**GRANT FUNDING OPPORTUNITY**

 **Research to Support a Climate Resilient Transition to a Clean Electricity System**

**EPIC Program**



**GFO-21-302**

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

**State of California**

**California Energy Commission**

October 2021

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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)*** |

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# I. Introduction

## Purpose of Solicitation

The purpose of this solicitation is to fund applied research that will support climate resilience planning for California’s ongoing transition to a clean electricity system in accordance with Senate Bill (SB) 100 goals. The proposed research will improve electricity system modeling of the effects of climate change and particularly climate extremes on electricity supply and demand over the next few decades, a period in which both electricity supply and demand are expected to rapidly evolve to achieve California’s 2030 and 2045 decarbonization goals. The proposed research will also support the design of technology research that is responsive to climate impacts on electricity supply and demand and targeted to California’s future electricity system versus the system of today. The objective is to ensure that California’s decarbonizing grid is resilient to future climate extremes and reliably distributes the benefits of clean energy to all Californians.

The California Energy Commission’s (CEC) *2018-2020 Electric Program Investment Charge (EPIC) Triennial Investment Plan* includes the research subtheme S7.1 “Identify Pathways for Achieving California’s Energy and Climate Goals” and S7.2 “Increase the Resiliency of the Electricity System to Climate Change and Extreme Weather Events.” The proposed research is intended to provide crucial support for electricity sector resilience by supporting three initiatives associated with these subthemes:

* Initiative S7.1.1 Integrated Pathways for Energy Futures: Tools and Science-Based Research for Holistic Energy Decision Making
* Initiative S7.2.1 Improved Understanding of Climate- and Weather-Related Risks and Resilience Options.
* Initiative S7.2.3 Integrate Climate Readiness into Electricity System Operations, Tools, and Models

California has clear and ambitious clean energy goals. The research described in this solicitation manual will support the integration of climate resilience considerations into SB 100 implementation, while assisting policymakers in addressing grid resilience to future extreme events. In addition, these research products will provide Investor-owned utilities (IOUs) and other electricity sector stakeholders with a foundation for considering climate change, variability, and extremes in modeling that supports electricity-sector planning. This research will also support CEC’s integration of climate change into energy supply and demand forecasting and will contribute to the energy-related component of California’s Fifth Climate Change Assessment.

The proposed research is expected to leverage products of two ongoing efforts funded through EPIC Grant Funding Opportunity GFO-19-311, including:

1. Climate projections based on the most current climate models that deliver key parameters of interest relevant to the electricity system serving California—including those that have been elusive due to limitations in prior generations of models—at spatial and temporal resolutions that are meaningful to inform electricity sector vulnerability assessment, resilience strategies, demand forecasting, and infrastructure planning (EPC-20-006).[[1]](#footnote-1)
2. A data platform and analytics engine designed to deliver climate and weather-related data to energy sector stakeholders in a manner that enables integration of climate-related trends and parameters into decision support, modeling, and planning (EPC-20-007)[[2]](#footnote-2) This effort will reduce vast amounts of data from sophisticated climate projections into useful information for key stakeholders, including the research teams funded through this solicitation.

To ensure opportunity for stakeholder input regarding the scope and organization of this solicitation, CEC staff held a public workshop on March 5, 2021, to present initial ideas and elicit input. CEC appreciates the participation of nearly 100 attendees, including representation from IOUs, the academic research community, national laboratories and research programs, federal agencies, state agencies, members of the public, industry, and private consultants. Links to the workshop materials, including the presentation and recording, are available in the “Reference Documents” section of this solicitation manual.

Projects must fall within one of the following project groups:

* **Group 1**: Assessing and improving the climate resilience of an electricity system in transition
* **Group 2**: Climate-related changes to availability and distribution of solar, wind, and hydroelectric generation
* **Group 3**: Cal-Adapt enhancements to support energy sector stakeholders

See Part II of this solicitation for project eligibility requirements. Applications will be evaluated as follows: Stage One Application Screening and Stage Two Application 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 CEC’s Empower Innovation website at: [www.empowerinnovation.net](http://www.empowerinnovation.net/).

## 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.  Also referred to as “Proposal”.  |
| 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:  Has an office in the region (e.g., air basin or county) and meets the demographic profile of the communities they serve.Has deployed projects and/or outreach efforts within the region (e.g., air basin or county) of the proposed disadvantaged or low-income community.Has an official mission and vision statements that expressly identifies serving disadvantaged and/or low-income communities.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.  |
| CEC  | California Energy Commission.  |
| CEQA  | California Environmental Quality Act, California Public Resources Code Section 21000 et seq.  |
| CMIP6  | Coupled Model Intercomparison Project Phase 6  |
| Days  | *Days refers to calendar days.*  |
| Disadvantaged Community  | These are communities in the top 25% scoring areas from CalEnviroScreen along with other areas with high amounts of pollution and low populations. (https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30)   |
| 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.  |
| Fifth Assessment   | California’s Fifth Climate Change Assessment  |
| GCM  | Global Circulation Model  |
| 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.  |
| 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

**Group 1: Assessing and improving the climate resilience of an electricity system in transition (maximum award amount $1,950,000):**

There is an urgent need to better understand the implications of a changing climate on an electricity system that is expected over the next few decades to transition to zero-carbon. During this transition, the electricity system is also expected to take on new roles in decarbonizing energy use in sectors such as transportation and buildings—with substantial implications for the magnitude and pattern of electricity demand. Prior research on long-term energy scenarios for California generally has considered the effects of average climate changes on demand and generation. But heat waves, heavy storms, wildfires, and other climate-related extremes can substantially affect electricity supply and demand, disrupt electricity operations, and damage grid infrastructure. Long-term energy system planning and modeling needs to further incorporate the effects of climate variability, changes in weather patterns, and extremes—as well as regional differences in climate change impacts—on the rapidly evolving electricity system serving California. Incorporating these effects will support meeting the goals of SB 100 in a manner that is resilient to changing climate.

Research supported by Group 1 will respond to these needs by identifying and quantifying relationships between supply, demand, and climate in a manner that sheds light on technological and operational strategies to manage supply and demand in a changing climate.

**Successful applicants must demonstrate**:

* A skilled, well-resourced management team to ensure coordination between the different aspects of the proposed research, coordination between related research efforts, and responsiveness to incorporating research directions that emerge within the project duration.
* The capacity for coordination with the research team that is funded by Group 2, which is expected to illuminate supply-side issues of interest to this (Group 1) project.
* A clearly articulated approach to stakeholder engagement, including dedicated funding and expertise.

