantaged and/or low-income communities.
4. 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.
 |
| CCUS | Carbon capture, utilization, and sequestration |
| CEC | State Energy Resources Conservation and Development Commission or , the California Energy Commission. |
| CEQA | California Environmental Quality Act, California Public Resources Code Section 21000 et seq. |
| Days | *Days refers to calendar days.* |
| Disadvantaged Community |  These are 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) |
| Energy Equity | The fair distribution of benefits and burdens from energy production and consumption. |
| EPIC | *Electric Program Investment Charge,* the source of funding for the projects awarded under this solicitation. |
| IOU | *Investor-owned utility,* an electrical corporation as defined in in California Public Utilities Code section 218. For purposes of this EPIC solicitation, it includes Pacific Gas and Electric Co., San Diego Gas and Electric Co., and Southern California Edison Co. |
| Low Income Community | *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)  |
| NOPA | *Notice of Proposed Award,* a public notice by the CEC that identifies award recipients. |
| Pre-Commercial Technology | *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. |
| Pilot Test | *Pilot test* means small scale testing in the laboratory or testing on a small portion of the production line of the affected industry. Pilot tests help to 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 | An entity or individual 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 |  An entity receiving an award under this solicitation. |
| Simple Payback | Simple payback = (equipment cost + installation cost + annual recurring fees) ÷ (annual energy savings + demand cost savings) |
| Solicitation | This entire document, including all attachments, exhibits, any addendum and written notices, and questions and answers (“solicitation” may be used interchangeably with “Grant Funding Opportunity”).  |
| State | State of California |
| 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> |

## Project Focus

1. **Group 1: Low-Carbon High-Temperature Industrial Heating**

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).

Targeted industries include energy-intensive industries such as (but not limited to) cement, glass, chemicals, and metals and processes that use heat over 800°C (1472°F) such as melting, smelting, curing, and calcining. These processes currently use low-cost fossil gas as a primary source of energy. More demonstrations and deployments under real-world operating conditions of low-carbon high-temperature industrial heating technologies could improve the value proposition by reducing capital and operating costs, leading to wider adoption of electric heating alternatives to use of fossil fuels. The goal is to make low-carbon high-temperature industrial technologies applicable and economically feasible for industrial operations beyond those participating in this solicitation. Technologies sought are either pre-commercial or commercialized but underutilized (due to economics, lack of verified field performance data, or both) and are currently at a technology readiness level (TRL) of 6-8, with the expectation to progress up one or more levels by the end of the project.

Group 1 projects will fall under one of the following areas:

* ***Direct electrification of heating:*** Electrotechnologies such as microwaves, infrared, radio frequency, ultrasonic, pressure-assisted heating, and others can be highly energy-efficient; have potential for high reliability, throughput, and convenience of automation; and may provide better-quality products relative to conventional heating approaches. Reduction of capital and operating costs and field demonstration of the reliability and flexibility of these systems are crucial to move targeted processes away from fossil fuels. Potential research areas include:
	+ Develop, test, and demonstrate new electric or hybrid equipment for high-temperature industrial heating with a goal of reducing energy consumption per unit produced.
	+ Develop and demonstrate emerging electrotechnologies to scale-up, move to a higher TRL, and gather operation data via demonstration in real-world conditions.
	+ 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.
	+ Develop and demonstrate advanced controls and heating operations using electrotechnologies to minimize grid impacts and demonstrate in a real-world industrial setting.
* ***Zero-carbon heat sources:***Use of industrial waste heat is a promising source of low/zero-carbon heat. Currently, available heat pumps are mostly limited to heat supply at around 80°C (176°F), while many industrial processes typically require temperatures from 100° to 200°C (212° to 392°F). Projects of interest should focus on the development, testing, and demonstration of HTHP technologies that advance electrification and improve energy efficiency by recovering waste heat. Potential research areas include:
	+ Develop and demonstrate refrigerants, components, and HTHP systems that could use and upgrade waste heat for medium-temperature industrial processes (output at 150-230°C or 300-450°F) with the goal of reducing capital costs of the system.
	+ Develop and demonstrate emerging heat-pump technologies, including advanced operation cycles, non-vapor compression heat pumps, with the goal of advancing TRL at least one level higher by the end of the project.
	+ Develop and demonstrate industrial-scale heat pump equipment to reduce capital and operational costs and improve project economics.
	+ Demonstrate integration of industrial heat pumps with direct or indirect heating systems. Indirect heating systems can include use of renewable energy, such as solar thermal and geothermal, and use of thermal energy storage that can improve load flexibility. Commercially available technologies may be part of the integration project, but CEC funds must only be spent on purchasing, developing, and demonstrating emerging and underutilized industrial heat pumps or direct/indirect heating systems. CEC funds cannot be used for renewable energy sources associated with the HTHP demonstration. These portions can be paid with match funds.

**NOTE:** Projects are expected to have independent third-party Measurement and Verification to establish a baseline performance using data on at least 6 months prior to the project deployment, and 6 months post-deployment, to measure and quantify project benefits per Attachment 5 Scope of Work Template. If the proposed project is building a new facility and 6 months of performance data at the demonstration/pilot site cannot be obtained, the applicant must provide a detailed explanation of a reasonable pathway to establishing the baseline for best-in-class or industry standard equipment.

The Project Narrative (Attachment 3) must include the following:

In the Technical Merit section:

* 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, decrease in capital and/or operational costs, and water savings (if any) over baseline conditions. Commercially available technologies may be part of the integration project, but CEC funds should only be spent on developing and demonstrating emerging and underutilized commercial equipment.
* Describe the proposed project’s potential for flexible operations and demand response.
* Discuss how demonstrating technologies in the real-world setting within the scope of the proposed project will promote their adoption and identify gaps and barriers that need to be overcome for wider adoption.
* Describe and justify that the proposed technologies are currently at a technology readiness level of 6-8 and how the proposed project will lead to progress up one or more levels by the end of the agreement term.
* Discuss market size for the proposed technologies and their potential for deployment to multiple industries beyond the term of the proposed project.

In the Technical Approach section:

* Describe how the proposed project could assist in load shifting, peak shaving, demand side management, increasing utilization of excess renewable energy during certain periods in the industrial sector, and promoting reliable operation of the demonstration facility.
* Describe and discuss cost effectiveness of the proposal that includes the following: potential energy savings and other benefits, estimated project fixed costs, and other costs necessary for long term use (e.g., beyond the term of proposed project).
* Describe and discuss how the project team will maximize the cost-effectiveness of the CEC funds requested.
* Describe and discuss how the technology transfer plan discussed in the Project Narrative (Attachment 3, Technical Approach, item f) will be deployed to ensure market adoption beyond the demonstration sites with buy-in from other stakeholders, such as electric utilities, trade groups, and industries in California. Applicants should include all of the following in their discussion:
	+ A discussion of what metrics the applicant would use to determine the “success” of the technology transfer plan in achieving the objectives of increased industry adoption.
	+ A description of how the verified results and data collected will be disseminated and made publicly available.
	+ A description and examples of the team’s past successes with deploying innovative technologies to the marketplace.
	+ Workshops, webinars, and case studies describing the approach, methodology details, benefits, and energy and cost savings from participating industrial facilities and the potential for similar benefits to other sites.
	+ Development of a technical advisory committee representing various industrial facilities, trade groups, electric utilities, and other stakeholders.
	+ Best practices for implementing this technology to the rest of California’s industrial sector.
* Describe a comprehensive M&V plan that addresses the information in the Project Narrative (Attachment 3, Technical Approach, item g) and includes, but is not limited to, how the applicant will:
	+ Establish a baseline performance based on at least 6 months of data. If the proposed project is building a new facility and 6 months of performance data at the demonstration/pilot site cannot be obtained, the applicant must provide detailed explanation of a reasonable pathway to establishing the baseline for best-in-class or industry standard equipment.
	+ Monitor and verify savings for at least 6 months post installation.
	+ Estimate energy cost savings and simple payback (Simple payback = (equipment cost + installation cost + annual recurring fees) ÷ (annual energy savings + demand cost savings)).
* Discuss and justify how the project (at each demonstration site) will meet the research goals listed in Table 1.
* Describe a plan to perform the work proposed, including the M&V plan, under continued supply chain disruptions and inflation-impacted costs for materials, equipment, and consumable supplies.

