See the formatting recommendations in Part III, Section A.

The Project Narrative must respond to each sub-criterion below.

**Technical Merit**

1. 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.
   * Achieving the State’s 2045 energy goals will require a portfolio of energy storage technologies. Applicants should include a description of the anticipated application(s) (e.g. reliability, resiliency for critical facilities) for the proposed energy storage technology and how this supports the State’s energy goals. The applicant should also describe the technology advancements their technology represents, how this grant will advance the technology and how this technology addresses know issues the State of California will face as the electrical system is prepared to meet the goals of SB-100.
2. Describes the competitive advantages of the proposed technology over state-of-the-art (e.g., efficiency, emissions, durability, cost).
   * Applicants should write a short (300-500 word) executive summary highlighting the key competitive advantage(s) of the proposed technology that would explain to a potential future customer or investor why they should procure this technology solution over alternative technology solutions.
   * In addition, provide a non-proprietary, publically available competition matrix to compare applicant’s current technology performance, anticipated future performance at completion of the grant term, and reference attributes for a comparable current leading technology (such as a Lithium-Ion battery or other emerging energy storage technologies) that is commonly used in applications similar to those proposed for the applicant’s technology.

**Table X: Competition Matrix**

**(Note: any information provided by applicants must be considered publically available. Applicants should not provide any data or information that is considered confidential or proprietary***)*

| **Comparable Attribute**  *(examples below)* | **Applicant’s Technology**  *(performance today)* | **Applicant’s Technology**  ***(****target performance at completion of grant term)* | **Current Leading Technology / Competitor**  *(performance today)* |
| --- | --- | --- | --- |
| Example: Electrical efficiency | (1 unit) | (3 units) | (2 units) |
| Example: Temperature range | (5 units) | (10 units) | (10 units) |
| Example: |  |  |  |
| Example: |  |  |  |

Applicants should provide comparative attributes of a currently fielded leading technology used in a similar application (e.g. Lithium-Ion battery), or technology types the applicants feel are their competitors for a given customer application (e.g. other emerging energy storage technologies). Applicants should identify attributes relevant to their proposed technology and application, which may be different to the examples of attributes listed below:

* + Estimated square foot space required for a system that supports 100kW of power
  + Volumetric energy density (xxx Wh/L)
  + Specific energy density (xxx Wh/kg)
  + Cycle performance (xxx % round trip efficiency to 80% discharge)
  + Long term lifecycle performance, (number of cycles, to 80% discharge)
  + Self-discharge (% / month)
  + Cell voltage (nominal voltage)
  + Internal resistance (mΩ per cell)
  + Overcharge tolerance (describe)
  + Critical energy needs such as resiliency (describe)
  + Reliability (describe)
  + Safety
    - Operational temperature range (charging and discharging)
    - Thermal stability
    - Toxicity
    - Electrolyte pH
  + Cost estimates that are considered publically available
    - $/kW
    - $/kWh
    - $/cycle

1. Describe the technology readiness level (TRL) the proposed technology has achieved and the expected TRL by the end of the project.
   * Refer to the table below to identify the current Technology Readiness Level (TRL) for the project’s proposed technology and provide detailed justification for the assignment of this TRL.
     + All technologies proposed for consideration shall be pre-commercial and have a technical readiness level (TRL) of in the range of 4 to 5.
     + Applicants should detail the history of the proposed technology’s development from basic research (TRL 1) to the current TRL.
     + Describe at what scale the technology has been successfully demonstrated, including size or capacity, number of previous installations, location and duration, results, etc.)
     + Applicants that provide a complete history of the technology, with reference contacts that can verify and support the justification of the current Technology Readiness Level will be scored higher.
   * The goal of this funding is for the technology to advance to TRL 6 or 7 by the end of the grant.
     + Applicants should identify the expected final TRL after the agreement term and provide details to describe how the project will help achieve this TRL.
     + The applicant’s proposal must define the value of the EPIC funds to the grant recipient. The proposal will define how these funds will be used to advance the technology status, how the proposed demonstration will lead to increased adoption of the technology in California and improve the ability of the company to attract new customers and investors in the future.
   * Energy storage technologies that have already exceeded TRL level 6 may apply to this solicitation if there is a substantial design improvement and a redesign of their technology that provides significant improvements in performance, reliability or costs. In this case, the proposer must clearly define how this new configuration lowers the TRL level to 4 or 5 and how they will reach TRL level 6 or 7 by the end of the grant performance period.