**Projects in this group must, at a minimum:**

* **Assess the climate resilience**of the electricity system serving California and its ability to reliably meet anticipated hourly electricity demand in three time periods: (1) the system of today; (2) modeled system(s) of mid-century that achieve the goals of SB 100; and (3) the modeled system in transition from (1) to (2) (e.g., one or more intervening periods such as 2030). Assess resilience to the effects of climate variability and extremes (e.g., stress testing of the system under anticipated extreme events) including potential seasonal impacts. This includes exploring and parameterizing impacts on electricity supply and demand in a manner that can be incorporated into PLEXOS modeling as well as providing an improved basis for incorporating climate change and its interactions with electrification into mid-term and long-term demand forecasting.
* **Using SB 100 and CEC’s demand forecasting efforts as starting point, develop and evaluate demand and demand-modifying scenarios** representing an array of possibilities for climate conditions, energy efficiency, load flexibility, load evolution, and demographic changes.
* **Consider climate change impacts on the regional distribution of zero-carbon generation**, including insights from Group 2 of this solicitation.
* **Evaluate strategies for improving climate resilience of SB 100-compliant long-term demand and supply scenarios**for the electricity sector, in the context of energy system transition pathways consistent with the State's economy-wide carbon neutrality and sectoral decarbonization goals. Examples of considerations for improving climate resilience include: (a) potential roles for offshore wind, green hydrogen, and long-duration energy storage technologies; (b) strategies for managing future patterns of energy demand and enhancing demand flexibility; (c) implications for community-scale resilience of modeled electricity system transition pathways, including utilization of local, distributed generation and storage versus centralized utility-scale generation and storage.
* **Directly engage IOUs and other electricity-sector stakeholders,** including the SB 100 Modeling Team and the CEC’s Energy Assessments Division (EAD) supply analysis and demand forecasting teams,from project inception to completion, leveraging and coordinating with stakeholder engagement efforts of related EPIC grants funded by GFO-19-311 and Group 2 of this solicitation.
* Develop results and products that **facilitate potential future analyses** such as the examples below, which could be the subject of applied research funded through the EPIC 4 investment plan:
	+ **Equity and affordability implications** of concurrent climate and energy system changes over the next 20-30 years (through mid-century).
	+ **Economic costs of climate impacts and resilience strategies** for California's electricity system.
	+ **Near-term (sub-seasonal and seasonal to decadal) probabilistic climate and energy forecasts** to inform resilient operations of a grid in transition.
	+ **Capture implications of the results for trends (in both magnitude and variability) of natural gas demand** **for electricity generation** to inform long-term electricity sector planning.

Additionally, it is desirable that research funded in Group 1 will:

* **Extend the capabilities of energy system models** to better incorporate climate variability, changes in weather patterns, climate extremes, and changes and variability in energy demand patterns in order to address the requirements listed above, particularly for models used in support of state policy and IOU planning. Extending these capabilities will require attention to the social dynamics of demand and community-level resilience.

Timeline considerations

To assist applicants in developing a project timeline that leverages downscaled climate projections, the following is an indication of expected availability dates for major draft deliverables from EPC-20-006:

* Dynamically downscaled climate projections from selected CMIP6 GCMs are expected by March 31, 2022
* Localized Constructed Analogs modelling (LOCA) output from selected CMIP6 GCMs are expected by March 31, 2022
* Hydrological model output data are expected by March 31, 2023

These deliverables can be reviewed in the Scope of Work for that project.[[3]](#footnote-3) Recipients will coordinate with the Commission Agreement Manager to obtain the relevant data.

To assist the Recipient of Group 1 of the current solicitation in using these climate projections, a CEC-funded data platform and analytics engine will deliver those projections in a manner tailored to specific use cases. The outreach team of the analytics engine grant (EPC-20-007) expects to meet with the Recipient of Group 1 as early as Q3 2022 to understand their data needs and how they can be supported through the analytics engine.

Policy context and related research

The 2021 SB 100 Joint Agency Report, *Achieving 100 Percent Clean Electricity in California: An Initial Assessment*, highlights that, “Cost-effective achievement of the 100 percent clean electricity target requires that investments in electricity generation and infrastructure consider climate change impacts.” This is true of an SB 100-compliant electricity grid, as well as the grid in transition from today’s system to a future zero-carbon grid.

The Final Root Cause Analysis (2021) of the rotating electricity outages instituted by the California Independent System Operator Corporation (CAISO) in mid-August 2020 points to two major contributing factors that are directly relevant to this solicitation. First, the extreme heat wave that extended across the western United States during that period led to electricity demand exceeding electricity resource planning targets at a time when resources in neighboring areas were also strained. Second, the rotating outages occurred during the early evening “net demand peak” (demand net of solar and wind generation), when utility-scale and behind-the-meter solar generation declines more rapidly than demand. Resource planning targets have not kept pace with the decarbonizing resource mix to ensure sufficient resources that can be relied upon to meet demand during the net demand peak, a challenge that is amplified during an extreme heat wave. The research funded by this solicitation can help inform electricity system planning to ensure that sufficient resources are available to serve load, particularly during the net peak period and other potential periods of system strain as the resource mix and patterns of demand evolve over the next few decades.

A CEC-funded report by E3, *The Challenge of Retail Gas in California’s Low-Carbon Future* (2020), drew on prior EPIC-funded long-term energy scenarios presented in *Deep Decarbonization in a High Renewables Futur*e (2018) to explore the implications of a low-carbon future on the state’s retail natural gas system. It concludes that building electrification is a relatively low-cost approach to meeting the state’s mitigation goals, and a managed gas transition is imperative to address issues related to equity and costs. These scenarios incorporate limited physical climate impacts into demand analysis with the PATHWAYS model.  E3’s modeling does include direct impacts of climate change on thermal electricity generation; these effects are portrayed as relatively small, in part because with a zero-carbon grid, natural gas generation plays a diminishing role and is expected to be relied upon primarily at night, when temperature-related impacts on thermal efficiency are less. Additional analysis could assess the transition from the current role natural gas generation plays in meeting electricity demand to an attenuated role, particularly with respect to the early evening net demand peak discussed above. On hot days when net peak demand is high, natural gas generation may simultaneously be affected by thermal impacts. E3’s modeling has also considered results from Tarroja et al. (2019a) suggesting, on average, a decreasing trend in availability of hydroelectric generation in California (see CEC Publication: 500-2019-015). Additional analysis by Tarroja et al. (2019b) considers both changes to overall availability and variability of hydroelectric generation in California and suggests that additional dispatchable capacity would be needed to compensate for increasing variability of hydroelectric resources. The implications of increasing hydroelectric variability are relevant to consider in new long-term scenarios.