**Table 1: Research Goals for Group 1**

|  |  |  |
| --- | --- | --- |
| **Technology** | **Baseline Performance/ Energy Use (to be completed by applicants)** | **Research Goals** |
| **Direct Electrification of Heating****Zero-carbon heat sources** | * Current electricity and fossil gas usage
* Current GHG emissions at facility level and at the system level for proposed technology application
* Current operational and maintenance costs
* Current typical load profile for facility and/or equipment level for the proposed technology application
* Other criteria as appropriate to be provided by Applicants
 | * 25 percent or greater reduction in fossil fuel use
* 25 percent or greater reduction of facility-level greenhouse gas 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
 |

**\*** See glossary

1. **Group 2: Energy Efficiency and Decarbonization of Concrete Manufacturing**

Manufacturing cement is an energy-intensive process that involves the grinding and mixing of raw materials, which are chemically altered by intense heat in a high-temperature kiln to form a compound with binding properties. Approximately 60 percent of emissions from cement production are process-related, primarily from the conversion of limestone to clinker, while 40 percent come from fuel and electricity consumption, including onsite combustion to power high-temperature clinker kilns.295F[[10]](#footnote-11) California’s cement industry energy emissions are elevated relative to other industries in the state due to the high use of coal (51 percent of total energy consumption as of 2015) and petroleum coke (21 percent).296F[[11]](#footnote-12) Innovation is required to decarbonize this industry because of the substantial process emissions and because conventional electrification is unlikely to suffice for the high temperatures needed for clinker kilning (>750⁰C) in the near term.

Carbon capture, utilization, and sequestration (CCUS) is a potential pathway to achieve significant decarbonization of the cement industry to help achieve California’s climate and energy goals. Sixty percent of the CO2 produced in cement manufacturing is from process emissions, and there is risk aversion from the cement, concrete, and construction sectors to switch to less familiar, lower-CO2 emitting materials out of concern that they could compromise the structural properties of produced materials. Carbon capture is energy intensive, and if it is applied at scale, the power consumption of cement manufacturing will increase significantly (50-120 percent on the plant level).299F[[12]](#footnote-13) With the objective of decarbonization, CCUS should be electrified and made as energy efficient as possible to enhance grid reliability and maximize available renewables resources.

One of the ways to utilize captured carbon onsite is to produce synthetic aggregates using old and rejected concrete as feedstock. Some emerging utilization techniques to accelerate this process include carbon injection, carbonate mineralization coating, carbon curing, and carbonation activation. The inclusion of carbon into cement has the potential to enhance the concrete’s compressive strength. It is necessary to investigate the possible impact of deep concrete mineral carbonization on its reinforcement, as the steel most often used for reinforcement may suffer accelerated corrosion.302F[[13]](#footnote-14) With almost 50 billion tons of construction aggregates produced annually worldwide (including 4 billion tons in North America)303F[[14]](#footnote-15) and a thermodynamically favorable reaction, mineral carbonation is among the largest and most energy-efficient routes for carbon utilization.304F[[15]](#footnote-16)

This research topic focuses on developing and demonstrating energy efficiency and decarbonization technologies for concrete manufacturing. Potential projects can include:

* Develop and demonstrate technologies for increasing the efficiency of electricity-driven carbon capture and utilization at cement and/or concrete production facilities. The goals are to demonstrate technical feasibility and economic viability and to identify barriers and opportunities for cost reductions.
* Develop and demonstrate the use of alternative raw materials and processes (for instance, electrochemical clinker production) to produce cement and/or concrete and enable electrification of production by reducing the need for high-temperature heating (e.g., alternative chemistries that reduce the temperature of the limestone conversion process). The goals are to improve the TRL of emerging technologies, enable field demonstrations, and scale up technologies.
* Demonstrate fuel substituting with electricity in the cement/concrete production process (such as in the precalciner). The goals are to demonstrate technical feasibility and economic viability and to identify barriers and opportunities for cost reductions.

**NOTE:** Commercially available technologies can be part of the project, but CEC funds must only be spent on purchasing, developing, and demonstrating emerging and underutilized technologies. CEC funds cannot be spent on the renewable energy portions of the project associated with these technology demonstrations. These portions can be paid with match funds.

**NOTE:** Projects are expected to have independent third-party Measurement and Verification to establish a baseline performance using data on at least 6 months prior to the project deployment and 6 months post-deployment to measure and quantify project benefits per Attachment 5 Scope of Work Template. If the proposed project is building a new facility and 6 months of performance data at the demonstration/pilot site cannot be obtained, the applicant must provide a detailed explanation of a reasonable pathway to establishing the baseline for best-in-class or industry standard equipment.

The Project Narrative (Attachment 3) must include the following:

In the Technical Merit section:

* Describe and discuss pre-commercial and commercialized technologies that are part of the proposed project (and align with Table 2) and how their implementation at the demonstration site(s) will lead to energy and GHG emissions reductions, decrease in capital and/or operational costs, and water savings (if any) over baseline conditions.
* Describe the proposed project’s potential for flexible operations and demand response.
* Discuss how demonstrating technologies in the real-world setting within the scope of the proposed project will promote their adoption and identify gaps and barriers that need to be overcome for wider adoption.
* Describe and justify that the proposed technologies are currently at a TRL of 5-8 and how the proposed project will lead to progress up one or more levels by the end of the agreement term.
* Discuss market size for the proposed technologies and their potential for deployment to multiple industries beyond the term of the proposed project.

In the Technical Approach section:

* Describe how the proposed project could assist in load shifting, peak shaving, demand side management, increasing utilization of excess renewable energy during certain periods in the industrial sector, and promoting reliable operation of the demonstration facility.
* Describe and discuss the cost-effectiveness of the proposal and include the following: potential energy savings and other benefits, estimated project fixed costs, and other costs necessary for long term use (e.g., beyond the term of proposed project).
* Describe and discuss how the project team will maximize the cost-effectiveness of the CEC funds requested.
* Describe and discuss how the technology transfer plan discussed in the Project Narrative (Attachment 3, Technical Approach, item f) will be deployed to ensure market adoption beyond the demonstration sites with buy-in from other stakeholders, such as electric utilities, trade groups, and industries in California. Applicants should include all of the following in their discussion:
	+ A discussion of the metrics the applicant would use to determine the “success” of the technology transfer plan in achieving the objectives of increased industry adoption.
	+ A description and examples of the team’s past successes with deploying innovative technologies to the marketplace.
	+ Workshops, webinars, and case studies describing approach, methodology details, benefits, and energy and cost savings from participating cement/concrete facilities and the potential for similar benefits to other sites.
	+ Development of a technical advisory committee representing cement and concrete facilities, trade groups, electric utilities, and other stakeholders.
	+ Best practices for implementing this technology to the rest of the California cement industry.
	+ A description of how the verified results and data collected will be disseminated and made publicly available.
* Describe a comprehensive M&V plan that addresses the information in the Project Narrative (Attachment 3, Technical Approach, item g) and includes, but is not limited to, how the applicant will:
	+ Establish a baseline performance based on at least 6 months of data. If the proposed project is building a new facility and 6 months of performance data at the demonstration/pilot site cannot be obtained, the applicant must provide a detailed explanation of a reasonable pathway to establishing the baseline for best-in-class or industry standard equipment.
	+ Monitor and verify savings for at least 6 months post installation.
	+ Estimate energy cost savings and simple payback (Simple payback = (equipment cost + installation cost + annual recurring fees) ÷ (annual energy savings + demand cost savings)).
* Discuss and justify how the project (at each demonstration site) will meet the research goals listed in Table 2.
* Describe a plan to perform the work proposed, including the M&V plan under continued supply chain disruptions and inflation-impacted costs for materials, equipment, and consumable supplies.