**Table X: Technology Readiness Level (TRL) Matrix***:*

| **Relative Level of Technology Development** | **Technology Readiness Level** | **TRL Definition** | **Description** |
| --- | --- | --- | --- |
| **System Operations** | **TRL 9** | Actual system operated over the full range of expected mission conditions. | The technology is in its final form and operated under the full range of operating mission conditions. Examples include using the actual system with the full range of wastes in hot operations. |
| **System Commissioning** | **TRL 8** | Actual system completed and qualified through test and demonstration | The technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental testing and evaluation of the system with actual waste in hot commissioning. Supporting information includes operational procedures that are virtually complete. |
| **System Commissioning** | **TRL 7** | Full-scale, similar (prototypical) system demonstrated in relevant environment | This represents a major step up from TRL 6, requiring demonstration of an actual system prototype in a relevant environment. Examples include testing full-scale prototype in the field with a range of simulants in cold commissioning. Supporting information includes results from the full-scale testing and analysis of the differences between the test environment, and analysis of what the experimental results mean for the eventual operating system/environment. Final design is virtually complete. |
| **Technology Demonstration** | **TRL 6** | Engineering/pilot-scale, similar (prototypical) system validation in relevant environment | Engineering-scale models or prototypes are tested in a relevant environment. This represents a major step up in a technology’s demonstrated readiness. Examples include testing an engineering scale prototypical system with a range of simulants.1 Supporting information includes results from the engineering scale testing and analysis of the differences between the engineering scale, prototypical system/environment, and analysis of what the experimental results mean for the eventual operating system/environment. TRL 6 begins true engineering development of the technology as an operational system. The major difference between TRL 5 and 6 is the step up from laboratory scale to engineering scale and the determination of scaling factors that will enable design of the operating system. The prototype should be capable of performing all the functions that will be required of the operational system. The operating environment for the testing should closely represent the actual operating environment. |
| **Technology Development** | **TRL 5** | Laboratory scale, similar system validation in relevant environment | The basic technological components are integrated so that the system configuration is similar to (matches) the final application in almost all respects. Examples include testing a high-fidelity, laboratory scale system in a simulated environment with a range of simulants1 and actual waste2. Supporting information includes results from the laboratory scale testing, analysis of the differences between the laboratory and eventual operating system/environment, and analysis of what the experimental results mean for the eventual operating system/environment. The major difference between TRL 4 and 5 is the increase in the fidelity of the system and environment to the actual application. The system tested is almost prototypical. |
| **Technology Development** | **TRL 4** | Component and/or system validation in laboratory environment | The basic technological components are integrated to establish that the pieces will work together. This is relatively "low fidelity" compared with the eventual system. Examples include integration of ad hoc hardware in a laboratory and testing with a range of simulants and small scale tests on actual waste2. Supporting information includes the results of the integrated experiments and estimates of how the experimental components and experimental test results differ from the expected system performance goals. TRL 4-6 represent the bridge from scientific research to engineering. TRL 4 is the first step in determining whether the individual components will work together as a system. The laboratory system will probably be a mix of on hand equipment and a few special purpose components that may require special handling, calibration, or alignment to get them to function. |
| **Research to Prove Feasibility** | **TRL 3** | Analytical and experimental critical function and/or characteristic proof of concept | Active research and development (R&D) is initiated. This includes analytical studies and laboratory-scale studies to physically validate the analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative tested with simulants.1 Supporting information includes results of laboratory tests performed to measure parameters of interest and comparison to analytical predictions for critical subsystems. At TRL 3 the work has moved beyond the paper phase to experimental work that verifies that the concept works as expected on simulants. Components of the technology are validated, but there is no attempt to integrate the components into a complete system. Modeling and simulation may be used to complement physical experiments. |
| **Basic Technology Research** | **TRL 2** | Technology concept and/or application formulated | Once basic principles are observed, practical applications can be invented. Applications are speculative, and there may be no proof or detailed analysis to support the assumptions. Examples are still limited to analytic studies.  Supporting information includes publications or other references that outline the application being considered and that provide analysis to support the concept. The step up from TRL 1 to TRL 2 moves the ideas from pure to applied research. Most of the work is analytical or paper studies with the emphasis on understanding the science better. Experimental work is designed to corroborate the basic scientific observations made during TRL 1 work. |
| **Basic Technology Research** | **TRL 1** | Basic principles observed and reported | This is the lowest level of technology readiness. Scientific research begins to be translated into applied R&D. Examples might include paper studies of a technology’s basic properties or experimental work that consists mainly of observations of the physical world. Supporting Information includes published research or other references that identify the principles that underlie the technology. |

Source: http://www2.lbl.gov/dir/assets/docs/TRL%20guide.pdf, (pages 9-11)

1. In addition to responding to the specific questions in described in Section II.B.2 for the respective group, the applicant must explain in detail how their proposal meets each criterion listed in the Scoring Criteria 2-5 (see Section IV.F) and include that information in the Project Narrative (Attachment 4).