There are a range of additional climate-related challenges to a decarbonizing grid that are not considered by prior CEC-funded research, including extended drought; regional heat waves (e.g., as in August 2020); confluence of heat waves and wildfire, with wildfire-generated aerosols compromising solar generation (Energy Information Administration, 2020); climate-related impacts on imported hydroelectric power; and wind “drought.” Ongoing efforts to extend energy system models to understand the value of long-duration storage will expand the ability of models to capture weather patterns of interest and should be considered by the research funded through this solicitation.[[4]](#footnote-4)

In addition to these climate effects on generation and storage, how energy is used may change substantially from the recent past due to both climate- and non-climate related events. For example, the pandemic changed social activity patterns and thus what and where loads occur. These changes are reflected in sector- and systems-level electricity patterns (Energy Information Administration 2021; Krarti and Aldubyan 2021) and will not necessarily return to what was considered normal in the past, even in a recovered economy. For example, a greater proportion of work hours may continue to occur at home rather than in a commercial office space (Boland et al. 2020), illustrating the possibility of step changes in how energy is used (e.g., Zanocco et al. 2021).

Critical support for this effort will derive from EPIC-funded research that commenced in the first quarter of 2021, namely the next-generation climate projections under development by a University of California San Diego-led team (EPC-20-006), as well as the stakeholder-informed analytics engine and data platform to deliver climate projections and analytics under development by an Eagle Rock Analytics-led team (EPC-20-007). In addition, this effort should incorporate insights from the analysis of climate impacts on solar, wind, and hydroelectric generation conducted in Group 2 of this solicitation.

**Group 2:**Climate-related changes to availability and distribution of solar, wind, and hydroelectric generation **(maximum award amount $900,000):**

Climate change could have substantial impacts on where and when solar, wind, and hydroelectric resources are available in California, with implications for utility scale and distributed energy generation. Anticipating these impacts when planning a high-renewables future is crucial to achieving a zero-carbon, reliable, cost-effective electricity grid. Ongoing efforts to generate improved, higher resolution historical datasets and next-generation climate projections provide an opportunity to generate a shared knowledge base for how solar, wind, and hydroelectric resources may vary and evolve over the coming decades, a period when the state expects to substantially increase its reliance on renewable resources to achieve the goals of SB 100.

**Successful applicants must demonstrate**:

* The capacity for coordination with the research teams that are funded by Group 1 (which is expected to incorporate insights from this project) and by Group 3 (which is expected to make findings of this project available via the Cal-Adapt web application.
* A clearly articulated approach to stakeholder engagement, including dedicated funding and expertise.

**Projects in this group must, at a minimum**:

* Generate projected changes in solar, wind, and hydropower resource availability and variability over the next decade and through mid-century. This includes providing model inputs to CEC’s supply analysis team in the form of hourly wind and solar generation profiles, as well as hydroelectric generation projections that account for climate change.
* Evaluate changes in each resource individually as well as spatial and temporal correlations among these resources, including the changing resource availability profiles during extreme events of relevance to electricity demand and supply and reliability planning.
* Leverage Coupled Modeled Intercomparison Project Phase 6 (CMIP6)-based climate scenarios, stakeholder-informed use cases and stress tests, data platform and analytics engine funded by EPC-20-006 and EPC-20-007, respectively.
* Expand consideration of climate-related phenomena that affect solar and wind resources in California and are now represented in next-generation climate projections.
* Directly engage IOUs and other electricity-sector stakeholders, including the SB 100 Modeling Team and the CEC’s Energy Assessments Division’s (EAD) supply analysis team, from project inception to completion, leveraging and coordinating with stakeholder engagement efforts or related grants (e.g., EPC-20-006 and EPC-20-007).

Additionally, it is desirable that research funded in Group 2 will:

* Support the development of methods for quantifying benefits to reliability of potential resilience strategies.
* Support further integration of climate variability, extremes, and changes in weather patterns and their effects on renewable resources into tools used for electricity planning and infrastructure-related decisions, with direct engagement of electricity-sector stakeholders.

Timeline considerations

To assist applicants in developing a project timeline that leverages downscaled climate projections, the following is an indication of expected availability dates for major draft deliverables from EPC-20-006:

* Dynamically downscaled climate projections from selected CMIP6 GCMs are expected by March 31, 2022
* Localized Constructed Analogs modelling (LOCA) output from selected CMIP6 GCMs are expected by March 31, 2022
* Hydrological model output data are expected by March 31, 2023

These deliverables can be reviewed in the Scope of Work for that project.[[5]](#footnote-5) Recipients will coordinate with the Commission Agreement Manager to obtain the relevant data.

To assist the Recipient of Group 1 of the current solicitation in using these climate projections, a CEC-funded data platform and analytics engine will deliver those projections in a manner tailored to specific use cases. The outreach team of the analytics engine grant (EPC-20-007) expects to meet with the Recipient of Group 1 as early as Q3 2022 to understand their data needs and how they can be supported through the analytics engine.

Related prior and ongoing research

Modeling of the reliability of electricity systems generally relies on historical climate and weather data to simulate solar, wind, and hydropower resource availability, including studies that examine the potential reliability of future electricity systems with a high penetration of renewable energy generation (see, e.g., E3's Renewable Energy Capacity (RECAP) model, as applied to California in Long-Run Resource Adequacy under Deep Decarbonization Pathways for California).

As highlighted in the 2018-2020 EPIC Investment Plan, “California must anticipate climate-related changes to the availability and distribution of wind, and solar resources to ensure appropriate long-term investments in low-carbon energy systems.”

Limited CEC-funded research has been undertaken to characterize relationships between climate change and solar and wind resource availability and variability, as well as with large scale climate patterns such as El Niño/La Niña. Based on results from the Variable-Resolution Community Earth System Model (1980-2000 period vs. 2030-2050 period), Lawrence Berkeley National Laboratory (LBNL) researchers suggest that “wind power generation capacity throughout California is expected to increase during the summer and decrease during fall and winter, based on significant changes at several wind farm sites" (Milstein et al, 2018). Such results can be complemented by analysis using additional models and methods.