**Table 2 Research Metrics for Group 2**

|  |  |  |
| --- | --- | --- |
| **Technology** | **Baseline Performance/ Energy Use (to be completed by applicants)** | **Research Goals** |
| **Electricity Driven Carbon Capture and Utilization Equipment** | * Current carbon capture efficiency in tons/kWh
* Daily and annual carbon capture capacity
* Water and chemical usage
 | * 25 percent or greater reduction of facility-level greenhouse gas emissions
* Increased carbon capture efficiency compared to current technology(in tons/kWh)
* Increase the utilization of captured greenhouse gas emissions within or outside the cement industry
* Development of efficient carbon delivery methods/storage systems
 |
| **Alternative Raw Materials Enabling Electrification Processes** | Conventional Cement Production Process:* Estimate of total facility energy/per ton of cement produced
* Current operating temperatures
 | * Compressive strength of alternate material must be equal to or greater than that of current materials
* Reduced greenhouse gas emissions from alternative raw materials
* Decreased process heating temperature requirements to economical electrification temperatures
 |
| **Electrification Equipment for Conventional Cement Production** | Conventional Cement Production Process:* Estimate of total facility energy
 | * 25 percent or greater reduction in fossil fuel use from equipment electrification
* 25 percent or greater reduction of facility-level greenhouse gas emissions
 |

1. **Group 3: Energy Efficient Separation Processes**

Separation processes (including distillation, drying, and evaporation) are among the most common in the industrial sector and are estimated to consume about 22 percent of in-plant energy use in U.S. industry.317F[[16]](#footnote-17) Some estimates attribute 10–15 percent of the total energy used in the United States to chemical separations.318F[[17]](#footnote-18) Separation processes include energy-intensive heating processes with distillation, drying, and evaporation accounting for 49, 20, and 11 percent of the energy use in separation processes, respectively.319F[[18]](#footnote-19) As California’s grid moves to 100 percent clean electricity, switching from fossil gas-intensive separation to electricity-driven separation (for example, non-thermal separation with filtration, crystallization, and absorption) can substantially reduce GHG emissions. With continued capital and operating cost improvements, adoption of electricity-driven separation technologies could increase, delivering energy savings and GHG emission reductions in the industrial sector.

The purpose of this research area is to develop, test, and demonstrate advanced electric-driven separation technologies in the industrial sector that could reduce energy intensity and provide co-benefits such as water recovery. Targeted industries include food processing, chemicals, pulp and paper, water desalination, wastewater treatment, and carbon capture (including direct air capture). Separation processes targeted by this solicitation group include use of membranes (including ion transport membranes), filtration, freeze distillation, and electrochemical separation.

Group 3 projects will fall under one of the following areas of interest:

* Develop and demonstrate separation technologies for direct air capture of CO2.
* Develop and demonstrate equipment that replaces thermal separation (evaporation, distillation) with alternative non-thermal separation (for instance, membranes or freeze concentration). The goals are to demonstrate economic and market viability of the replacement in a real-world setting and to improve its energy efficiency and economics.
* Develop and demonstrate energy efficiency improvements to existing separation processes that can improve economics and market viability. Examples include reducing capital costs of ion transport membranes, increasing the TRL of swing absorption units, and improving the robustness of membranes that treat water flows contaminated with oils.
* Develop and demonstrate advanced separation technologies for wastewater treatment of biosolids/sludge that maximize GHG reductions and improve economics compared to the incumbent process. [**Note:** Digestor projects are ineligible as part of this GFO but could be considered in future solicitations.]
* Develop and demonstrate novel separation technologies with the potential for water reclamation that maximize GHG reductions and improve economics compared to incumbent processes.

**NOTE:** Projects are expected to have independent third-party Measurement and Verification to establish a baseline performance using data on at least 6 months prior to the project deployment and 6 months post-deployment to measure and quantify project benefits per Attachment 5 Scope of Work Template. If the proposed project is building a new facility and 6 months of performance data at the demonstration/pilot site cannot be obtained, the applicant must provide a detailed explanation of a reasonable pathway to establishing the baseline for best-in-class or industry standard equipment.

The Project Narrative (Attachment 3) must include the following:

In the Technical Merit section:

* 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 electricity and GHG emissions reductions, decrease in capital and/or operational costs, and water savings (if any) over baseline conditions.
* Describe the proposed project’s potential for flexible operations and demand response.
* Discuss how demonstrating technologies in the real-world setting within the scope of proposed project will promote their adoption and identify gaps and barriers that need to be overcome for wider adoption.
* Describe and justify that the proposed technologies are currently at a TRL of 5-8 and how the proposed project will lead to progress up one or more levels by the end of the agreement term.
* Discuss the market size for the proposed technologies and their potential for deployment to multiple industries beyond the term of the proposed project.

**NOTE:** Commercially available technologies can be part of the project, but CEC funds must only be spent on purchasing, developing, and demonstrating emerging and underutilized technologies. CEC funds cannot be spent on the renewable energy portions of the project associated with these technology demonstrations. These portions can be paid with match funds.

In the Technical Approach section:

* Describe how the proposed project could assist in load shifting, peak shaving, demand side management, increasing utilization of excess renewable energy during certain periods in the industrial sector, and promoting reliable operation of the demonstration facility.
* Describe and discuss cost-effectiveness of the proposal and include the following: potential energy savings and other benefits, estimated project fixed costs, and other costs necessary for long term use (e.g., beyond the term of proposed project).
* Describe and discuss how the project team will maximize the cost-effectiveness of the CEC funds requested.
* Describe and discuss how the technology transfer plan discussed in the Project Narrative (Attachment 3, Technical Approach, item f) will be deployed to ensure market adoption beyond the demonstration site(s) with buy-in from other stakeholders, such as electric utilities, trade groups, and industries in California. Applicants should include all of the following in their discussion:
	+ A discussion of the metrics the applicant would use to determine the “success” of the technology transfer plan in achieving the objectives of increased industry adoption.
	+ A description of how the verified results and data collected will be disseminated and made publicly available.
	+ A description and examples of the team’s past successes with deploying innovative technologies to the marketplace.
	+ Workshops, webinars, and case studies describing the approach, methodology details, benefits, and energy and cost savings from participating industrial facilities and potential for similar benefits to other sites.
	+ Development of a technical advisory committee representing various industrial facilities, trade groups, electric utilities, and other stakeholders.
	+ Best practices for implementing this technology to the rest of the California’s industrial sector.
* Describe a comprehensive M&V plan that addresses the information in the Project Narrative (Attachment 3, Technical Approach, item g) and includes, but is not limited to, how the applicant will:
	+ Establish a baseline performance based on at least 6 months of data. If the proposed project is building a new facility and 6 months of performance data at the demonstration/pilot site cannot be obtained, the applicant must provide a detailed explanation of a reasonable pathway to establishing the baseline for best-in-class or industry standard equipment.
	+ Monitor and verify savings for at least 6 months post installation.
	+ Estimate energy cost savings and simple payback (Simple payback = (equipment cost + installation cost + annual recurring fees) ÷ (annual energy savings + demand cost savings)).
* Discuss and justify how the project (at each demonstration site) will meet the research goals listed in Table 3.
* Describe a plan to perform the work proposed, including the M&V plan under continued supply chain disruptions and inflation-impacted costs for materials, equipment, and consumable supplies.

**Table 3: Research Metrics for Group 3**

|  |  |  |
| --- | --- | --- |
| **Technology** | **Baseline Performance/ Energy Use (to be completed by applicants)** | **Research Goals** |
| **All eligible Group 3 technologies** | * Current electricity and fossil gas usage
* Current operational and maintenance costs
* Current GHG emissions facility level and at the system level for proposed technology application
* Other criteria as appropriate to be provided by Applicants
 | * 25 percent or greater reduction in fossil fuel use
* 25 percent or greater reduction of facility-level greenhouse gas emissions
* 10 percent or greater reduction in operational and maintenance costs
* Simple payback\* of under three years
 |

**\*** See glossary

## Funding

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

There is **up to $40,000,000** available for grants awarded under this solicitation. The total, minimum, and maximum funding amounts for each project group are listed below.

| Project Group | Available Funding | Minimum award amount | Maximum award amount | Minimum match funding(% of EPIC Funds Requested) |
| --- | --- | --- | --- | --- |
| Group 1: Low-Carbon, High-Temperature Industrial Heating | Up to$5,000,000 | $2,000,000 | $5,000,000 | 20% |
| Group 2: Energy Efficiency and Decarbonization of Concrete Manufacturing  | Up to$20,000,000 | $2,000,000 | $12,000,000 | 20% |
| Group 3: Energy Efficient Separation Processes  | Up to$15,000,000 | $2,000,000 | $12,000,000 | 20% |

1. **Match Funding Requirement**

Match funding is required in the amount of at least **20%** of the requested project funds.

