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21-ESR-01 RFI Clean Energy Resources for Reliability

Additional submitted attachment is included below.

SB Energy

Response to Request for Information Clean Energy Resources for Reliability

Questions for the Public
<u>List of Resource types and Evaluation Attributes</u>

The RFI seeks feedback on the following questions regarding the list of preliminary resources and qualitative and quantitative attributes by which they will be evaluated:

1) Are the categories (indicated in Tables 1, 2 and 3) appropriately representing how the CEC should be evaluating resources?
   Yes.

2) Are there resources that should be added to or removed from the preliminary list under each of the categories (shown in Tables 1, 2, and 3)?
   We recommend that CEC divide Energy Storage into three categories: Short-Duration (less than 4 hours), Medium-Duration (4 to 8 hours), and Long-Duration (greater than 8 hours). While no division is perfect, these three categories capture the varying use cases as well as differentiate between best-suited technologies.

   We also recommend that CEC note that Solar and Energy Storage resources are often co-located and for a given project may, in some respects, be considered a single resource.

3) Are there other attributes that should be considered, in addition to the ones listed in Table 4? If so, should those be considered for the qualitative and/or quantitative evaluation?
   We recommend that the CEC consider the cleanliness and the resiliency of the supply chain for each resource. For example, CEC should consider if the supply chain is located within North America, the treatment of labor within the supply chain, and the environmental impact / carbon intensity of the supply chain. This can be a qualitative as well as a quantitative evaluation.

   Cost of the resource should be considered. This can be a quantitative evaluation based on the levelized cost of energy generated by the resource.

4) How should the attributes be weighted relative to each other? Should some attributes be weighted more than others?
   Cleanliness, readiness, dispatchability, and supply chain should be key attributes in the CEC's assessment.

5) What data/information sources can help inform characterization and evaluation (both qualitative and quantitative) of the different resources?
   We recommend that following sources of information for attributes:

- Readiness: Technology readiness assessment from national labs, state universities, and industry associations.
- Supply chain: Interviews with and reports from non-profit organizations specializing in supply chain standards.
- Cleanliness: Expected greenhouse gas and pollutant emissions per unit of generation
- Dispatchability: Performance data from existing deployments.

Resource Characterization

The RFI seeks feedback on the following questions for each potential resource.

1) Please provide a general overview of the resource, including the following:
    a. Resource category (e.g., supply, demand) and type (e.g., solar) and scale (e.g., utility, distributed)?

    Supply resources, renewables and storage, utility scale solar and energy storage.

2) How does the resource compare to conventional generation in terms of greenhouse gas and priority pollutant emissions?

    Utility-scale solar produces no greenhouse gas or priority pollutant emissions. When charged from renewable resources, the discharge of electricity from long and short duration energy storage does not produce greenhouse gas or priority pollutant emissions.

3) How does the resource support reliability (e.g., supply, permanent load reduction, net peak reduction, or emergency asset?) (List all that apply.)
    a. How can the resource be used as an incremental on-call resource during emergencies?

    Utility-scale solar can provide new supply. Additionally, utility-scale solar can charge long and short duration energy storage, which can then be discharged to reduce net peak load and utilized as an on-call resource during emergencies.

4) How many new MWs and MWhs can the resource provide per year, taking into account resource characteristics and known barriers between now and 2035?
    a. How is that different if used incrementally as an emergency asset during an extreme heat event?

    California could add tens of gigawatts of new utility-scale solar and storage between now and 2035, on the order of 3 – 4 GW / yr. for solar (excluding commercial and residential) and 2 – 3 GW / yr. for storage.

    Regarding extreme heat events, certain long duration energy storage technologies, such as iron flow batteries, can operate in environments with temperatures greater than what is acceptable for conventional energy storage technologies.

5) What is the levelized cost for the resource in \$/MW-yr. and \$/MWh-yr. from 2023 to 2035?

The research arm of the investment bank Lazard reports the following levelized costs for utility-scale solar and utility-scale storage. In our experience, utility-scale projects in California fall at the higher ends of these ranges due to higher upfront costs for labor and development expenses.

Resource	**Levelized Cost**
Utility-scale Solar	\$30 - \$41 / MWh
Utility-scale Energy Storage (4-hr Duration)	\$131 - \$232 / MWh

The levelized costs for medium and long-duration storage are less certain but expected to be in the same range as for short-duration, due to a higher upfront cost but greater energy usage per unit of capacity.

6) What is the average length of time from ordering or purchasing the resource to operation? How long does that typically take in today's market? What conditions must be met to deploy the technology rapidly? (e.g., transmission interconnection, building electrification or upgrades, etc.)

The average length of time from executing a revenue contract to commercial operations is roughly 2 years (~1 year for late-stage development and financing following the execution of the revenue contract and ~1 year for construction).

One main obstacle to development is "deliverability," CAISO's assessment of a project's ability to deliver energy during different system conditions. CAISO's assessment of deliverability is too conservative and now presents a major bottleneck for California's clean energy and reliability goals. To obtain financing, a clean energy project, particularly battery storage projects, must be able to sell Resource Adequacy. However, to obtain Resource Adequacy, a project must first obtain deliverability. Deliverability is often unavailable or delayed due to lengthy network upgrade timelines provided by transmission owners (e.g., PG&E, SCE, etc.) and CAISO's overly stringent delivery assessment methodology.

As a result, solar plus storage and stand-alone storage projects linger in the interconnection queue waiting for network upgrades and deliverability allocation, unable to come online as early as technically possible to provide reliability.

7) For an emerging technology, when will it be ready for deployment, and at what scale?

N/A

8) Is the target customer primarily residential, commercial, agricultural or industrial?

All the above are target customers as the electricity is distributed through the transmission system and wholesale power market.

9) What are the key non-financial barriers to the development and implementation of this resource (including, but not limited to, permitting, interconnection, supply chain, customer acceptance, and alignment with policy goals)?

   Key non-financial barriers include long interconnection queues and qualification for deliverability.

10) What are the key financial barriers to the development and implementation of this resource?

   Key financial barriers include securing of long-term revenue contracts for resource adequacy, which is tied to the qualification for deliverability, as noted above.

11) What types of benefits or impacts is the resource anticipated to have on low income and disadvantaged communities, and tribes, if any in terms of development and deployment?

   N/A

Input on Distributed Electricity Backup Assets Program Design

The Distributed Electricity Backup Assets program can provide incentives for two main categories of projects:

- Efficiency upgrades, maintenance, and capacity additions to existing power generators.
- Deployment of new zero- or low-emission technologies, including, but not limited to, fuel cells or energy storage, at existing or new facilities.

The statute also requires that all funding recipients participate as on-call emergency resources for the state during extreme events.

The RFI seeks feedback on the following questions, in addition to the information requested in the questions above, to help inform the design of the Distributed Electricity Backup Assets program and its phased development and launch:

1) What size of resource and what types of customers should the program target?
   The program should target energy storage technologies that are sized similarly to the installed capacity of the existing power generators they will be paired with or sized sufficiently to provide consistent power if collocated with demand centers.

2) What types of incentive structures and amounts are needed to accelerate the development and deployment of this resource?
   Long-term revenue contracts with credit-worthy off-takers or cost reimbursements would accelerate the development and deployment of these resources.

3) What types of conditionalities and measurement and verification requirements should the program include to ensure funded resources participate and deliver during emergency events?
   The California Energy Commission could require participating resources to undergo a capacity verification test, similar to PJM.

4) In general, please provide any specific proposal or recommendation on the design and implementation of the DEBA program.
N/A.