Statistical methods used to generate climate projections for California’s Fourth Climate Change Assessment were hampered by “the lack of suitable wind observations with the required spatial density to cover California to capture wind fields” (Pierce et al, 2018). To remedy this gap in historical observed data, recent EPIC-funded research (EPC-16-063, UCSD) was undertaken to develop a hybrid approach that leverages dynamical and statistical methods for portraying wind fields (Cayan et al, 2020).

Recently completed EPIC-funded work also supports improved short-term forecasting for solar photovoltaic generation (Norris et al, 2020). However, integrating longer-term projections into our understanding of solar capacity—which includes not only considerations related to ground-level solar irradiation but also impacts of wildfire-related aerosols—remains to be done.

Ongoing EPIC-funded research to develop high-resolution, next-generation projections for California based on CMIP6 (EPC-20-006) is poised to improve our understanding of climate projections relevant to California’s transition to a reliable, resilient, zero-carbon electricity system, such as coastal low cloudiness and wind fields (speed, direction). This effort and the companion project developing a stakeholder-informed analytics engine and data platform to deliver these projections provide an opportunity to generate a shared knowledge base for how solar and wind resources may change over the coming decades, for use in longer-term resource planning as well as for shorter-term consideration of climate-related challenges and resilience options.

Such analysis can also extend to evaluation of the potential for and impacts of additional energy resources and storage strategies under consideration in building a cost-effective, reliable, low-carbon grid, such as offshore wind development, green hydrogen, and long-term energy storage technologies.

**Group 3: Cal-Adapt enhancements to support energy sector stakeholders (maximum award amount $750,000):**

This effort will align data and research results available to a broad range of non-technical stakeholders through Cal-Adapt's easy-to-use interface with the climate projections, data platform and analytics engine under development in support of California’s anticipated Fifth Climate Change Assessment (see Footnotes 1 and 2). This effort is important because it aligns the information available through Cal-Adapt’s interactive web application with the sophisticated knowledge base—namely the aforementioned next-generation climate projections, data platform and analytics engine—that is intended to support energy sector adaptation planning.

**Successful applicants must demonstrate**:

* The capacity for coordination with the research team that is funded by Group 2, the findings of which will be made available by this (Group 3) research effort.
* The capacity to develop and execute scientifically rigorous data analyses and visualizations based on the research products of Group 2 and other relevant efforts.
* The capacity to coordinate with the research team that is funded by EPC-20-007 and to ensure that the products of this (Group 3) effort conform to the overall vision, data architecture, and branding of the data platform and analytics engine effort under development through EPC-20-007, which is foundational to the expanded Cal-Adapt enterprise described below.
* A clearly articulated approach to stakeholder engagement (including outreach and training), including dedicated funding and expertise.

**Projects in this group must, at a minimum**:

* Enhance Cal-Adapt’s interactive web application to provide access—through easy-to-use data download tools and interactive visualizations—to the climate and wildfire projections that are used for California’s Fifth Climate Change Assessment and that serve as a basis for IOUs vulnerability assessments and planning.
* Enhance Cal-Adapt’s interactive web application to provide access to data and interactive visualizations portraying projected changes in the temporal and spatial distributions of zero-carbon electricity generation resources investigated by Group 2.
* Update the Cal-Adapt web platform with energy-related products from complementary initiatives, including the EPIC project on “A Co-Produced Climate Data and Analytics Platform to Support California's Electricity Resilience Investments” (EPC-20-007) and “Comprehensive Open Source Development of Next Generation Wildfire Models for Grid Resiliency” (EPC-18-026).

As indicated above, Group 3 will require close coordination with the data platform and analytics effort recently launched under EPC-20-007. Led by Eagle Rock Analytics, EPC-20-007 adds a new dimension—distinct from the interactive web application that is the focus of Group 3—to the Cal-Adapt enterprise by providing sophisticated, data-intense analyses to feed into energy sector modeling, detailed vulnerability analyses, and infrastructure and planning decisions. CEC’s vision for the expanded Cal-Adapt enterprise is to provide climate and data services for a wide array of users and applications involving California’s energy sector, coordinating closely with other agencies, including the Governor’s Office of Planning and Research (OPR). This coordination will provide support for additional stakeholders beyond the energy sector, including Community Based Organizations (CBOs).

Additional Considerations Related to Cal-Adapt

To facilitate integration of the elements that will contribute to an expanded Cal-Adapt enterprise, the current Cal-Adapt development team funded by ongoing CEC grants[[6]](#footnote-6) is working with CEC staff and Eagle Rock Analytics to transfer the Cal-Adapt web application and hosting of Cal-Adapt.org to Eagle Rock Analytics by March 31, 2022. This transfer will facilitate integration of three key elements of CEC’s efforts to advance energy sector resilience:

1. Next-generation climate projection data, which will constitute a much larger (order of 1 PB) dataset than what the current Cal-Adapt web application hosts (order of 10 TB);
2. The forthcoming data platform and analytics engine, which will expand the Cal-Adapt enterprise to provide unprecedented computational and technical resources to help electricity sector stakeholders access and make use of next-generation climate projections;
3. The current Cal-Adapt web application, on which Group 3 builds, which provides interactive visualizations and easy access to data for a variety of users, including non-technical audiences.

Integration of these elements will result in an enhanced Cal-Adapt brand that includes features for a broad range of stakeholders who need easily accessible visualizations and data download tools while also providing a “pro” version for users with highly technical, data-intensive needs that can be addressed by the data platform and analytics engine. Specifically, Cal-Adapt visualizations will continue to provide powerful existing features that allow for local and state decision makers as well as community groups to easily visualize the effects that climate may have on their particular area of concern. The Cal-Adapt analytics engine and data platform, under development through EPC-20-007, will allow IOUs, research scientists, and others to access and analyze quality-controlled data using sophisticated models and analytics to dive deep into the potential impacts relevant to their interests in a much more granular and quantitative way than current visualizations provide.

Further, the data platform and analytics engine effort, launched under EPC-20-007, will be structured so that it can be easily transferred at the conclusion of the project in alignment with CEC’s aspirations to cost-effectively control and make use of data and tools produced through its funding programs. Similarly, the Group 3 awardee (and future awardees of CEC funds supporting Cal-Adapt enhancements) will be required to transfer relevant products to the entity specified by CEC for further expansion and development.