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 California Energy Commission (CEC) reserves the right to:

1. Increase or decrease the available funding and the minimum/maximum award amounts described in this section.
2. Allocate any additional or unawarded funds to passing applications, in rank order.
3. Reallocate funding between any of the groups
4. Reduce funding to an amount deemed appropriate if the budgeted funds do not provide full funding for agreements. In this event, the Recipient and Commission Agreement Manager will 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.**

This solicitation will include up to three application rounds if remaining funds are available, or additional funds are added, after the close of a round. Applicants that submit a proposal for the first application round and are not awarded may reapply to the subsequent application rounds. Applicants that receive an award in one application round are allowed to submit a proposal for the subsequent application rounds, provided that their subsequent round application is for a distinct project (i.e., no overlap with respect to the tasks described in the first round proposal’s Scope of Work).

| ACTIVITY | DATE | TIME[[19]](#footnote-20)  |
| --- | --- | --- |
| Solicitation Release | October 13th  |  |
| **Pre-Application Workshop** | **October 26th** | **10:00 a.m.** |
| **Deadline for Written Questions[[20]](#footnote-21)** | **November 14th** | **5:00 p.m.** |
| Anticipated Distribution of Questions and Answers  | Week of December 5th |  |
| **1st Round Deadline to Submit Applications** | **March 6th, 2023** | **11:59 p.m.** |
| **2nd Round Deadline to Submit Applications (If needed)** | **To Be Announced** | **11:59 p.m.** |
| **3rd Round Deadline to Submit Applications (If needed)** | **To Be Announced** | **11:59 p.m.** |
| Anticipated Notice of Proposed Award Posting Date (Round 1) | April 2023 |  |
| Anticipated Notice of Proposed Award Posting Date (Round 2, if needed) | To Be Announced |  |
| Anticipated Notice of Proposed Award Posting Date (Round 3, if needed) | To Be Announced |  |
| Anticipated Energy Commission Business Meeting Date (Round 1)**\*** | May 2023 |  |
| Anticipated Agreement Start Date | 45 days after the business meeting |  |
| Anticipated Agreement End Date  | Four years after the applicable application deadline |  |

**\* Subsequent Business Meetings for Rounds 2 and 3 with be determined later.**

## Notice of Pre-Application Workshop

CEC staff will hold one Pre-Application Workshop to discuss the 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.

**Date and time:** October 26th, 2022 at 10:00 AM

**Zoom Instructions:**

To join the Zoom meeting, go to <https://zoom.us/join> and 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:** 967 1123 3605

**Meeting Password:** meeting@10

**Topic:** Pre-Bid for Commercializing Industrial Decarbonization (2022 CID 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 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 800-822-6228.

* 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 have a disability and require assistance to participate, please Erica Rodriguez by e-mail at Erica.Rodriguez@energy.ca.gov or (916) 654-4314 at least five days in advance.

## Questions

During the solicitation process, direct questions to 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., questions concerning application format requirements or attachment instructions) may be submitted to the Commission Agreement Officer (CAO) at any time prior to 5:00 p.m. of the application deadline date.

The questions and answers will also be posted on the Commission’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 CEC 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 Commission 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.**

1. **Applicants’ Admonishment**

This solicitation contains application requirements and instructions. Applicants are responsible for **carefully reading** the 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/Scoring Criteria and** **Grounds for Rejection** in Part IV, and the relevant EPIC Grant terms and conditions located at: http://www.energy.ca.gov/research/contractors.html.

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 upon the posting of the Notice of Proposed Award.

1. **additional requirements**
* Time is of the essence. Funds available under this solicitation have encumbrance deadlines as early as June 30, 2023.  This means that the CEC must approve proposed awards at a business meeting (usually held monthly) prior to June 30, 2023, in order to avoid expiration of the funds. Prior to approval and encumbrance, the CEC must comply with the California Environmental Quality Act (CEQA). To comply with CEQA, the Commission 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 Commission 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 proposals in a manner that minimizes the time required for the Commission to comply with CEQA and provide all CEQA-related information to the Commission in a timely manner such that the Commission 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 Commission’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 or environmental impact report 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 adopted a CEQA finding 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. Please plan project proposals accordingly.

1. **Background**
2. **Electric Program Investment Charge (EPIC) Program**

This solicitation will award projects funded by the EPIC, an electricity ratepayer surcharge established by the California Public Utilities Commission (CPUC) in December 2011.[[21]](#footnote-22) The purpose of the EPIC program is to benefit the ratepayers of three investor-owned utilities (IOUs), including Pacific Gas and Electric Co., San Diego Gas and Electric Co., and Southern California Edison Co. The EPIC funds clean energy technology projects that **meet the guiding principles of** **(1) improving safety, (2) increasing reliability, (3) increasing affordability, (4) improving environmental sustainability, and (5) improving equity, all as related to California's electric system.[[22]](#footnote-23)** [~~promote greater electricity reliability, lower costs, and increased safety.~~~~[[23]](#footnote-24)~~] In addition to providing IOU ratepayer benefits, funded projects must lead to technological advancement and breakthroughs to overcome the barriers that prevent the achievement of the state’s statutory energy goals.[[24]](#footnote-25) The EPIC program is administered by the CEC and the IOUs.

* **Program Areas, Strategic Objectives, and Funding Initiatives**

EPIC projects must fall within the following **program areas** identified by the CPUC:

* Applied research and development;
* Technology demonstration and deployment; and
* Market facilitation.

In addition, projects must fall within one of the general focus areas (**“strategic objectives”**) identified in the CEC’s EPIC Investment Plans[[25]](#footnote-26) [[26]](#footnote-27) and within one or more specific focus areas (**“funding initiatives”**) identified in the plan. This solicitation targets the following program area(s), strategic objective(s), and funding initiative(s):

**EPIC 2021-2025 Investment Plan**

* **Program Area**: Technology Demonstration and Deployment
* **Strategic Objective** Industrial Decarbonization Initiative: Accelerate Electrification and Improve Energy Efficiency in the Industrial Sector
	+ **Funding Initiative 31**: Low-Carbon, High-Temperature Industrial Heating
	+ **Funding Initiative 32**: Energy Efficiency and Decarbonization of Concrete Manufacturing
	+ **Funding Initiative 33**: Energy Efficient Separation Processes

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

This solicitation addresses the energy goals described in the following laws, policies, and background documents.

Laws/Regulations

* **Assembly Bill (AB) 32[[27]](#footnote-28) - Global Warming Solutions Act of 2006**

AB 32created a comprehensive program to reduce greenhouse gas (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 required the California Air Resources Board (ARB) to develop a Scoping Plan that describes the approach California will take to reduce GHGs. ARB must update the plan every five years.

Additional information: http://www.leginfo.ca.gov/pub/15-16/bill/sen/sb\_0001-0050/sb\_32\_bill\_20160908\_chaptered.htm

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

* **Senate Bill (SB) 32[[28]](#footnote-29) - California Global Warming Solutions Act of 2006: emissions limit**

AB 32 designates the State Air Resources Board as the state agency charged with monitoring and regulating sources of greenhouse gas (GHG) emissions. The state board is required to approve a statewide GHG emissions limit equivalent to the statewide GHG emissions level in 1990 to be achieved by 2020 and to adopt rules and regulations in an open public process to achieve the maximum, technologically feasible, and cost-effective GHG emissions reductions. This requires the state board to ensure that statewide GHG emissions are reduced to 40% below the 1990 level by 2030.

Additional information: https://ww3.arb.ca.gov/cc/scopingplan/scopingplan.htm

* **SB X7-7[[29]](#footnote-30)- Water Conservation Act**

SB X7-7 requires the State to achieve a 20% reduction in urban per capita water use by December 31, 2020. It requires all retail urban water suppliers to increase water use efficiency and to establish urban water use targets.

Additional Information: http://www.bsc.ca.gov/; http://www.energy.ca.gov/appliances/

Applicable Law: California Code of Regulations, Title 20, Division 2, Chapter 4, Article 4, §§ 1601 et. seq.

Policies/Plans

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

California Public Resources Code Section 25302 requires the Energy Commission 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 Energy Commission 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.