**Technical Approach**

1. Proposal describes the technique, approach, and methods to be used in performing the work described in the Scope of Work
2. The Scope of Work identifies goals, objectives, and deliverables, details the work to be performed, and aligns with the information presented in Project Narrative.
3. Proposal identifies the reliability that the project and site recommendations as described will be carried out if funds are awarded.
4. Identifies and discusses factors critical for success, in addition to risks, barriers, and limitations (e.g. loss of demonstration site, key subcontractor). Provides a plan to address them.
5. Discusses the degree to which the proposed work is technically feasible and achievable within the proposed project schedule in Attachment 6A and the key activities schedule in Section I.F
6. Describes the technology transfer plan to assess and advance the commercial viability of the technology.
7. Provides a clear and plausible measurement and verification plan that describes how energy savings and other benefits specified in the application will be determined and measured.
8. Provides information documenting progress towards achieving compliance with the California Environmental Quality Act (CEQA) by addressing the areas in Section I.D, and Section III.D.4, and Section III.D.8.
   * The proposed project must meet all CEQA requirements in time for the encumbrance of the EPIC funds by June 2020. Due to the encumbrance deadline for applicable funding, the status of lead agency CEQA approval for the proposed project, if any, must be included with the application and all final CEQA approval documents must be received in time to make the schedule for the June 2020 Business Meeting. Applications with energy storage technologies that (1) fall under a statutory or categorical CEQA exemption, or (2) are already approved, or (3) can be easily approved, by any applicable lead agency are highly encouraged and will be scored accordingly.
9. Provides information described in Section II.B.2 for the respective group.

**Impacts and Benefits to California IOU Ratepayers**

1. Explains how the proposed project will benefit California Investor-Owned Utility (IOU) ratepayers and provides clear, plausible, and justifiable (quantitative preferred) potential benefits.

Estimates the energy benefits such as:

* + annual electricity and thermal savings (kilowatt-hour and therms), energy cost reductions, peak load reduction and/or shifting, infrastructure resiliency, infrastructure reliability.

In addition, estimates the non-energy benefits such as:

* greenhouse gas emission reductions, air emission reductions (e.g. NOx), water savings and cost reduction, and/or increased safety.

1. States the timeframe, assumptions with sources, and calculations for the estimated benefits, and explains their reasonableness. Include baseline or “business as usual” over timeframe.
2. Explains the path-to-market strategy including near-term (i.e. initial target markets), mid-term, and long-term markets for the technology, size and penetration or deployment rates, and underlying assumptions.
3. Identifies the expected financial performance (e.g. payback period, ROI) of the demonstration at scale.

**Team Qualifications, Capabilities and Resources**

1. Identifies credentials of prime and any subcontractor core personnel, including the project manager and principal investigator *(include this information in Attachment 5, Project Team Form).*
2. Demonstrates that the project team *including Community Based Organization* has appropriate qualifications, experience, financial stability and capability to complete the project.
3. Explains the team structure and how various tasks will be managed and coordinated.

*Include an organization chart similar to the one below*

**Figure X: Organization Chart**

1. Describes the facilities, infrastructure, and resources available that directly support the project.
2. Describes the team’s history of successfully completing projects in the past 10 years including subsequent deployments and commercialization.

**Budget and Cost Effectiveness**

1. Budget forms are complete for the applicant and all subcontractors, as instructed in Attachment 7.

*Provide a budget by tasks, such as:*

**Table X: Task Budget**

| Task (by major task) | Energy Commission Funds | Match Share | Total |
| --- | --- | --- | --- |
| Task 1: General Project Tasks |  |  |  |
| Task 2: |  |  |  |
| Task [TBD-1]: Evaluation of Project Benefits |  |  |  |
| Task [TBD-2]: Technology/ Knowledge Transfer Activities \* |  |  |  |

\* **Requires 5% of total CEC funds**

1. Justifies the reasonableness of the requested funds relative to the project goals, objectives, and tasks.
2. Justifies the reasonableness of direct costs (e.g., labor, fringe benefits, equipment, materials & misc. travel, and subcontractors).
3. Justifies the reasonableness of indirect costs (e.g., overhead, facility charges (e.g., rent, utilities), burdens, subcontractor profit, and other like costs).

**Funds Spent in California**

This project proposes to spend $\_\_\_\_\_\_\_\_\_ of Energy Commission funds in California.

**Disadvantaged Communities**

1. Proposal identifies how the target market(s) will benefit disadvantaged and low-income communities.
2. Identifies economic impact on low-income and disadvantaged communities including customer bill savings, job creation, partnering and contracting with micro- and small-businesses, and economic development.
3. Describes how the project will increase access to clean energy or sustainability technologies within disadvantaged or low-income communities and how the development will benefit the communities.
4. Applicants have letters of support from technology partners, community based organizations, environmental justice organizations, or other partners that demonstrate equity, feasibility, and commercial viability in low-income and disadvantaged communities.