Finally, CEC is actively coordinating with OPR to ensure that the interactive web-based features of Cal-Adapt are maintained for a broad base of users. OPR has articulated its high-priority goal of securing funding for maintenance and front-end enhancements to the web application, while leaving the applied research related to the web application, data platform, analytics engine, and underlying data with CEC.

*Governance*

Cal-Adapt development will be directed by staff at CEC and OPR, who will rely on a combination of internal resources and competitively awarded grant agreements to execute the vision of the State of California and brand Cal-Adapt as a product of the State of California. It is imperative that the Cal-Adapt brand and vision reflect that it is a product of the State of California to preserve continuity, as it is expected that the grant Recipients associated with the Cal-Adapt enterprise will change over time. The California Energy Commission will designate a Recipient to lead the overall Cal-Adapt enterprise as directed by CEC and OPR. This overall Cal-Adapt lead will be responsible for coordinating between Recipients who are in turn responsible for implementing their respective scopes of work in a manner that aligns with state agency direction. This includes:

* making design decisions that support alignment and harmonization across grants,
* representing Cal-Adapt in the scientific community,
* providing guidance and direction to the developer of Cal-Adapt’s web application to ensure that cloud computing architecture is reflective of high-level best practices and responsive to the needs of multiple elements of the expanded Cal-Adapt enterprise.

Between inception of the grant supported by Group 3 (summer 2022) and 2026, CEC anticipates that EPC-20-007 will serve as the Cal-Adapt lead; however, the State retains sole discretion of assigning and distributing lead roles for items that impact execution of multiple scopes of work.

## Funding

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

There is **up to $3,600,000** 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: Assessing and improving the climate resilience of an electricity system in transition** | $1,950,000  | $1,850,000  | $1,950,000  |  5%  |
| **Group 2: Climate-related changes to availability and distribution of solar, wind, and hydroelectric generation** | $900,000  | $800,000  | $900,000  |  5%  |
| **Group 3: Cal-Adapt enhancements to support energy sector stakeholders** | $750,000  | $650,000 | $750,000  |  5% |

1. **Match Funding Requirement**

Match funding is required in the amount of at least **5% minimum** of the requested project funds.

For the definition of match funding see Section 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:

* Increase or decrease the available funding and the minimum/maximum award amounts described in this section.
* Allocate any additional or unawarded funds to passing applications, in rank order.
* Reallocate funding between any of the groups
* 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.**

| ACTIVITY | DATE | TIME[[7]](#footnote-7) |
| --- | --- | --- |
| Solicitation Release | **October 19, 2021** |  |
| **Pre-Application Workshop** | **November 2, 2021** | **9:00a.m.** |
| **Deadline for Written Questions[[8]](#footnote-8)** | **November 10, 2021** | **5:00 p.m.** |
| Anticipated Distribution of Questions and Answers (*date should be at least two weeks after the Deadline for Written Questions)* | November 22, 2021 |  |
| **Deadline to Submit Applications** | **January 4, 2022** | **5:00 p.m.** |
| Anticipated Notice of Proposed Award Posting Date | March 2, 2022 |  |
| Anticipated Energy Commission Business Meeting Date | May 11, 2022 |  |
| Anticipated Agreement Start Date | May 18, 2022 |  |
| Anticipated Agreement End Date  | March 31, 2026 |  |

## 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, consistent with Executive Orders N-25-20 and N-29-20 and the recommendations from the California Department of Public Health to encourage physical distancing to slow the spread of COVID-19. 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 call (916) 654-4381 or refer to the CEC's website at www.energy.ca.gov/contracts/index.html to confirm the date and time.

**Date and time:** November 2, 2021 at 9:00a.m.

**Zoom Instructions:**

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

**Meeting Link:** <https://energy.zoom.us/j/91698621267?pwd=Vk1LRFZIbWxFcUNyUVR4dzBOdHVGQT09>

**Meeting Password:** resilience

**Topic:** GFO-21-302 Pre-Application Workshop: Research to Support a Climate Resilient Transition to a Clean Electricity System

**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:

Natalie Johnson, Commission Agreement Officer

California Energy Commission

715 P Street​

Sacramento, CA 95814

Telephone: (916) 891-8523

E-mail: Natalie.Johnson@energy.ca.gov

Applicants may ask questions at the Pre-Application Workshop, and may submit written questions via mail, electronic mail, and by FAX. 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 the application deadline.

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 to the application deadline, 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 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, 2022.  This means that the CEC must approve proposed awards at a business meeting (usually held monthly) prior to June 30, 2022 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.[[9]](#footnote-9) 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 Program funds clean energy technology projects that promote greater electricity reliability, lower costs, and increased safety.[[10]](#footnote-10) 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.[[11]](#footnote-11) 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[[12]](#footnote-12) [[13]](#footnote-13) and within one or more specific focus areas (**“funding initiatives”**) identified in the plan. This solicitation targets the following program area, strategic objective, and funding initiatives:

**2018-2020 Electric Program Investment Charge (EPIC) Triennial Investment Plan**

* **Program Area**: Applied Research and Development
* **Strategic Objective** **S7:** (7) Develop Tools and Analysis to Inform State Energy Policy and Planning
	+ **Funding Initiative S7.1.1**: Integrated Pathways for Energy Futures: Tools and Science-Based Research for Holistic Energy Decision Making
	+ **Funding Initiative S7.2.1**: Improved Understanding of Climate- and Weather-Related Risks and Resilience Options.
	+ **Funding Initiative S7.2.3**: Integrate Climate Readiness into Electricity System Operations, Tools, and Models
* **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[[14]](#footnote-14) - Global Warming Solutions Act of 2006**

AB 32creates a comprehensive program to reduce greenhouse gas (GHG) emissions in California. GHG reduction strategies include a reduction mandate to 1990 levels by 2020 and a cap-and-trade program. AB 32 also requires the California Air Resources Board (CARB) 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: <https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200520060AB32>

<https://ww3.arb.ca.gov/cc/scopingplan/scopingplan.htm>

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

* **Senate Bill (SB) 32 - California Global Warming Solutions Act of 2006: emissions limit**

SB 32 expands upon AB 32 and requires CARB to ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by 2030. SB 32 further requires that these emissions reductions are achieved in a manner that benefits the state’s most disadvantaged communities and is transparent and accountable to the public and the Legislature.