* **2019 California Energy Efficiency Action Plan**

The Energy Efficiency Action Plan expands on the Existing Buildings Energy Action Plan and includes topics related to existing buildings’ energy efficiency, low-income barriers to energy efficiency, and doubling energy efficiency by 2030. The SB 350 Doubling of Energy Efficiency by 2030 report expands beyond existing buildings to include agriculture, industry, newly constructed buildings, conservation voltage reduction, and electrification. This report combines these topics with the Existing Buildings Energy Efficiency Action Plan to create a comprehensive statewide energy efficiency action plan.

Additional information: https://ww2.energy.ca.gov/efficiency/existing\_buildings/

* **Executive Order B-29-15**

Governor Brown’s Executive Order B-29-15 proclaims the severity of the drought conditions in California and directs the Energy Commission to invest in new technologies that will achieve water and energy savings and greenhouse gas reductions.

1. **Match Funding**
* **“Match funds”** includes cash or in-kind (non-cash) contributions provided by the applicant, subcontractors, 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: CEC awards, EPIC funds received from other sources, 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 recipient’s possession or proposed by 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** 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).
* Match funds must be spent only during the agreement term, either before or concurrently with EPIC funds. Match funds also must be reported in invoices submitted to the CEC.
* All applicants providing match funds must submit commitment letters, **including prime and subcontractors**, 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 **Attachment 10**[~~Attachment 11~~], Commitment and Support Letter Form. Commitment and support letters must be submitted with the application to be considered.
* Any match pledged in Attachment 1 must 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, Attachment 1 must match this amount). Only 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. EPIC funds are limited to lodging and any form of transportation (e.g., airfare, rental car, public transit, parking, mileage). 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. Applicants shall adhere to travel restrictions of using state funds to travel to certain other states pursuant to AB 1887 (2016) and codified at California Government Code Section 11139.8. All applicants are encouraged to consider the Attorney General’s website https://oag.ca.gov/ab1887 for a current list of states subject to travel restrictions. Awarded Grants under this solicitation shall not contain travel paid for with Commission funds (applicants can instead use match funds) to the listed states unless the Commission approves in writing that the trip falls within one of the exceptions under the law.
		- **“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 Energy Commission funds for these purchases is not allowed.**
1. **Funds Spent in California**
2. Only CEC reimbursable funds counts towards funds spent in California total.
3. "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 subcontractors.
4. 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: Grant funds will be spent on temperature sensors.  The temperature sensors are manufactured in Texas. The 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: Grant funds will be spent on temperature sensors. The temperature sensors are manufactured in Texas. The recipient orders the temperature sensors directly from Texas.  The manufacturer has training centers in CA that instructs purchasers on how to use the sensors. The invoice shows that the transaction occurred in Texas. This transaction is not eligible and cannot be counted as funds spent in CA.

# II. Eligibility Requirements

## Applicant Requirements

1. **Eligibility**

This solicitation is open to all public and private entities with the exception of local publicly owned electric utilities.[[30]](#footnote-31) In accordance with CPUC Decision 12-05-037, funds administered by the CEC may not be used for any purposes associated with local publicly owned electric utility activities.

1. **Terms and Conditions**

Each grant agreement resulting from this solicitation will include terms and conditions that set forth the recipient’s rights and responsibilities. By signing the Application Form (Attachment 1), 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. All terms and conditions are located at http://www.energy.ca.gov/research/contractors.html. Please refer to the applicable EPIC Grant terms and conditions. Failure to agree to the terms and conditions by taking actions such as failing to sign the Application Form or 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 conditionsprior to executing grant agreements.

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 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 via its website at 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 CEC prior to their project being recommended for approval at an CEC Business Meeting.

1. **Disadvantaged & Low-income Communities**

The California Energy Commission is committed to ensuring all Californians have an opportunity to participate in and benefit from programs and services. While it is not required to complete the project within a disadvantaged community, demonstration projects located and benefiting disadvantaged and/or low-income communities will be considered under the scoring criteria for this GFO.

Disadvantaged Communities are those designated pursuant to Health and Safety Code section 39711 as representing the 25% highest scoring census tracts in CalEnviroScreen or other areas with high amounts of pollution and low populations as identified by CalEPA. Please see https://calepa.ca.gov/envjustice/ghginvest/ for the most current CalEPA designations.

“Low-income communities” are defined as communities within census tracts with median household incomes at or below either of the following levels:

1. Eighty percent of the statewide median income.
2. The applicable low-income threshold listed in the state income limits updated by the Department of Housing and Community Development and filed with the Office of Administrative Law pursuant to subdivision (c) of Section 50093 of the Health and Safety Code.

Visit the California Department of Housing & Community Development site for the current HCD State Income Limits at: http://www.hcd.ca.gov/grants-funding/income-limits/index.shtml. Disadvantaged communities are defined as areas representing census tracts scoring in the top 25% in CalEnviroScreen. For more information on disadvantaged communities and to determine if your project is in a disadvantaged community, use the California Communities Environmental Health Screening tool (CalEnviroScreen) at:

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

Another resource is the Healthy Places Index Tool for California, located at: https://healthyplacesindex.org/

## Project Requirements

1. **Technology Demonstration and Deployment Stage**

Projects must fall within the “technology demonstration and deployment” stage, which involves the installation and operation of pre-commercial technologies or strategies at a scale sufficiently large and in conditions sufficiently reflective of anticipated actual operating environments to enable appraisal of operational and performance characteristics, and of financial risks.[[31]](#footnote-32)

1. **Ratepayer Benefits, Technological Advancements, and Breakthroughs**

California Public Resources Code Section 25711.5(a) requires EPIC-funded projects to:

* Benefit electricity ratepayers; and
* Lead to technological advancement and breakthroughs to overcome the barriers that prevent the achievement of the state’s statutory energy goals.

**EPIC's mandatory guiding principle is to provide ratepayer benefits, which is defined as (1) improving safety, (2) increasing reliability, (3) increasing affordability, (4) improving environmental sustainability, and (5) improving equity, all as related to California's electric system.[[32]](#footnote-33)**

**Accordingly, the Project Narrative Form (Attachment 3) and the “Goals and Objectives” section of the Scope of Work Template (Attachment 5) must describe how the project will: (1) benefit California IOU ratepayers by improving safety, increasing reliability, increasing affordability, improving environmental sustainability, and improving equity, all as related to California's electric system; and (2) lead to technological advancement and breakthroughs to overcome barriers to achieving the state’s statutory energy goals. Any estimates of energy and water savings or GHG impacts must be calculated using the References for Calculating Electricity End-Use, Electricity Demand, and GHG Emissions (Attachment 13).**

[~~The CPUC defines “ratepayer benefits” as greater reliability, lower costs, and increased safety.~~**~~[[33]](#footnote-34)~~** ~~The CPUC has also adopted the following guiding principles as complements to the key principle of electricity ratepayer benefits: societal benefits; GHG emissions mitigation and adaptation in the electricity sector at the lowest possible cost; the loading order; low-emission vehicles/transportation; economic development; and efficient use of ratepayer monies.~~**~~[[34]](#footnote-35)~~**

~~Accordingly, the Project Narrative Form (Attachment and the “Goals and Objectives” section of the Scope of Work Template (Attachment) must describe how the project will: (1) benefit California IOU ratepayers by increasing reliability, lowering costs, and/or increasing safety; and (2) lead to technological advancement and breakthroughs to overcome barriers to achieving the state’s statutory energy goals. Any estimates of energy and water savings or GHG impacts must be calculated using the References for Calculating Electricity End-Use, Electricity Demand, and GHG Emissions (Attachment.~~]

1. **Technology Transfer Expenditures**

To maximize the impact of EPIC projects and to promote the further development and deployment of EPIC-funded technologies, a minimum of 5 percent of CEC funds requested should go towards technology transfer activities. Appropriate technology transfer activities for this solicitation are listed in the Scope of Work Template (Attachment). The Budget Forms (Attachment 7) should clearly distinguish funds dedicated for technology transfer.

1. **Measurement and Verification Plan**

The Project Narrative (Attachment) must include a Measurement and Verification Plan that describes how actual project benefits will be measured and quantified such as by identifying measurable and quantifiable project benefit metrics (energy and water usage, GHG emissions, energy/unit of product, etc.) that are applicable to the project group. For example, energy efficiency projects may identify pre- and post-project energy use (kilowatt hours, kilowatts), water use (million gallons), and cost savings for energy, water, and other benefits. The activities proposed in the Measurement and Verification Plan must be included in the “Technical Tasks” section of the Scope of Work Template (Attachment 5).

*

# III. Application Organization and Submission Instructions

## Application Format, Page Limits, and Number of Copies

The following table summarizes the application formatting and page limit recommendations:

The CEC may have waived the requirement for a signature on application materials for this solicitation. If a notice regarding CEC’s waiver of the signature requirement appears here: https://www.energy.ca.gov/funding-opportunities/solicitations, the waiver applies to this solicitation. In the event of a conflict between the notice and any language in this solicitation regarding signatures, the notice will govern.

|  |  |
| --- | --- |
| **Format** | * **Font:** 11-point, Arial (excluding Excel spreadsheets, original template headers and footers, and commitment or support letters)
* **Margins:** No less than one inch on all sides (excluding headers and footers)
* **Spacing:** Single spaced, with a blank line between each paragraph
* **Signatures**: Wet signatures only (i.e., not electronic)
* **File Format:** MS Word version 2007 or later (.doc or .docx format), excluding Excel spreadsheets and commitment or support letters (PDF files are acceptable for the letters)
* **File Storage:** Electronic files of the application must be submitted on a USB memory stick when submitting via **hard copy.**
 |
| **Maximum Page Limit Recommendations** | * **Executive Summary** (Attachment): **two** pages
* **Project Narrative Form** (Attachment): **twenty** pages excluding documentation for CEQA
* **Project Team Form** (Attachment): **two** pages for each resume
* **Reference and Work Product Form** (Attachment): **one** page for each reference, **two** pages for each project description
* **Commitment and Support Letter Form** (Attachment): **two** pages, excluding the cover page
* **Scope of Work** (Attachment): **thirty** pages
* **Project Schedule** (Attachment): **four** pages
* There are no page limits for the following:
	+ **Application Form** (Attachment)
	+ **Budget Forms** (Attachment)
	+ **CEQA Compliance Form** (Attachment)
	+ **Project Performance Metrics** (Attachment)
 |

## Method For Delivery

The only method of submitting applications to this solicitation is the CEC Grant Solicitation System (GSS), available at: https://gss.energy.ca.gov/. This online tool allows applicants to submit their electronic documents to the CEC prior to the date and time specified in this solicitation. Electronic files 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 may be scanned and submitted in PDF format.  Completed Budget Forms, (Attachment), must be in Excel format.

The deadline to submit grant applications through the CEC’s GSS is 11:59 p.m. The GSS system 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. NO EXCEPTIONS will be entertained.

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 the GSS system, upload times may be much longer than expected. For example, some past applicants experienced unexpected issues on their end, causing long delays that prevented timely submission. They spent significant time and resources on applications the CEC will not consider. Please plan accordingly. For instructions on how to apply using the GSS system, please see the How to Apply document available on the CEC website at: https://www.energy.ca.gov/media/1654.

First time users must register as a new user to access the system. Applicants will receive a confirmation email after all required documents have been successfully uploaded. A tutorial of the system will be provided at the pre-application workshop, and you may contact the Commission Agreement Officer identified in the Questions section of the solicitation for more assistance.

## 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. Application Form (Attachment 1)

This form requests basic information about the applicant and the project. The application must include an original Application Form that includes all requested information. The Application Form must be signed by an authorized representative of the applicant’s organization or will be failed as indicated in Section IV.E.

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1. Executive Summary Form (Attachment 2)

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 3)

This form will include the majority of the applicant’s responses to the Scoring Criteria in Section IV, including the following which must be addressed for both Applied Research & Technology Demonstration projects:

* 1. **Group Specific Questions**
* Include required group specific information (see Section I.C.) in the specified sections.
	1. **Project Readiness**
* Include information about the permitting required for the project and whether or not the permitting has been completed. If complete, provide appropriate documentation. If local jurisdiction CEQA review and project approval is not complete, applications must include information documenting progress towards and a schedule for achieving compliance under CEQA within the timeframes specified in this solicitation (see Section I.E). All supporting documentation must be included in Attachment 8.
1. Project Team Form (Attachment 4)

Identify by name all key personnel[[35]](#footnote-36) assigned to the project, including the project manager and principal investigator (if applicable), and individuals employed by any major subcontractor (a major subcontractor is a subcontractor receiving at least 25% of Commission funds or $100,000, whichever is less). Clearly describe their individual areas of responsibility. Include the information required for each individual, including a resume (maximum two pages, printed double-sided).

1. Scope of Work Template (Attachments 5)

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. See requirements in section III.A.

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

1. Project Schedule (Attachment 6)

The Project Schedule includes a list of all product, 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 7)

The budget forms are in MS Excel format. Detailed instructions for completing them are included at the beginning of Attachment 7.  **Read the instructions 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 approved agreement term. Match share requirements are discussed in Part I 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 terms and conditions. Rates and personnel shown must reflect the rates and personnel the applicant would include if selected as a Recipient.
3. The proposed rates are considered capped and may not change during the agreement term. The Recipient will only be reimbursed for **actual** rates up to the rate caps.
4. The budget must NOT include any Recipient profit from the proposed project, either as a reimbursed item, match share, or as part of overhead or general and administrative expenses (subcontractor profit is allowable, though the maximum percentage allowed is 10 % of the total subcontractor rates for labor, and other direct and indirect costs as indicated in the Category Budget form). 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 Commission Agreement Manager.
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 under this Agreement with CEC funds, with the exception of costs incurred by University of California recipients.
7. The budget must NOT identify that EPIC 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. All applicants should go to the Attorney General’s website https://oag.ca.gov/ab1887 for a current list of states subject to travel restrictions. Grants awarded under this solicitation shall not contain travel paid for with Commission funds (applicants can instead use match funds) to the listed states unless the Commission approves in writing that the trip falls within one of the exceptions under the law.
9. **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, 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, 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 8)

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 result in the cancellation of a proposed award and allocation of funding elsewhere, such as to the next highest-scoring project.

1. Reference and Work Product Form (Attachment 9)
	* 1. Section 1: Provide applicant and subcontractor references as instructed.
		2. Section 2: Provide a list of past projects detailing technical and business experience

of the applicant (or any member of the project team) that is related to the proposed work. Identify past projects that resulted in market-ready technology, advancement of codes and standards, and/or advancement of state energy policy. Include copies of up to three of the applicant or team member’s recent publications in scientific or technical journals related to the proposed project, as applicable.

1. Commitment and Support Letter Form (Attachment 10)

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 signedby eachrepresentative of the entity or individual that is committing to providing match funding. The letter must: (1) identify the source(s) of the funds; and (2) guarantee the availability of the funds for the project.

* The applicant must include a site commitment letter signed by an authorized representative of the proposed demonstration 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 Attachments 1 and 8. and (2) commit to providing the site for the proposed activities.
* **Project partners** that are making contributions other than match funding or a demonstration 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) commits to making the contribution.
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 demonstration site.

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1. Project Performance Metrics (Attachment 11)

The purpose of this questionnaire is to identify and document 5-7 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.

1. Applicant Declaration (Attachment 12)

This form requests the applicant declare that they: are not delinquent on taxes nor suspended by the California Franchise Tax Board; are not being sued by any public agency or entity; are in compliance with the terms of all settlement agreements, if any, entered into with the Energy Commission or another public agency or entity; are in compliance with all judgments, if any, issued against the Applicant in any matter to which the Energy Commission or another public agency or entity is a party; are complying with any demand letter made on the Applicant by the Energy Commission or another public agency or entity; and are not in active litigation with the Energy Commission regarding the Applicant’s actions under a current or past contract, grant, or loan with the Energy Commission. The declaration must be signed under penalty of perjury by an authorized representative of the applicant’s organization.

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1. References for Calculating Energy End-Use and GHG Emissions (Attachment 13)

Any estimates of energy savings or GHG impacts described in the application should be calculated as specified on this form, to the extent that the references apply to the proposed project.

# 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 on past performance of CEC agreements. To evaluate applications, the CEC will organize an Evaluation Committee that consists primarily of CEC staff. The Evaluation Committee may use technical expert reviewers to provide an analysis of applications. Applications will be evaluated in two stages:

1. **Stage One: Application Screening**

The Contracts, Grants, and Loans Office and/or the Evaluation Committee will screen applications for compliance with the Screening Criteria in **Section E** of this Part. **Applications that fail any of the screening criteria will be rejected.**The Evaluation Committee may conduct optional telephone **Clarification Interviews** with applicants during the screening process 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. **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 F** of this Part.