Additional information: <http://www.leginfo.ca.gov/pub/15-16/bill/sen/sb_0001-0050/sb_32_bill_20160908_chaptered.htm>

* **Senate Bill (SB) 100 - The 100 Percent Clean Energy Act of 2018**

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

Additional information: <https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB100>

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.

* **CPUC Decision 19-10-054, “Decision on Phase 1 Topics 1 and 2, Order Instituting Rulemaking to Consider Strategies and Guidance for Climate Change Adaptation Rulemaking 18-04-019” (2019)**

The decision defines climate change adaptation for energy utilities in California; identifies the California Fourth Climate Assessment and any subsequent assessments as the primary source of climate projections and scientific studies; and establishes the criteria for any further data or models that energy utilities may develop to understand climate impacts.

Additional information: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M319/K075/319075453.PDF>

* **Executive Order B-30-15**

Governor Brown’s Executive Order B-30-15 established a new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030, to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050. The Executive Order addresses the need to incorporate climate impacts into the state’s Five-Year Infrastructure Plan and planning and investment decisions.

Additional information:

<https://www.ca.gov/archive/gov39/2015/04/29/news18938/index.html>

* **Executive Order N-19-19**

Governor Newsom’s Executive Order N-19-19 requires that “every aspect of state government redouble its effort to reduce greenhouse gas emissions and mitigate impacts of climate change while building a sustainable, inclusive economy.” It calls on the creation of a Climate Investment Framework that leverages the state’s $700 billion investment portfolio to advance the State’s climate leadership, protect taxpayers, and support the creation of high-road jobs.

Additional information:

<https://www.gov.ca.gov/wp-content/uploads/2019/09/9.20.19-Climate-EO-N-19-19.pdf>

* **Climate Change Research Plan for California**

Successfully negotiating climate change challenges will require integrating a sound scientific basis for climate preparedness into local planning, resource management, infrastructure, and public health, as well as introducing new strategies to reduce GHG emissions or increase carbon sequestration into nearly every sector of California’s economy. This Climate Change Research Plan presents a strategy for developing the requisite knowledge through a targeted body of policy-relevant, California-specific research. The plan calls for research to better estimate the impacts of climate change on the existing energy infrastructure (e.g., wildfires on electricity distribution networks).

Additional information:

<https://cawaterlibrary.net/wp-content/uploads/2017/10/CAT_research_plan_2015.pdf>

* **SB 100 Joint Agency Report: Charting a Path to a 100% Clean Energy Future**

The 2021 SB 100 Joint Agency Report (2021 Report) includes a review of the policy to provide 100 percent of electricity retail sales and state loads from renewable and zero-carbon resources in California by 2045. The report assesses various pathways to achieve the target and an initial assessment of costs and benefits. The report includes results from capacity expansion modeling and makes recommendations for further analysis and actions by the joint agencies.

Additional Information:

<https://efiling.energy.ca.gov/EFiling/GetFile.aspx?tn=237167&DocumentContentId=70349>

Reference Documents

Refer to the documents below for information about CEC research and related activities associated with development of climate projections for California as well as development of a publicly available platform (Cal-Adapt) for making projections available:

* California Energy Commission staff. 2019. Chapter 5: “Climate Change Adaptation” Final 2019 Integrated Energy Policy Report. California Energy Commission. Publication Number: CEC-100-2019-001-CMD.
* California Energy Commission Staff Workshop: Hourly Temperature Data on Cal-Adapt (December 18, 2019)
	+ Staff Workshop information located here: https://www.energy.ca.gov/event/workshop/2019-12/staff-workshop-hourly-temperature-data-cal-adapt
	+ Docket containing public comments located here: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-ERDD-01

The documents and resources below are referred to in this solicitation manual:

* Aas, D., Mahone, A. Subin, Z. Mac Kinnon, M. Lane, B. Price, S. (University of California, Irvine, Advanced Power and Energy Program). “The Challenge of Retail Gas in California’s Low Carbon Future: Technology Options, Customer Costs, and Public Health Benefits of Reducing Natural Gas Use.” California Energy Commission (2020). Publication number: CEC-500-2019-055-F.
* American Geophysical Union (AGU). “Position Statement on Data.” November 2019 Revision. Link to AGU’s Position Statement on Data: <https://www.agu.org/Share-and-Advocate/Share/Policymakers/Position-Statements/Position_Data>
* Boland, B., De Smet, A., Palter, R. Sanghvi, A. “Reimagining the Office and Work Life After COVID-19.” (2020) McKinsey & Company. <https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Organization/Our%20Insights/Reimagining%20the%20office%20and%20work%20life%20after%20COVID%2019/Reimagining-the-office-and-work-life-after-COVID-19-final.pdf>
* Cayan, D., Pierce, D., DeHaan, L., Guzman-Morales, J., Gershunov, A., Clemesha, R., Ullrich, P., Shu, L., Ajami, H., Schreiner-McGraw, A. “Downscaling Using Dynamical and Statistical Methods [White Paper].” (2020). <https://efiling.energy.ca.gov/GetDocument.aspx?tn=232882&DocumentContentId=65318>
* [Committee Report, California Energy Commission. Technology Evaluation Office. Intergovernmental Relations Committee.](https://www.worldcat.org/search?q=au%3ACalifornia+Energy+Committee.+Technology+Evaluation+Office.+Intergovernmental+Relations+Committee.&qt=hot_author) “*The Impacts of Global Warming on California: Interim Report*.” (1989). P500-89-004.  <https://cepsym.org/documents/Impacts-Global-Warming-CEC-June-1989.pdf>
* California Energy Commission. “*Achieving 100 Percent Clean Electricity in California: An Initial Assessment.”* (2021). *State Bill 100 Joint Agency Report.* [*https://www.energy.ca.gov/news/2021-03/california-releases-report-charting-path-100-percent-clean-electricity*](https://www.energy.ca.gov/news/2021-03/california-releases-report-charting-path-100-percent-clean-electricity)
* California Energy Commission Staff Workshop: Request for Comments on Forthcoming Solicitation Regarding Climate Scenarios and Analyses (December 16, 2019).
	+ Staff Workshop documentation located [here:](https://efiling.energy.ca.gov/GetDocument.aspx?tn=230888) <https://ww2.energy.ca.gov/research/notices/#12162019>
	+ Docket containing public comments located [here:](https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-ERDD-01) <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-ERDD-01>
* California Energy Commission Staff Workshop: Request for Comments on Forthcoming Solicitation Regarding Research to Support a Climate-Resilient Transition to a Clean Electricity System (March 5, 2021).
	+ Staff Workshop documentation located [here:](https://efiling.energy.ca.gov/GetDocument.aspx?tn=230888) https://efiling.energy.ca.gov/GetDocument.aspx?tn=237014&DocumentContentId=70190
	+ Docket containing public comments located [here:](https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-ERDD-01) <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=19-ERDD-01>
* California Independent System Operator. “Final Root Cause Analysis: Mid-August 2020 Extreme Heat Wave.” (2021). <http://www.caiso.com/Documents/Final-Root-Cause-Analysis-Mid-August-2020-Extreme-Heat-Wave.pdf>
* Energy Information Administration. “Annual Energy Outlook 2021.” (2021). <https://www.eia.gov/outlooks/aeo/pdf/AEO_Narrative_2021.pdf>
* Energy Information Administration. “Smoke from California wildfires decreases solar generation in CAISO.” (2020). <https://www.eia.gov/todayinenergy/detail.php?id=45336>
* EPC-16-063. “Advanced Statistical-Dynamical Downscaling Methods and Products for California Electricity System Climate Planning.” University of California, Scripps Institution of Oceanography.
	+ Grant Request Form located here: www.energy.ca.gov › 2017\_packets › Item\_07b\_EPC-16-063
* EPC-19-056. “Assessing Long-duration Energy Storage Deployment Scenarios to Meet California’s Energy Goals.” Energy and Environment Economics Inc. (E3)
	+ Grant Request Form located here: https://www.energy.ca.gov/filebrowser/download/2270
* EPC-19-060. “Modeling of Long-duration Storage for Decarbonization of California Energy System.” The Regents of the University of California, Merced.
	+ Grant Request Form located here: https://www.energy.ca.gov/filebrowser/download/2107
* EPC-20-006. “Development of Climate Projections for California and Identification of Priority Projections.” The Regents of the University of California, San Diego.
	+ Grant Request Form located here: <https://www.energy.ca.gov/filebrowser/download/2855>
* EPC-20-007. “A Co-Produced Climate Data and Analytics Platform to Support California's Electricity Resilience Investments.” Eagle Rock Analytics.
	+ Grant Request Form located here: <https://www.energy.ca.gov/filebrowser/download/2856>
* Franco, G., D. R. Cayan, S. Moser, M. Hanemann, and M.-A Jones. “Second California Assessment: integrated climate change impacts assessment of natural and managed systems. Guest editorial.” *Climatic Change*. (2011): https://doi.org/10.1007/s10584-011-0318-z
* Koy, Kevin; Maggi Kelly; Brian Galey. (Geospatial Innovation Facility). *Cal-Adapt: Visualizing Climate Change Risk and Adaptation Options for California*. California Energy Commission. (2014). Publication number: CEC-500-2016-046.
* Krarti, M., Aldubyan, M. “Review Analysis of COVID-19 Impact on Electricity Demand for Residential Buildings.” Renewable and Sust*ainable Energy Reviews,*v. 143. (2021): doi:10.1016/j.rser.2021.110888
* Mahone, A., Kahn-Lang, J., Li, V., Ryan, N., Subin, Z., Aleen, D. De Moor, G., Price, S. (Energy and Environmental Economics, Inc.). “Deep Decarbonization in a High Renewables Future: Updated Results from the California PATHWAYS Model.” California Energy Commission. (2018). Publication number: CEC-500-2018-012.
* Millstein, D., Wang, M., Ullrich, P.  The Future of Wind Energy in California: Future projections with the Variable-Resolution CESM. Lawrence Berkeley National Laboratory. Science Direct, v. 127, (2018): p 242-257, doi:10.1016/j.renene.2018.04.031
* Norris, B.L., Perez, M., Gruenhagen, P., Hazari, J., Hoff, T.E., Monforte, F., Kleissl, J. Wu, E., Clemesha, R.E.S., Perez, R.R., Schlemmer, J., Kivalov, S. “Developing a Comprehensive, System-Wide Forecast to Support High-Penetration Solar.” California Energy Commission. (2020). Publication Number: 500-2020-060.
* Office of Planning and Research. Budget Change Proposal: Cap and Trade Expenditure Plan: Climate Resilience Research, Regional Collaboration, and Implementation. 1/10/2020. <https://esd.dof.ca.gov/Documents/bcp/2021/FY2021_ORG0650_BCP3734.pdf>
* Pierce, D. W., D. R. Cayan, and B. L. Thrasher. “Statistical downscaling using localized constructed analogs” (LOCA). J. Hydrometeorology, v. 15, (2014): p. 2558, doi:10.1175/JHM‐D‐14‐0082.1
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* Tarroja, B., Samuelsen, S., AghaKouchak, A., Feldman, D., Forrest, K., Chiang, F. “Building a Climate Change-Resilient Electricity System for Meeting California’s Energy and Environmental Goals.” California Energy Commission. (2019a) Publication Number: CEC-500-2019-015.
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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 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**
* Only CEC reimbursable funds counts towards funds spent in California total.
* "Spent in California" means that:
	+ (1) Funds in the "Direct Labor category and all categories calculated based on direct labor (e.g., fringe benefits, indirect costs and profit) are paid to individuals that pay California state income taxes on wages received for work performed under the agreement. Payments made to out-of-state workers do not count as “funds spent in California.” However, funds spent by out-of-state workers in California (e.g., hotel and food) can count as “funds spent in California.”; AND
	+ (2) Business transactions (e.g., material and equipment purchases, leases, and rentals) are entered into with a business located in California.
	+ (3) Total should include any applicable subcontractors.
* 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.[[15]](#footnote-15) 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**

At least 25% of available Electric Program Investment Charge (EPIC) technology demonstration and deployment funding must be allocated to project sites located in, and benefiting, disadvantaged communities; and an additional minimum 10% of funds must be allocated to projects sites located in and benefiting low-income communities.[[16]](#footnote-16) The Energy Commission in administering EPIC must also take into account adverse localized health impacts of proposed projects to the greatest extent possible,[[17]](#footnote-17) and give preference for funding to clean energy projects that benefit residents of low-income or disadvantaged communities.[[18]](#footnote-18)

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.