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

Clarification Interviews: The Evaluation Committee may conduct optional telephone interviews with applicants during the evaluation process 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.

* **A minimum score of 70.0 points** is required for criteria 1-7 to be eligible for funding. In addition, the application must receive a minimum score of **52.50 points for criteria 1−4** to be eligible for funding.

## 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.

* 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 at its headquarters in Sacramento and on its website and will mail it to all entities that submitted an application. Proposed awards must be approved by the CEC at a business meeting.
* **Debriefings:** Unsuccessful applicants may request a debriefing after the release of the

NOPA by contacting the Commission Agreement Officer 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; and
	+ Negotiate with successful applicantstomodify the project scope, schedule, project team entity that will receive the award, location and/or level of funding.
1. **Agreements**

Applications recommended for funding will be developed into a proposed grant agreement to be considered at a CEC Business Meeting. 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 Recipient and the CEC).

* **Agreement Development:** The Contracts, Grants, and Loans Office will send the 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 terms and conditions) prior to executing any agreement.
* **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 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 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.
* The application contains confidential information or identifies any portion of the application as confidential.

## 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 send an addendum to all entities that requested the solicitation and will also post it on the CEC’s website at: www.energy.ca.gov/contracts. 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 withdraw or modify a submitted application before the deadline to submit applications by sending a letter to the Commission Agreement Officer listed in Part I. 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** 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.**

1. **Solicitation Errors**

If an applicant discovers any ambiguity, conflict, discrepancy, omission, or other error in the solicitation, 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 the successful applicant from full compliance with solicitation requirements.

1. **Disposition of Applicant’s Documents**

Upon the posting of the NOPA, all applications and related materials submitted in response to this solicitation will become property of the State and publicly available records. Unsuccessful applicants who seek the return of any materials must make this request to the Agreement Officer listed in Part I and provide sufficient postage to fund the cost of returning the materials.

## 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’s Contracts, Grants, and Loans Office 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 Form (Attachment 1) is signed where indicated.
 | [ ]  Pass [ ]  Fail |
| 1. The Applicant Declaration Form (Attachment 12) is signed where indicated.
 | [ ]  Pass [ ]  Fail |
| 1. The application addresses only one of the eligible project groups, as indicated on the Application Form.
 | [ ]  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 tasks described in the Scope of Work, Attachment).

*If the projects are not distinct and the applications were submitted at the same time, only the first application screened by the CEC will be eligible for funding. If the applications were submitted separately, only the first application received by the CEC will be eligible for funding.* | [ ]  Pass [ ]  Fail |
| 1. The Application includes Commitment Letters that total the minimum of **20*%*** in match share of the total requested CEC funds.
 | [ ]  Pass [ ]  Fail |
| 1.
* 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.
 | [ ]  Pass [ ]  Fail |

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## Stage Two: Application Scoring

Proposals 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 on the next page and the Scoring Scale below (with the exception of 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** | **Explanation for Percentage Points**  |
| 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. |

**Additional Screening Criteria for Past Performance**

| **Screening Criteria** |  |
| --- | --- |
| **Applicant Past Performance with Energy Commission**The applicant—defined 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;
* Termination with cause;
* Demonstrated poor communication, project management, and/or inability, due to circumstances within its control, from materially completing the project;
* Quality issues with deliverables including poorly written final report that prevents publishing; and
* Severe unresolved negative audit findings.
 |  |
| **Must pass to continue with Scoring Criteria** | **Pass/Fail** |
| **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** | **Maximum 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 technology over state-of-the-art (e.g., efficiency, emissions, durability, cost).
4. Provides the proposed technical specifications and describe how the project will meet or exceed the technical specifications by the end of the project.
5. Describes the technology readiness level (TRL) the proposed technology has achieved and the expected TRL by the end of the project.
6. Describes at what scale the technology has been successfully demonstrated, including size or capacity, number of previous installations, location and duration, results, etc.
7. Describes how the proposed demonstration will lead to increased adoption of the technology in California.
8. Provides information described in Section I.C.
 | **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. Proposal identifies the reliability that the project and site recommendations as described will be carried out if funds are awarded.
5. 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.
6. 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.
7. Describes the technology transfer plan to assess and advance the commercial viability of the technology.
8. Provides a clear and plausible measurement and verification plan that describes how energy savings and other benefits specified in the application will be determined and measured.
9. 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.8.
10. Provides information described in Section I.C.
 | **25** |
| 1. **Impacts and Benefits for California IOU Ratepayers**
	1. Explains how the proposed project will benefit California Investor-Owned Utility (IOU) ratepayers and provides clear, plausible, and justifiable (quantitative preferred) potential benefits. Estimates the energy benefits including:
* annual electricity savings and fossil fuel consumption reduction, energy cost reductions, peak load reduction and/or shifting, infrastructure resiliency, infrastructure reliability.

**In addition, estimates the non-energy benefits including:*** greenhouse gas emission reductions, criteria pollutant reductions (e.g., NOx), water savings and cost reduction, and/or increased safety.
1. States the timeframe, assumptions with sources, and calculations for the estimated benefits, and explains their reasonableness. Include baseline or “business as usual” over timeframe.
2. Explains the path-to-market strategy including near-term (i.e., initial target markets), mid-term, and long-term markets for the technology, size and penetration or deployment rates, and underlying assumptions.
3. Identifies the expected financial performance (e.g., payback period, ROI) of the demonstration at scale.
4. Identifies the specific programs which the technology intends to leverage. (e.g. feed-in tariffs, IOU rebates, demand response, storage procurement and extent to which technology meets program requirements.)
 | **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. This can include contacting references.1. Identifies credentials of prime and any subcontractor key personnel, including the project manager, principal investigator and technology and knowledge transfer lead *(include this information in the Project Team Form).*
2. Demonstrates that the project team (including Community Based Organization) has appropriate qualifications, experience, financial stability and capability to complete the project.
3. Explains the team structure and how various tasks will be managed and coordinated.
4. Describes the facilities, infrastructure, and resources available that directly support the project.
5. Describes the team’s history of successfully completing projects in the past 10 years including subsequent deployments and commercialization.
 | **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 subcontractors, 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 subcontractors).
5. Justifies the reasonableness of indirect costs (e.g., overhead, facility charges (e.g., rent, utilities), burdens, subcontractor 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 CEC 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% |

 | **10** |
| 1. **Ratio of Direct Labor to Indirect Costs**

The score for this criterion will be calculated by the following formula:$$\frac{Total Direct Labor}{Total Direct Labor + Total Fringe + Total Indirect + Total Profit}$$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. | **5** |
| **Total Possible Points****(Minimum Passing Score for Criteria 1 – 7 is 70% or 70.00)** | **100** |
| **Preference Points** Applications must meet all minimum passing scores (Scoring Criteria 1-4 and 1-7) to be eligible for the additional points. |

| **Scoring Criteria** | **Maximum Points** |
| --- | --- |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. **Match Funds**
2. Cash match share is preferred; however, in-kind 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 amount above minimum using the Exceeds Minimum Match Scoring table:

**Exceeds Minimum Match Scoring Table**

| Percentage above Minimum Match (cash and in-kind) | Score |
| --- | --- |
| $\geq $ 80% | 5 |
| 60 to <80% | 4 |
| 40 to <60% | 3 |
| 20 to <40% | 2 |
| 10 to <20 % | 1 |

  | **5** |
|  |
| 1. **Disadvantaged & Low-Income Communities**

In order to receive or qualify for additional points, the proposed project must demonstrate benefits to the disadvantaged and/or low-income community in order to receive additional points. 1. Proposal identifies how the target market(s) will benefit disadvantaged and/or low-income communities.
2. Identifies economic impact on low-income and disadvantaged communities including customer bill savings, job creation, partnering and contracting with micro- and small-businesses, and economic development.
3. Describes how the project will increase access to clean energy or sustainability technologies within disadvantaged and/or low-income communities and how the development will benefit the communities.
4. Applicants have letters of support from technology partners, community-based organizations, environmental justice organizations, or other partners 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 communities.
 | **5** |

1. Bureau of Economic Analysis – U.S. Department of Commerce 2021 Fourth Quarter Dataset [↑](#footnote-ref-2)
2. California Energy Consumption Database – Staff estimate from 2016 dataset [↑](#footnote-ref-3)
3. “Optionality, flexibility & innovation pathways for deep decarbonization in California”. Energy Futures Initiative. 2019. <https://energyfuturesinitiative.org/s/EFI_CA_Decarbonization_Full-b3at.pdf> [↑](#footnote-ref-4)
4. SB 350 (Statutes of 2015, chapter 547) [↑](#footnote-ref-5)
5. Kizer, Alex, Tim Bushman, Anne Canavati, and Sam Savitz. 2019. [*Optionality, Flexibility & Innovation Pathways for Deep Decarbonization in California*](https://energyfuturesinitiative.org/s/EFI_CA_Decarbonization_Full-b3at.pdf). Energy Futures Initiative. https://energyfuturesinitiative.org/s/EFI\_CA\_Decarbonization\_Full-b3at.pdf. [↑](#footnote-ref-6)
6. Carbon capture and utilization (CCU) is the process of capturing CO2 for further use or conversion into valuable products. CCU differs from carbon capture and storage (CCS) in that CCU does not aim to or result in permanent geological storage of CO2. [↑](#footnote-ref-7)
7. SB 32 (Statutes of 2016, chapter 249) [↑](#footnote-ref-8)
8. SB 100 (Statutes of 2018, chapter 312) [↑](#footnote-ref-9)
9. SB 350 (Statutes of 2015, chapter 547) [↑](#footnote-ref-10)
10. Hasanbeigi, Ali and Cecilia Spinger. 2019. [*California’s Cement Industry Failing the Climate Challenge.*](https://www.climateworks.org/wp-content/uploads/2019/02/CA-Cement-benchmarking-report-Rev-Final.pdf) Global Efficiency intelligence. https://www.climateworks.org/wp-content/uploads/2019/02/CA-Cement-benchmarking-report-Rev-Final.pdf. [↑](#footnote-ref-11)
11. Ibid [↑](#footnote-ref-12)
12. [*Development of State of the Art-Technologies in cement Manufacturing: Trying to look Ahead, Revision 2017*](http://docs.wbcsd.org/2017/06/CSI_ECRA_Technology_Papers_2017.pdf). 2017. European Cement Research Academy. http://docs.wbcsd.org/2017/06/CSI\_ECRA\_Technology\_Papers\_2017.pdf. [↑](#footnote-ref-13)
13. “[OPEN+ Concrete and Methane Cohorts](https://arpa-e.energy.gov/sites/default/files/documents/files/OPEN_2018_Cohort_Concrete_Methane_FINAL.pdf).” 2021. ARPA. https://arpa-e.energy.gov/sites/default/files/documents/files/OPEN\_2018\_Cohort\_Concrete\_Methane\_FINAL.pdf. [↑](#footnote-ref-14)
14. The Freesonia Group. 2012. “[Global Demand for Construction Aggregates to Exceed 48 Billion Metric Tons in 2015.”](https://www.concreteconstruction.net/business/global-demand-for-construction-aggregates-to-exceed-48-billion-metric-tons-in-2015_o) Concrete Construction. https://www.concreteconstruction.net/business/global-demand-for-construction-aggregates-to-exceed-48-billion-metric-tons-in-2015\_o. [↑](#footnote-ref-15)
15. [*Gaseous Carbon Waste Streams Utilization*](https://www.nap.edu/catalog/25232/gaseous-carbon-waste-streams-utilization-status-and-research-needs). 2019. The National Academics: Science, Engineering, and Medicine. https://www.nap.edu/catalog/25232/gaseous-carbon-waste-streams-utilization-status-and-research-needs. [↑](#footnote-ref-16)
16. [*Materials for Separation Technologies. Energy and Emission Reduction Opportunities*](https://www.osti.gov/biblio/1218755-materials-separation-technologies-energy-emission-reduction-opportunities). 2005. Oak Ridge National Laboratory. https://www.osti.gov/biblio/1218755-materials-separation-technologies-energy-emission-reduction-opportunities. [↑](#footnote-ref-17)
17. [*A Research Agenda for Transforming Separation Science*](https://www.nap.edu/catalog/25421/a-research-agenda-for-transforming-separation-science). 2019. The National Academics Press: Sciences, Engineering, and Medicine. https://www.nap.edu/catalog/25421/a-research-agenda-for-transforming-separation-science. [↑](#footnote-ref-18)
18. [*Materials for Separation Technologies. Energy and Emission Reduction Opportunities*](https://www.osti.gov/biblio/1218755-materials-separation-technologies-energy-emission-reduction-opportunities). 2005. Oak Ridge National Laboratory. https://www.osti.gov/biblio/1218755-materials-separation-technologies-energy-emission-reduction-opportunities. [↑](#footnote-ref-19)
19. Pacific Standard Time or Pacific Daylight Time, whichever is being observed. [↑](#footnote-ref-20)
20. This deadline does not apply to non-technical questions (e.g., questions concerning application format requirements or attachment instructions) or to questions that address an ambiguity, conflict, discrepancy, omission, or other error in the solicitation. Such questions may be submitted to the Commission Agreement Officer listed in Section G at any time prior to the application deadline. Please see Section G for additional information. [↑](#footnote-ref-21)
21. See CPUC “Phase 1” Decision 11-12-035, December 15, 2011, http://docs.cpuc.ca.gov/PublishedDocs/WORD\_PDF/FINAL\_DECISION/156050.PDF. [↑](#footnote-ref-22)
22. CPUC Decision 21-11-028, Appendix A https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M425/K515/425515575.PDF (revising former guiding principles within CPUC “Phase 2” Decision 12-05-037, Ordering Paragraph 2 http://docs.cpuc.ca.gov/PublishedDocs/WORD\_PDF/FINAL\_DECISION/167664.PDF.).  [↑](#footnote-ref-23)
23. See CPUC “Phase 2” Decision 12-05-037, May 24, 2012, http://docs.cpuc.ca.gov/PublishedDocs/WORD\_PDF/FINAL\_DECISION/167664.PDF. [↑](#footnote-ref-24)
24. California Public Resources Code, Section 25711.5(a), http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group=25001-26000&file=25710-25712. [↑](#footnote-ref-25)
25. EPIC Interim Investment Plan, https://efiling.energy.ca.gov/GetDocument.aspx?tn=236882 [↑](#footnote-ref-26)
26. EPIC 2021-2025 Investment Plan, https://www.energy.ca.gov/publications/2021/electric-program-investment-charge-proposed-2021-2025-investment-plan-epic-4 [↑](#footnote-ref-27)
27. AB 32 (Statutes of 2006, chapter 488) [↑](#footnote-ref-28)
28. SB 32 (Statutes of 2016, chapter 249) [↑](#footnote-ref-29)
29. SBX7-7 (Statutes of 2009-10, seventh extraordinary session, chapter 4) [↑](#footnote-ref-30)
30. A local publicly owned electric utility is an entity as defined in California Public Utilities Code section 224.3. [↑](#footnote-ref-31)
31. See CPUC “Phase 2” Decision 12-05-037 at pp. 39-40 and 90, http://docs.cpuc.ca.gov/PublishedDocs/WORD\_PDF/FINAL\_DECISION/167664.PDF. [↑](#footnote-ref-32)
32. CPUC Decision 21-11-028, Appendix A https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M425/K515/425515575.PDF (revising former guiding principles within CPUC “Phase 2” Decision 12-05-037, Ordering Paragraph 2 http://docs.cpuc.ca.gov/PublishedDocs/WORD\_PDF/FINAL\_DECISION/167664.PDF.). [↑](#footnote-ref-33)
33. See CPUC “Phase 2” Decision 12-05-037 at pp. 39-40 and 90, http://docs.cpuc.ca.gov/PublishedDocs/WORD\_PDF/FINAL\_DECISION/167664.PDF. [↑](#footnote-ref-34)
34. *Id.* at pp. 19-20. [↑](#footnote-ref-35)
35. “Key personnel” are individuals that are critical to the project due to their experience, knowledge, and/or capabilities. [↑](#footnote-ref-36)