## Project Requirements

1. **Applied Research and Development Stage**

Projects must fall within the “applied research and development” stage, which includes activities that support pre-commercial technologies and approaches that are designed to solve specific problems in the electricity sector. Applied research and development activities include early pilot-scale testing activities that are necessary to demonstrate the feasibility of pre-commercial technologies. By contrast, the “technology demonstration and deployment” stage 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 the operational and performance characteristics and the financial risks.**[[19]](#footnote-19)**

1. **Technology or Knowledge 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 knowledge transfer activities. Appropriate knowledge transfer activities for this solicitation are listed in the Scope of Work Template (Attachment). The Budget Forms (Attachment) should clearly distinguish funds dedicated for knowledge transfer.

# III. Application Organization and Submission Instructions

## Application Format and Page Limits

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)
 |
| **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)
 |

## Online Method For Delivery

Due to the COVID-19 Health Crisis, all applications must be submitted online. **Hard copies will not be accepted at this time.**

The online method of delivery for this solicitation is the Energy Commission Grant Solicitation System, 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 system will not allow applications to be submitted after the application due date and time.**

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 workshops and you may contact the Commission Agreement Officer identified in the Questions section of the solicitation for more assistance.

##

## Application Organization and Content

1. Label the proposal application cover “Grant Funding Opportunity GFO-21-302” and include: (a) the title of the application; and (b) the applicant’s name.
2. Separate each section of the application by Attachment number and section title indicated below.

Below is a description of each required section of the application. Completeness in submitting are the required information requested in each attachment will be factored into the scoring:

1. Application Form (Attachment 1)

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

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.

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[[20]](#endnote-1)**
		+ Include required group specific information (see Section I.C.) in the specified sections.
	2. **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[[21]](#footnote-20) 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.

* **Project partners** that are making contributions other than match funding 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.

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.

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.

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.

# 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 |

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.

## 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. Describe how the proposed model/tool/study will be used by key stakeholders (e.g. policymakers, project developers, other researchers, etc.).
4. Describes the advantage of the proposed model/tool/study over that currently being used by key stakeholders.
 | **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 knowledge transfer plan, including how key stakeholders and potential users will be engaged, and the plan to disseminate knowledge of the project’s results to those stakeholders and users.
 | **25** |
| 1. **Impacts and Benefits for California IOU Ratepayers**
2. 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 (EPIC) and thermal savings (PIER NG) (kilowatt-hour and therms), energy cost reductions, peak load reduction and/or shifting, infrastructure resiliency, infrastructure reliability.
3. States the timeframe, assumptions with sources, and calculations for the estimated benefits, and explains their reasonableness. Include baseline or “business as usual” over timeframe.
4. Identifies how outputs of the model/tool/study will benefit key stakeholders (e.g., streamline planning, help eliminate barriers, stimulate growth of applicable market sectors).
 | **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 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** |
| **Total Possible Points** | **100** |
| **Preference Points** Applications must meet all minimum passing scores (Scoring Criteria 1-4, 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. The Scope of Work for EPC-20-006 is available in the back-up materials (item 5a) for the January 25, 2021 Business Meeting of the California energy Commission: <https://www.energy.ca.gov/filebrowser/download/2855> [↑](#footnote-ref-1)
2. The Scope of Work for EPC-20-007 is available in the back-up materials (item 5b) for the January 25, 2021 Business Meeting of the California Energy Commission: <https://www.energy.ca.gov/filebrowser/download/2856> [↑](#footnote-ref-2)
3. The Scope of Work for EPC-20-006 is available in the back-up materials (item 5a) for the January 25, 2021 Business Meeting of the California energy Commission: <https://www.energy.ca.gov/filebrowser/download/2855> [↑](#footnote-ref-3)
4. EPC-19-056. Assessing Long-duration Energy Storage Deployment Scenarios to Meet California’s Energy Goals. Energy and Environment Economics Inc. (E3)

EPC-19-060. Modeling of Long-duration Storage for Decarbonization of California Energy System. The Regents of the University of California, Merced. [↑](#footnote-ref-4)
5. The Scope of Work for EPC-20-006 is available in the back-up materials (item 5a) for the January 25, 2021 Business Meeting of the California energy Commission: <https://www.energy.ca.gov/filebrowser/download/2855> [↑](#footnote-ref-5)
6. Both grants are led by the Geospatial Innovation Facility at the University of California, Berkeley: “Building on the Cal-Adapt Platform to Deliver Actionable Information in Support of Electricity Sector Resilience”, EPC-17-033; and “Developing Next-generation Cal-Adapt Features to Support Natural Gas Sector Resilience”, PIR-17-012. [↑](#footnote-ref-6)
7. Pacific Standard Time or Pacific Daylight Time, whichever is being observed. [↑](#footnote-ref-7)
8. 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-8)
9. 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-9)
10. 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-10)
11. 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-11)
12. 2012-14 EPIC Triennial Investment Plan, http://www.energy.ca.gov/research/epic/documents/final\_documents\_submitted\_to\_CPUC/2012-11-01\_EPIC\_Application\_to\_CPUC.pdf (Attachment 1), as modified and approved by CPUC Decision 13-11-025, http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M081/K773/81773445.PDF. [↑](#footnote-ref-12)
13. 2015-17 EPIC Triennial Investment Plan, http://www.energy.ca.gov/2014publications/CEC-500-2014-038/CEC-500-2014-038-CMF.pdf, as modified and approved by CPUC Decision 15-04-020, http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M151/K183/151183650.PDF. [↑](#footnote-ref-13)
14. AB 32 (Statutes of 2006, chapter 488) [↑](#footnote-ref-14)
15. A local publicly owned electric utility is an entity as defined in California Public Utilities Code section 224.3. [↑](#footnote-ref-15)
16. Public Resources Code § 25711.6. [↑](#footnote-ref-16)
17. Public Resources Code § 25711.5. [↑](#footnote-ref-17)
18. Public Resources Code § 25711.6. [↑](#footnote-ref-18)
19. See CPUC “Phase 2” Decision 12-05-037 at pp. 90, http://docs.cpuc.ca.gov/PublishedDocs/WORD\_PDF/FINAL\_DECISION/167664.PDF. [↑](#footnote-ref-19)
20. [↑](#endnote-ref-1)
21. “Key personnel” are individuals that are critical to the project due to their experience, knowledge, and/or capabilities. [↑](#footnote-ref-20)